


REVIEW

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# A narrative review of pharmacy workforce challenges in Indonesia

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## Abstract

**Background** Developing a skilled and motivated pharmacy workforce is imperative for strengthening healthcare systems. This narrative review examines challenges faced by Indonesian pharmacists in practice and identifies strategies and initiatives that have been implemented to support workforce development in Indonesia.

**Method** A systematic search of three databases (PubMed, EBSCO, and OVID) was conducted to identify research articles published from database inception to 30 June 2022. Data were synthesised narratively and mapped to a multidimensional healthcare workforce framework.

**Result** Forty studies were included, revealing four interrelated themes of workforce challenges: (1) personal challenges, (2) workplace conditions, (3) societal contribution and recognition; and (4) regulatory aspects. Strategies identified include professional guidelines, accreditation systems, and competency-based training programmes.

**Conclusion** The review indicates a need for Indonesian pharmacists to enhance their competencies to provide high-quality services. A multi-sectoral approach is recommended to address challenges. Providing decent working conditions for pharmacists in conjunction with workplace accreditation can support best practices of pharmaceutical care and ensure patient safety.

**Keywords** Pharmacists, Workforce development, Narrative review, Workforce challenge

## Introduction

The health workforce is an essential component of a strong health system [1]. In 2019, the World Health Organization projected a shortfall of 18 million health workers, which has now been reduced to 10 million by 2030, primarily in low- and lower-middle-income countries [2, 3]. Despite the progress, a chronic lack of investment in health workforce development has resulted in variations in availability, accessibility, capacity, and performance, adversely affecting the quality and coverage of healthcare [3, 4]. Increasing demand for equitable access to quality healthcare increases the need for a health workforce that is adequate, skilled, well-trained, and motivated [4]. Therefore, it is essential to develop evidence-based strategies in addressing gaps related to equitable distribution, competency, quality, and performance in the health workforce [3, 5].

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As part of the health workforce, the pharmacy workforce plays an integral part through its role in supplying medications, counselling patients on the medicines to use, monitoring side effects, disease prevention, and chronic illness management [6, 7]. In some countries, the pharmacy workforce is often the convenient and easy-to-reach point of contact for healthcare professionals [8]. There has been evidence that investing in the pharmacy workforce contributes to improved patient outcomes, improved access to essential medications, and reduced healthcare costs [6, 9]. In addition, a well-trained and supported pharmacy workforce can be valuable in addressing workforce shortages [10] and improving the distribution of healthcare services, particularly in areas of underserved and rural populations [11, 12].

In Indonesia, pharmacy workforce development is governed by several key institutions. The Ministry of Health (MoH) regulates pharmaceutical services and the pharmacy workforce, while the National Agency of Drug and Food Control (BPOM) ensures drug and food safety through regulatory oversight and inspections. The Indonesian Pharmacist Association (IAI), the country's largest pharmacist organisation, sets professional standards and promotes the advancement of the profession. Aspiring pharmacists in Indonesia must complete a 4-year Bachelor of Pharmacy degree followed by a 1-year professional programme, which includes a competency exam comprising a knowledge-based Computer-Based Test (CBT) and a skills-based Observed Structured Clinical Examination (OSCE) [13]. In 2019, there were 77,191 registered pharmacists in Indonesia, with a predominantly young workforce and a gender distribution of 78% female, a trend projected to continue. Similar challenges to those of the global health workforce were observed in Indonesia, including inequitable access to pharmacists, varying access to training opportunities, and the need for retention strategies for pharmacists [14].

The provision of healthcare services in Indonesia, an archipelago with a unique geography, adds complexity to workforce development [13, 14]. Similar to the general global trend, local pharmacies, where the pharmacy workforce provides pharmaceutical care, are often located in the heart of communities [13]. The pharmacy workforce's roles in Indonesia have evolved particularly since the establishment of the Pharmacy Practice Act of 2009 [15], the Community Pharmacy Decree of 2017 [16], and the Pharmacy Services Standards of 2016 outlining standards in community pharmacy [17], community health centre [18] and hospital [19]. These regulatory frameworks have aimed to standardise pharmacy services and ensure quality care across sectors.

A multidimensional healthcare workforce model provides a structured framework for tackling workforce

challenges. This model emphasises three core dimensions—competencies, scope, and capacity—each guided by a needs-based approach. Competencies refer to the knowledge, skills, and attitudes to deliver pharmaceutical care, which addresses gaps in education, training, and professional development that hinder pharmacists' ability to meet evolving healthcare demands. Scope involves the range of roles and responsibilities that the pharmacy workforce undertakes within their practice settings. Capacity pertains to the availability and equitable distribution of the pharmacy workforce to meet population health needs. Effective workforce development relies on understanding these dimensions to identify challenges and gaps [20]. By analysing the issues faced by the pharmacy workforce and the strategies that have been implemented, gaps in competencies, scope, and capacity can be identified to support sustainable workforce development.

Investigating challenges identified in the published literature may further assist in developing strategies for the development of the pharmacy workforce in Indonesia. This paper aims to review the published literature on the challenges of Indonesian pharmacists across all practice sectors and identify strategies or initiatives that have been implemented, ultimately highlighting gaps in workforce development.

## Method

The following databases were used: (1) PubMed/MedLine; (2) OvidSP platform, which provided access to literature from these electronic databases: EMBASE, PsycINFO, Ovid Medline, Social Policy and Practice, and International Pharmaceutical Abstracts; and (3) EBSCOhost platform, which provided CINAHL Plus and the Educational Administration Abstracts (ERIC). The literature search was conducted to identify research articles published from database inception to 30 June 2022. A combination of keywords, including terms related to "human resources", "pharmacy", "workforce", "pharmacists", and "Indonesia", was used to capture studies that describe pharmacy workforce challenges in Indonesia (see Table 1).

The search initially yielded 368 records, with an additional 3 records identified through other sources. After removing duplicates, 278 records remained for screening. Titles and abstracts were screened, resulting in the exclusion of 197 records where the titles and abstracts were not relevant. We applied a SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research Type) framework to guide the inclusion and exclusion criteria, given the exploratory and narrative nature of this review. A total of 81 full-text articles were assessed for eligibility based on these SPIDER-based criteria (see Table 2). At this stage, 41 articles were excluded for reasons such

**Table 1** Search combination

| Database (up to 30 June 2022) | Controlled vocabulary and keywords   | Citations retrieved   | Articles included in this review |
|-------------------------------|--|-----------------------|----------------------------------|
| PubMed                        | (((((("human resources") AND pharmacy)) OR ((pharmacy AND workforce)) OR "Pharmacists"[Mesh]                               | AND Indonesia 60      | 40                               |
| Ovid Database                 | (((((("human resources.mp") AND pharmacy.mp)) OR ((pharmacy.mp) AND workforce.mp)) OR ((pharmacist.mp) OR pharmacists.mp)) | AND Indonesia. mp 268 |                                  |
| EBSCO Database                | (((((("human resources") AND pharmacy)) OR ((pharmacy AND workforce)) OR ((pharmacist) OR pharmacists))                    | AND Indonesia 40      |                                  |

**Table 2** Selection criteria

| Criteria                    | Inclusion criteria   | Exclusion criteria   |
|-----------------------------|--|--|
| Country                     | Indonesia  |  |
| Sample or population (S)    | Pharmacist or pharmacy technician in any professional settings   | Pharmacy students, other health professionals  |
| Phenomenon of interest (PI) | Studies exploring or identifying pharmacy workforce development or challenges  | Studies focused on identifying the pattern of diseases in Indonesia or prescription pattern of medicines, or tool development or training module development |
| Design (D)                  | Surveys, interviews, focus group discussion, observational   |  |
| Evaluation (E)              | Studies that explore workforce challenges or describe development initiatives within pharmacy practice settings, focusing on issues such as skills, roles, or capacity | Studies that are purely clinical or focused solely on disease outcomes without addressing workforce-related aspects  |
| Research type (R)           | Qualitative, quantitative, and descriptive study   |  |
| Language                    | English or Indonesia   |  |
| Publication type            | Original research articles, secondary datasets   | Conference papers, news, commentary, reviews   |

as studies on identifying patterns of disease or prescription patterns or research centred on pharmacy students rather than practising pharmacists. This resulted in 40 articles included in the qualitative synthesis. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) chart detailing this process is shown in Fig. 1.

All articles were imported to the NVivo Software Version 12 to aid the review analysis. One author conducted the initial data extraction process using a structured extraction sheet, which captured the following key variables: (1) location in Indonesia where the study was conducted; (2) practice sector/setting; (3) study aims; (4) population and sample; (5) design; (6) data analysis; (7) results; and (8) comments related to study quality. These extracted variables were converted as 'code' in Nvivo. The 'results' code was subsequently divided into two codes based on the review's objectives: (1) challenges identified and (2) strategies to support workforce development outlined. Thematic coding was structured in alignment with the dimensions of the FIP workforce development framework—competencies, scope, and capacity. Additionally, the analysis was informed by published studies on workforce challenges

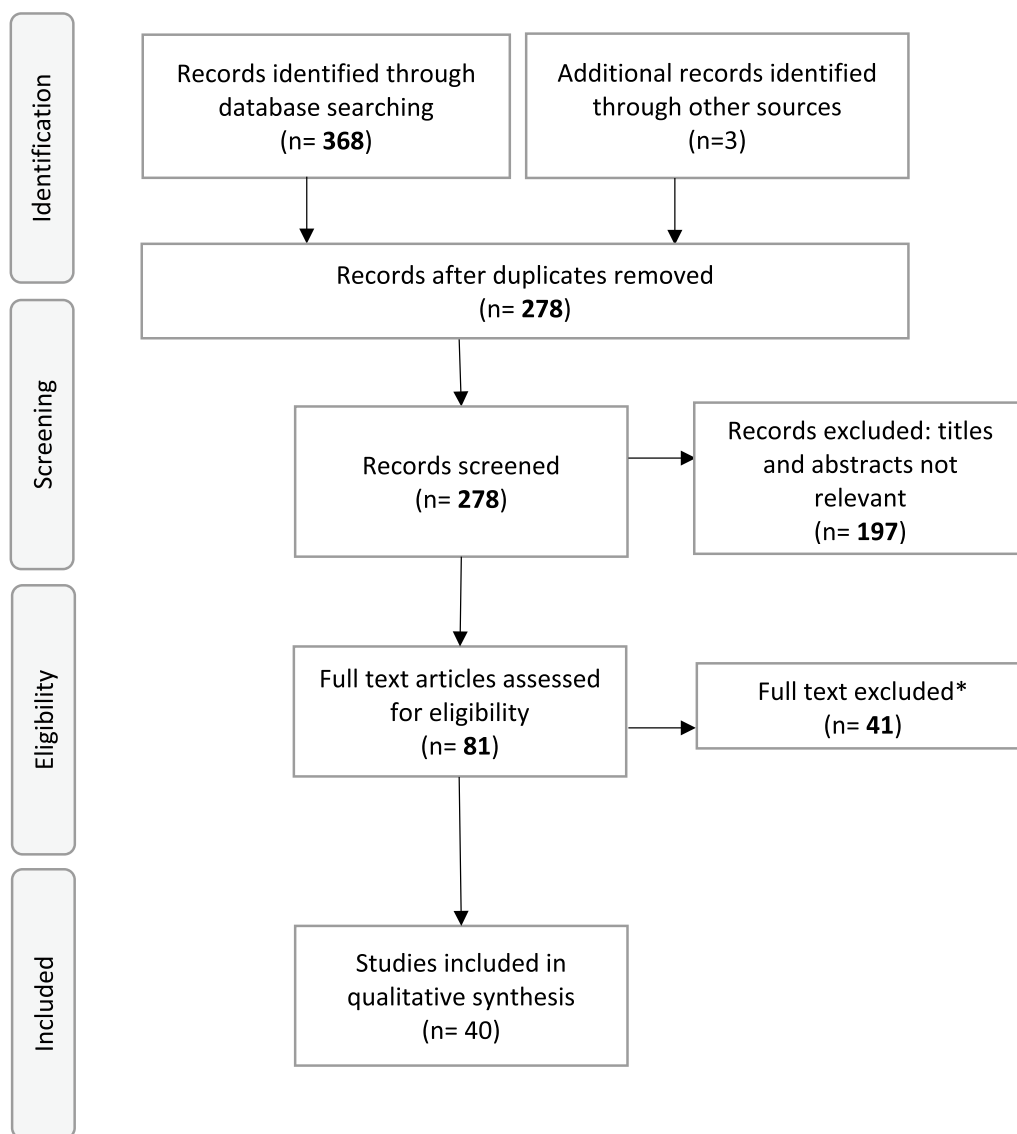
and strategies in pharmacy [21–23]. To ensure validity, three authors reviewed and refined the thematic codes. The results were then synthesised narratively, linking identified challenges and strategies back to the framework dimensions to provide an understanding of pharmacy workforce needs in Indonesia.

## Results

### Overview of selected studies

Forty papers were included in this review. Most articles highlighted the challenges pharmacists faced in providing services in patient care settings, such as in the community, community health centres and hospitals. Details of included studies are shown in Table 3.

Four interconnected themes emerged from the selected papers: 'personal challenges', 'workplace condition', 'societal contribution and recognition' and 'professional regulation'. These themes align with the multidimensional healthcare workforce framework dimensions—competencies, scope and capacity—and show the overlapping nature of challenges faced by the pharmacy workforce. The summary of challenges and gaps highlighted in the literature can be seen in Fig. 2.



**Fig. 1** Summary of the literature search process. \*Studies focused on other healthcare professionals or pharmacy students, evaluation of training modules, prevalence of drug-related problems, patients' knowledge of medicines, the impact of service interventions, or tool development

### Personal challenges

The theme of personal challenges was associated with gaps in skills, motivation, and professional confidence, which reflect the competency dimension of workforce development.

Several studies reported a *lack of motivation* among pharmacists to be more involved in patient care [24], to adopt new roles [25], to develop their practice [26], and to maintain Continuing Professional Development (CPD) [26–28]. A study on pharmacists' engagement and expectations of CPD activities found a need to change the focus of CPD towards evidencing learning rather than collecting points through CPD attendance [29].

*Competency gaps* were observed across a variety of sectors (hospitals, community and community health centres), a variety of locations (Sumatra island, Java island, the eastern part of Indonesia and a national study) and a variety of services (noncommunicable diseases, self-medication, compounding, universal healthcare, tuberculosis, asthma, smoking cessation) [24, 25, 27–42]. A possibility of a *competency gap* in the practice was expressed particularly when career change happens from the industrial sector to the community setting [26]. The perception of competency gaps was also reported in two other papers [29, 43], which resulted in a *lack of confidence* among pharmacists in providing pharmaceutical care services

**Table 3** Details of included studies

| No. | Study ID                | Title  | Topic                    | Aim of the study  | Methodology   | Target population   | Study location  | Pharmacy workforce challenges  |
|-----|-------------------------|--|--------------------------|---|---|---|-----------------|--|
| 1   | Khairunnisa (2015) [35] | Assessment of hypertension knowledge among pharmacists in Medan City, North Sumatera | Hypertension             | To assess the knowledge of pharmacists against hypertension and its treatment   | A quantitative study using survey   | Pharmacists working in all sectors of practice  | Sumatera Island | Variety of pharmacists' competencies   |
| 2   | Hermansyah (2018) [28]  | Prioritising recommendations to advance community pharmacy practice                  | Priority recommendations | To systematically identify and prioritise a range of potential recommendations to improve practice in Indonesian community pharmacy from the perspective of pharmacy stakeholders | A qualitative study using Nominal Group Technique (NGT)   | Pharmacy stakeholders   | Nationwide      | Staff remuneration, availability of career pathways and recognition; inconsistency in policy implementation  |
| 3   | Meilianti (2021) [26]   | A country-level national needs assessment of the Indonesian pharmacy workforce       | Needs assessment         | To prioritise gaps toward transforming the pharmacy workforce as a prelude to practice and pharmaceutical services reform in Indonesia  | A multiple method qualitative study consisted of face-to-face group discussion, and online and in-person semi-structured interviews | Pharmacist working in the academic, community, government institution, hospital, industry and primary health care | Nationwide      | Lack of motivations; variety of pharmacists' competencies; variation of services; staff remuneration, availability of career pathways and recognition; barriers in collaboration with other healthcare professions; lack of public's awareness of the pharmacists' role; need to update curriculum to adapt to practice needs; need for tailored and specific training and programmes; need for structured accredited training and micro-credentialing systems |

**Table 3** (continued)

| No. | Study ID             | Title   | Topic                               | Aim of the study   | Methodology  | Target population  | Study location | Pharmacy workforce challenges   |
|-----|----------------------|---|-------------------------------------|--|--|--|----------------|---|
| 4   | Pradipta (2021) [61] | <i>Barriers and strategies to successful tuberculosis treatment in a high-burden tuberculosis setting: A qualitative study from the patient's perspective</i> | Tuberculosis                        | To explore barriers to successful TB treatment from the patients' perspective, aiming to identify potential patient-centred care strategies to improve TB treatment outcome in Indonesia | A qualitative study using in-depth interviews and focus group discussions (FGDs)   | TB patients, physicians, nurses, pharmacists, TB activist, TB programmers at the district and primary care levels) | West Java      | Low health literacy of society  |
| 5   | Marijadi (2022) [29] | <i>Pharmacists' continuing professional development for noncommunicable diseases management: A consensus study</i>  | Noncommunicable diseases management | To identify South Borneo's pharmacists' engagement with, experiences of, and expectations for NCD-focused CPD activities, and CPD stakeholders' views on these expectations              | A mixed-methods study using quantitative survey and focus group discussions (FGDs) | Pharmacists  | South Borneo   | Need attitude changes; variety of pharmacists' attitudes and competencies; lack of confidence; shortages and presence of pharmacists; staff remuneration, availability of career pathways and recognition; lack of support; barriers in collaboration with other healthcare professions; low health literacy of society; lack of public's awareness of the pharmacists' role; need to update curriculum to adapt to practice needs; need for tailored and specific training and programmes; need for structured accredited training and micro-credentialing systems |

**Table 3** (continued)

| No. | Study ID                | Title  | Topic                               | Aim of the study  | Methodology   | Target population  | Study location | Pharmacy workforce challenges  |
|-----|-------------------------|--|-------------------------------------|---|---|--|----------------|--|
| 6   | Puspitasari (2015) [30] | <i>Challenges in the management of chronic noncommunicable diseases by Indonesian community pharmacists</i>            | Noncommunicable diseases management | To explore factors influencing Indonesian primary care pharmacists' practice in chronic disease management and proposed a model illustrating relationships among factors  | A qualitative study using in-depth and semi-structured interviews | Pharmacists working in community health centres and community pharmacies | East Java      | Variety of pharmacists' attitudes and competencies; high workload; variation of services; shortages and presence of pharmacists; staff remuneration, availability of career pathways and recognition; barriers in collaboration with other health-care professions; lack of public's awareness of the pharmacists' role; inconsistency in policy implementation; need to update curriculum to adapt to practice needs; variety of support from professional organisation |
| 7   | Wibowo (2015) [52]      | <i>An evaluation of community pharmacy-based services for type 2 diabetes in an Indonesian setting: patient survey</i> | Diabetes                            | To investigate, within a developing country setting (Indonesia), current use of pharmacy services by type 2 diabetes patients, and to evaluate their views regarding community pharmacists' roles, and the characteristics that influence their views | A quantitative study using survey                                 | Patients seeking anti-diabetic medications                               | Surabaya       | Variation of services; lack of public's awareness of the pharmacists' role   |

**Table 3** (continued)

| No. | Study ID            | Title  | Topic                | Aim of the study   | Methodology  | Target population                                    | Study location | Pharmacy workforce challenges  |
|-----|---------------------|--|----------------------|--|--|--|----------------|--|
| 8   | Wibowo (2015) [54]  | <i>Evaluation of community pharmacy-based services for type-2 diabetes in an Indonesian setting: pharmacist survey</i>   | Diabetes             | To evaluate current community pharmacy-based services and perceived roles of pharmacists in type 2 diabetes care, and characteristics (pharmacist and pharmacy) associated with current practice | A quantitative study using survey  | Community pharmacists                                | Surabaya       | Variation of services; shortage of pharmacists; staff remuneration, availability of career pathways and recognition; inconsistency in policy implementation; need to update curriculum to adapt to practice needs; need for structured accredited training and micro-credentialing systems |
| 9   | Wibowo (2016) [36]  | <i>Pharmacist and physician perspectives on diabetes service delivery within community pharmacies in Indonesia: a qualitative study</i>  | Diabetes             | To explore perspectives of physicians and pharmacists on diabetes service delivery within community pharmacies in Indonesia  | A qualitative study using in-depth interviews                            | Physicians and community pharmacists                 | Surabaya       | Variety of pharmacists' attitudes and competencies; shortages and presence of pharmacists; staff remuneration, availability of career pathways and recognition; barriers in collaboration with other healthcare professions  |
| 10  | Presley (2022) [47] | <i>Pharmacists' preferences for the provision of services to improve medication adherence among patients with diabetes in Indonesia: Results of a discrete choice experiment</i> | Medication adherence | To elicit pharmacists' preferences for services to improve medication adherence among their patients   | A quantitative study using survey using discrete choice experiment (DCE) | Pharmacists in hospital and community health centres | Surabaya       | Shortages and presence of pharmacists; staff remuneration, availability of career pathways and recognition; inadequate facilities and resources  |



**Table 3** (continued)

| No. | Study ID                | Title   | Topic        | Aim of the study   | Methodology  | Target population                               | Study location | Pharmacy workforce challenges  |
|-----|-------------------------|---|--------------|--|--|---|----------------|--|
| 11  | Widayati (2018) [25]    | <i>Pharmacists' views on the development of asthma pharmaceutical care model in Indonesia: A needs analysis study</i> | Asthma       | To explore Indonesian pharmacists' experiences, perspectives, and needs regarding the provision of pharmaceutical care for asthma patients in Indonesia  | A qualitative study using Focus Group Discussion (FGD) | Pharmacist across various settings of practice  | Yogyakarta     | Lack of motivations; variety of pharmacists' attitudes and competencies; shortages and presence of pharmacists; staff remuneration, availability of career pathways and recognition; lack of public's awareness of the pharmacists' role; variety of support from professional organisation; need for structured accredited training and micro-credentialing systems |
| 12  | Setiawan (2019) [60]    | The role of pharmacists in the pharmaceutical care of asthma patients in Yogyakarta, Indonesia: the patients' views   | Asthma       | To identify patients' views regarding current asthma care provided by their pharmacists and their perspectives on future pharmacy-based asthma services  | A qualitative study using interview guide              | Asthma patients                                 | Yogyakarta     | Low health literacy of society   |
| 13  | Wijaya (2019) [62]      | <i>Knowledge, attitude, and practice of pharmacists towards management of hypertension in primary care centers</i>    | Hypertension | To assess the knowledge, attitude, and practice (KAP) of pharmacists working in Puskesmas in Surabaya, Indonesia, towards the management of hypertension | A quantitative study using questionnaire               | Pharmacists working primary care centres        | Surabaya       | Variety of CPD opportunities   |
| 14  | Khairunnisa (2017) [34] | Pharmacists' perception about their roles in Tuberculosis control program in Medan, Indonesia                         | Tuberculosis | To assess the pharmacists' perception about their roles in tuberculosis (TB) control program in Medan, Indonesia   | A quantitative study using questionnaire               | Pharmacists across various settings of practice | Medan          | Variety of pharmacists' attitudes and competencies; variation of services; shortages and presence of pharmacists   |

**Table 3** (continued)

| No. | Study ID                  | Title  | Topic                           | Aim of the study  | Methodology  | Target population                                      | Study location                        | Pharmacy workforce challenges   |
|-----|---------------------------|--|---------------------------------|---|--|--|---------------------------------------|---|
| 15  | Puspitasari (2011) [53]   | Do Indonesian community pharmacy workers respond to antibiotics requests appropriately?  | Antibiotics                     | To quantify antibiotics sales without a prescription and to explore provision of patient assessment and medicine information related to antibiotics requested with or without a prescription in Surabaya community pharmacies | A simulated patient method                                 | Community pharmacists                                  | Surabaya                              | Variation of services; inconsistency in policy implementation   |
| 16  | Ferdiana (2021) [48]      | Community pharmacies, drug stores, and antibiotic dispensing in Indonesia: A qualitative study                                     | Antibiotics                     | To examine antibiotic dispensing practices and associated drivers in Indonesia  | A qualitative study using in-depth interviews              | Staff at pharmacies and drug stores, and their clients | Bekasi                                | Shortages and presence of pharmacists; lack of support; low health literacy of society; inconsistency in policy implementation  |
| 17  | Wiedyaningsih (2017) [33] | Opinion and expectation of pharmacists on providing extemporaneous compounding in Jogjakarta and Central Java provinces, Indonesia | Compounding                     | To identify opinion and expectations of pharmacists on providing extemporaneous drug compounding to support pharmacy service  | A qualitative analysis using focus group discussions (FGD) | Pharmacists  | Yogyakarta and Central Java provinces | Variety of pharmacists' attitudes and competencies; staff remuneration, availability of career pathways and recognition; variety of support from professional organisation; need for structured accredited training and micro-credentialing systems |
| 18  | Saragi (2019) [37]        | Exploring the potential of interprofessional collaboration in medication therapy management in primary health care                 | Interprofessional collaboration | To explore the potential of interprofessional collaboration between doctor and pharmacists in MTM at type 2 diabetic patient  | A qualitative study using in-depth interviews              | Physicians and pharmacists                             | Jakarta                               | Competency gaps; barriers in collaboration with other healthcare professions  |

**Table 3** (continued)

| No. | Study ID            | Title   | Topic                           | Aim of the study   | Methodology                                   | Target population  | Study location  | Pharmacy workforce challenges  |
|-----|---------------------|---|---------------------------------|--|---|--|---|--|
| 19  | Maziyah (2020) [46] | <i>Perception on clinical pharmacy services in a private hospital in Yogyakarta, Indonesia</i>  | Perception on pharmacy services | To determine perceptions of health professionals in a private hospital in Yogyakarta, Indonesia, on clinical pharmacy services   | A quantitative study using questionnaire      | Nurses and physicians  | Yogyakarta  | Shortages and presence of pharmacists; variation of services; barriers in collaboration with other healthcare professions  |
| 20  | Alfian (2016) [49]  | Consumer expectation on service quality provide by pharmacist in self medication practices and its associated factors in Bandung, Indonesia | Self-medication                 | To assess consumers' expectations regarding service quality provide by pharmacist in self-medication practices and determine the factors associated with self-medication in Bandung, Indonesia | A quantitative study using questionnaire      | Customers of community pharmacies  | Bandung   | Shortages and presence of pharmacists; variation of services; lack of public's awareness of the pharmacists' role  |
| 21  | Brata (2016) [31]   | Factors influencing the current practice of self-medication consultations in Eastern Indonesian community pharmacies: a qualitative study   | Self-medication                 | To identify the factors that influence current practice of pharmacy staff when handling self-medication consultations in Eastern Indonesian community pharmacies                               | A qualitative study using in-depth interviews | Pharmacists, pharmacy technicians, pharmacy owners, and counter attendants | Provincial capital located in the eastern part of Indonesia | Variety of pharmacists' attitudes and competencies; shortages and presence of pharmacists; staff remuneration, availability of career pathways and recognition; lack of public's awareness of the pharmacists' role; inconsistency in policy implementation; need to update curriculum to adapt to practice needs; variety of support from professional organisation |

**Table 3** (continued)

| No. | Study ID                        | Title  | Topic   | Aim of the study  | Methodology   | Target population                               | Study location                       | Pharmacy workforce challenges  |
|-----|---------------------------------|--|---|---|---|---|--------------------------------------|--|
| 22  | Mizranita (2021) [58]           | <i>Pharmacists' and pharmacy technicians' scopes of practice in the management of minor ailments at community pharmacies in Indonesia: A cross-sectional study</i> | Minor ailments                                | To evaluate pharmacists' and pharmacy technicians' understanding of their scopes of practice, perceived competency and factors influencing the delivery of minor ailments services in Indonesian community pharmacies | A quantitative study using questionnaire                      | Pharmacists and pharmacy technicians            | Central Java                         | Overlapping jobs; need for tailored and specific training and programmes; need for structured accredited training and micro-credentialing systems  |
| 23  | Herman and Susyanty (2012) [27] | An analysis of pharmacy services by pharmacist in community pharmacy   | Pharmacy services                             | To identify the qualification of pharmacist who delivers services in community pharmacy in compliance with the Indonesian Health Law No. 36 of 2009   | A qualitative study using In-depth interviews and observation | Community pharmacists                           | Bandung, DKI Yogyakarta and Surabaya | Lack of motivations; variety of pharmacists' attitudes and competencies; shortages and presence of pharmacists; variation of services; overlapping jobs; lack of public's awareness of the pharmacists' role; inconsistency in policy implementation; need to update curriculum to adapt to practice needs |
| 24  | Athiyah (2019) [38]             | <i>Assessment of pharmacists' knowledge, attitude and practice in chain community pharmacies towards their current function and performance in Indonesia</i>       | Pharmacists' knowledge, attitude and practice | To assess the knowledge, attitude and practice (KAP) of pharmacist working in chain community pharmacy towards their current function and performance in delivering pharmacy services                                 | A quantitative study using questionnaire                      | Pharmacists working in chain community pharmacy | Nationwide                           | Competency gaps; need for structured accredited training and micro-credentialing systems   |

**Table 3** (continued)

| No. | Study ID                | Title  | Topic                                 | Aim of the study   | Methodology  | Target population                   | Study location | Pharmacy workforce challenges  |
|-----|-------------------------|--|---------------------------------------|--|--|-------------------------------------|----------------|--|
| 25  | Safitrih (2019) [39]    | <i>Health Workers' Perceptions and Expectations of the Role of the Pharmacist in Emergency Units: A Qualitative Study in Kupang, Indonesia</i> | Perception on the role of pharmacists | To identify the perceptions and expectations of health workers with respect to pharmacy services in emergency units  | A qualitative study using a phenomenological approach with a semi-structured interview technique | Physicians and nurses               | Kupang         | Competency gaps; shortages and presence of pharmacists; high workload; barriers in collaboration with other healthcare professions; need for structured accredited training and micro-credentialing systems  |
| 26  | Kristina (2019) [40]    | Pharmacists' knowledge, self-efficacy and provision of health promotion practices in Yogyakarta, Indonesia                                     | Health promotion                      | To explore the knowledge, self-efficacy, and provision of health promotion, as well as its association in Yogyakarta province, Indonesia                         | A quantitative study using questionnaire   | Pharmacists                         | Yogyakarta     | Competency gaps; inadequate facilities and resources; need for tailored and specific training and programmes   |
| 27  | Febrinasari (2022) [50] | <i>Comparison of Patient's Satisfaction with Pharmaceutical Care Services in Ownership-Based Pharmacies in Semarang, Indonesia</i>             | Patient's satisfaction                | To compare the patient's perception of drug counselling services by pharmacy staff based on the type of pharmacy ownership (franchise/non-franchise) in Semarang | A quantitative study using questionnaire   | Patients in community pharmacies    | Semarang       | Variation of services; staff remuneration; availability of career pathways and recognition; lack of public's awareness of the pharmacists' role  |
| 28  | Widowati (2021) [55]    | <i>Perceptions of the role of pharmacy assistants in providing patient counselling in community pharmacies in Indonesia</i>                    | Role of pharmacy assistants           | To explore pharmacy workers' perceptions about the role of pharmacy assistants to provide patient counselling within the community                               | A qualitative study using semi-structured interviews   | Pharmacists and pharmacy assistants | Bali           | Variation of services; lack of support; inadequate facilities and resources; need for tailored and specific training and programmes; need for structured accredited training and micro-credentialing systems |

**Table 3** (continued)

| No. | Study ID               | Title  | Topic                           | Aim of the study   | Methodology   | Target population   | Study location | Pharmacy workforce challenges   |
|-----|------------------------|--|---------------------------------|--|---|---|----------------|---|
| 29  | Suryaputra (2021) [51] | Counselling practices in an East Javan district, Indonesia: What information is commonly gathered by pharmacy staff? | Counselling practice            | To identify pharmacy staff's practice of counselling and information gathered during counselling in an East Javan district, Indonesia  | A quantitative study using questionnaire                          | Pharmacists in hospital, community pharmacy and community health centres          | East Java      | Variation of services; need for tailored and specific training and programmes; need for structured accredited training and micro-credentialing systems  |
| 30  | Hermansyah (2018) [32] | <i>Investigating the impact of the universal healthcare coverage programme on community pharmacy practice</i>        | Universal Health Coverage (UHC) | To investigate perceptions of healthcare and pharmacy stakeholders about the impact of JKN on the practice of pharmacists and pharmacy in both public (Puskemas) and private (Community or Retail pharmacy) settings | A qualitative study using in-depth and semi-structured interviews | Pharmacy stakeholders in public and private community or retail pharmacy settings | Nationwide     | Variety of pharmacists' attitudes and competencies; shortages and presence of pharmacists; high workload; variation of services; staff remuneration, availability of career pathways and recognition; inconsistency in policy implementation; need to update curriculum to adapt to practice needs; variety of support from professional organisation |
| 31  | Kristina (2021) [63]   | <i>Practice and opinion of pharmacists toward disposal of unused medicines in Indonesia</i>                          | Unused medicines                | To explore the pharmacists' practice, awareness, and barriers toward disposal of unused medicine in Yogyakarta, Indonesia  | A quantitative study using questionnaire                          | Community pharmacists   | Yogyakarta     | Need for tailored and specific training and programmes  |
| 32  | Kristina (2022) [43]   | Pharmacists' willingness to administer COVID-19 vaccine: A survey from Yogyakarta community pharmacists              | Vaccine administration          | To investigate community pharmacists' perceptions and identify factors that influence their willingness to administer the COVID-19 vaccine   | A quantitative study using questionnaire                          | Community pharmacists   | Yogyakarta     | Lack of confidence; barriers in collaboration with other healthcare professions; need for tailored and specific training and programmes   |

**Table 3** (continued)

| No. | Study ID                  | Title  | Topic                           | Aim of the study  | Methodology   | Target population                                      | Study location      | Pharmacy workforce challenges   |
|-----|---------------------------|--|---------------------------------|---|---|--|---------------------|---|
| 33  | Halim (2021) [44]         | Assessing readiness for research: a pilot study of Indonesian pharmacists  | Readiness for research          | To assess readiness for research, as well as the associated demographic and attitudinal characteristics of pharmacists in a range of healthcare settings in East Java Province, Indonesia   | A quantitative study using questionnaire                      | Pharmacists in hospital and community health centres   | Malang and Surabaya | Variety of pharmacists' attitudes and competencies; shortages and presence of pharmacists; lack of support; inadequate facilities and resources; need for tailored and specific training and programmes   |
| 34  | Azizah et al. (2014) [41] | <i>Pharmacists' perception of their role and assessment of clinical pharmacy education to improve clinical pharmacy services in Indonesian hospitals</i> | Pharmacy education and services | To identify the pharmacists' perception on their role, barriers to implement clinical pharmacy services (CPSs), and importance of clinical pharmacy education (CPE) to improve CPSs in Indonesian hospitals   | A quantitative study using questionnaire                      | Pharmacists working in hospitals and academic settings | North Sumatera      | Competency gaps; lack of support; barriers in collaboration with other healthcare professions; need to update curriculum to adapt to practice needs   |
| 35  | Hermansyah (2018) [28]    | <i>Multiple policy approaches in improving community pharmacy practice: the case in Indonesia</i>  | Policy approach                 | To identify and collaborate information on approaches intended to improve practice in Indonesian community pharmacy and subsequently examine the perceptions of key stakeholders in healthcare and community pharmacy about these approaches and the extent to which they have affected community pharmacists as a profession | A qualitative study using in-depth semi-structured interviews | Pharmacy stakeholders                                  | Nationwide          | Lack of motivations; competency gaps; shortages and presence of pharmacists; barriers in collaboration with other healthcare professions; inconsistency in policy implementation; need for tailored and specific training and programmes; lack of public awareness of the pharmacist's role |

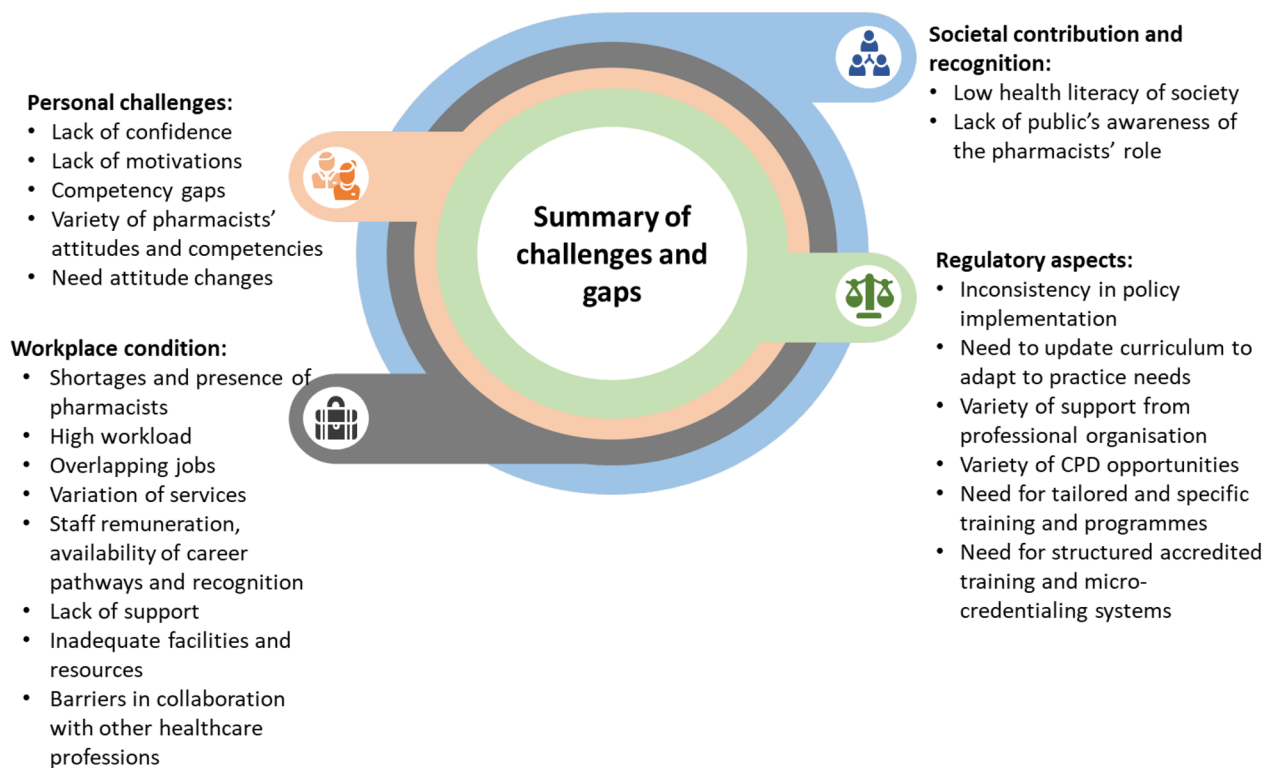
**Table 3** (continued)

| No. | Study ID                | Title  | Topic                     | Aim of the study   | Methodology  | Target population   | Study location | Pharmacy workforce challenges  |
|-----|-------------------------|--|---------------------------|--|--|---|----------------|--|
| 36  | Hermansyah (2012) [24]  | <i>The conflicts between professional and non professional work of community pharmacists in Indonesia</i>  | Community pharmacy        | To determine the type of professional and non-professional work of community pharmacists in Surabaya Indonesia and find the difference between time spent for performing both works in actual (current) situation and ideal (expected) situation | A quantitative study using questionnaire                       | Community pharmacists   | Surabaya       | Lack of motivations; variety of pharmacists' attitudes and competencies; overlapping jobs; lack of public's awareness of the pharmacists' role; need to update curriculum to adapt to practice needs |
| 37  | Limato (2022) [56]      | <i>A qualitative study of barriers to antimicrobial stewardship in Indonesian hospitals: governance, competing interests, cost, and structural vulnerability</i> | Antimicrobial stewardship | To explore context-specific underlying barriers to AMS implementation in Indonesian hospitals with a focus on governance practices and structural vulnerabilities  | A qualitative study using semi-structured interviews           | Physicians, surgeons, clinical microbiologists, pharmacists, AMS team leaders, hospital managers, medical students, and national AMR stakeholders | Jakarta        | Lack of support; barriers in collaboration with other healthcare professions   |
| 38  | Puspitasari (2021) [59] | <i>Challenges in the provision of natural medicines by community pharmacists in East Java Province, Indonesia</i>  | Natural medicines         | To investigate factors influencing Indonesian community pharmacists in the supply of, delivery of, and provision of information about natural medicines  | A qualitative study using in-depth, semi-structured interviews | Community pharmacists   | East Java      | Low health literacy of society; need to update curriculum to adapt to practice needs; need for tailored and specific training and programmes   |
| 39  | Kristina (2016) [42]    | <i>Measuring Effects of Pharmacists' Training on Smoking Cessation Using Mystery Shoppers</i>  | Pharmacy training         | To investigate whether pharmacists able to perform smoking cessation counseling at 4 weeks after training  | An observational study design                                  | Pharmacists   | Yogyakarta     | Competency gaps; variation of services; need for tailored and specific training and programmes; lack of public's awareness of the pharmacists' role  |



Table 3 (continued)

| No. | Study ID                       | Title  | Topic         | Aim of the study  | Methodology   | Target population  | Study location | Pharmacy workforce challenges         |
|-----|--------------------------------|--|---------------|---|---|--|----------------|---------------------------------------|
| 40  | Sunarko and Koeswo (2020) [45] | <i>A Root Cause Analysis of Prolonged Waiting Times for Compounded Prescriptions at an Indonesian Private Hospital</i> | Waiting times | To understand the causal factors that influence prolonged waiting times for compounded prescriptions in Indonesian private hospital | A qualitative study using In-depth interviews and observation | Hospital directors, head of pharmacy department, purchasing staff, pharmacy storage manager, other pharmacy staff, and service quality manager | Not specified  | Shortages and presence of pharmacists |



**Fig. 2** Summary of the narrative challenges and gaps in the retrieved literature

to patients. There was also an indication of a *variety of pharmacists' attitudes* across different sectors [36]. For example, a paper on research readiness showed that hospital pharmacists demonstrated a more favourable attitude towards research in comparison to those working in other settings (community and community health centres), particularly when it came to factors such as 'confidence, motivation, and resources', 'research culture', and 'support from others' [44].

### Workplace condition

Challenges related to workplace conditions reflect issues within the capacity dimension but also overlap with the competency dimension, as inadequate resources, support systems for CPD, and remuneration can impact pharmacists' ability to develop and maintain essential skills. Variations in roles and service provision also highlight intersections with the scope dimension.

Several studies reported *shortages of pharmacists* in community health centres, hospitals and community pharmacies [25, 27–29, 31, 32, 39, 44–49]. One possible reason was that it was perceived that working in government institutions, such as district or regional public health offices, was more prestigious and financially secure than in healthcare facilities [31]. Not only the attractiveness of one sector to another, but also the location of

practice could be another reason for shortages. A study conducted in an urban location and a semi-rural location in Indonesia about antibiotic dispensing practices identified that some pharmacy owners could not employ full-time pharmacists, and some pharmacists prefer to work in the cities rather than in rural areas [48]. Shortages of pharmacists in the workplace resulted in *high workloads* being experienced by pharmacists [39]. Pharmacists need to deal with many administrative and technical tasks, as was found in papers discussing the increased role of pharmacists in chronic noncommunicable diseases [30] and universal health care [32].

*Variations of services* provided in community settings were reported in some papers, in which only basic care was provided [42, 49–53] and monitoring patients' conditions was the less common practice [27, 30, 32, 34, 54, 55]. A minimum amount of information given to patients was also observed; for example, pharmacy staff only explained how to take the medicines [26], or patients were rarely provided with cost-effective alternative medicines to conventional medicines [46]. Apart from the information given, a lack of information gathered by the pharmacy staff was identified, specifically allergy history and adverse drug reactions [51]. The dispensing process, however, was evaluated to be implemented according to pharmaceutical services standards in pharmacy

in a study conducted in one of the cities in Indonesia [50]. Some papers found that the variation in services depended on the pharmacists' presence [27, 30, 32, 34, 54] or on whether the pharmacies were part of a chain or not [27, 30, 32, 34, 54]. Workplace accreditation was described as a way to maintain pharmacy service quality, especially in the competitive business environments reported in the community setting [31, 32, 54]. A study conducted in hospitals about antimicrobial stewardship programmes identified hospital accreditation as a way to improve the practice [56].

Another barrier found was related to *staff remuneration, availability of career pathways, and recognition* in delivering professional services. One example described was the low salary of pharmacists across all practising sectors [25, 30–33, 47, 54, 57]. Most papers were conducted by interviewing pharmacists; therefore, these challenges might show staff affordability from the Indonesian pharmacists' perspective. Not all pharmacists were willing to provide patient education due to time-consuming or not being remunerated from the pharmaceutical care service [29, 50]. The lack of remuneration and recognition was believed to also influence the presence of pharmacists in pharmacies [26, 36, 57]. Some studies found that an absence of pharmacists in pharmacies led to pharmacy services being provided by non-pharmacists or by pharmacy support staff [24, 27, 30, 32, 48, 54, 57] and could imply a poorer quality of care [32, 48]. Some papers also reported *overlapping jobs between pharmacists and pharmacy technicians* in community pharmacies [24, 27, 58], which may raise safety concerns [58] and the possibility of de-professionalise of the profession [24]. Low salaries also resulted in pharmacists having dual employment where pharmacists could have two jobs; this was perceived to affect their professionalism and productivity, especially their ability to focus on their work [31].

*Lack of support from the workplace* [29, 41, 44, 48, 55, 56] and *limited resources* in the workplace [40, 44, 47] were identified in some papers. Inadequate facilities and resources, such as the availability of private counselling rooms, were identified in two studies conducted in community settings [47, 55], affecting pharmaceutical care services given to patients. A qualitative study on antimicrobial resistance found a power imbalance between pharmacists and pharmacy owners in dispensing practices. This led to pressure on pharmacists to dispense medications or services that were not in patients' best interest [48]. Some employers did not provide enough support for pharmacists to attend continuing professional development (CPD), which was seen as personal rather than professional development, forcing pharmacists to take personal leave to attend [29].

Another example was limited support from the employer for pharmacists to be involved in research or how the employer enables a research environment in the workplace [44]. This paper encouraged collaboration between academics and practitioners and was recommended to encourage research culture in the workforce for improving pharmacy practices [44]. Despite the lack of support highlighted in other studies, one article conducted in one of the biggest pharmacy chains described an educational and capacity-building programme that they provided to support their staff [38]. This study also highlighted that the availability of standard operational procedures (SOPs) was not only helping the development of pharmacy practice in those pharmacies, but also reducing the variation and gap in performance of the pharmacy workforce across their branches [38].

*Collaboration* with other health workforce members has become a challenge for pharmacists and was also reported in some papers [26, 28–30, 36, 37, 39, 41, 43, 46, 56]. For instance, doctors' perceptions that pharmacists were purely medicine providers with no involvement in patient therapy became obstacles to the communication of drug therapy optimisation [30]. A study surveying nurses and medical doctors in a private hospital found that some doctors could not see the full role of clinical pharmacists role in the hospital [46]. Interestingly, another study across settings found that hospital and community health centre pharmacists had a much more cooperative relationship with their doctors compared to the community setting [29]. An interprofessional learning approach with other healthcare professionals in CPD formats and initial education and training was recommended [26, 29] to overcome these challenges.

### Societal contribution and recognition

The theme of societal contribution and recognition reflects the scope dimension related to pharmacists' roles in addressing community healthcare needs.

*Low health literacy of society* was reported in some studies, for example, misconceptions of the public about antibiotics use [48], lack of knowledge of noncommunicable risk factors [29], their belief in traditional or alternative or 'natural' medicines [59, 60], and their lack of knowledge of the importance of adherence in tuberculosis medications [61]. This was identified as an opportunity for pharmacists to expand their roles as health educators; however, the majority of the challenges in providing pharmaceutical care services reported were associated with the *public's awareness of the pharmacists' role* [28, 42, 49, 52] and their trust in the pharmacist's competencies [24–27, 29–31, 50]. Patients' cultural characteristics, which might differ in each location in Indonesia, were also reported in one paper [31]. The need for

pharmacists who are adaptable and flexible to manage patients with different cultural characteristics is highlighted in this paper [31].

Two national studies on recommendations to advance community settings stated the need to provide evidence-based research to collect the details of pharmacists' contributions to community health [26, 57]. In addition, to increase the branding and recognition of the pharmacy profession in society, the professional leadership body in Indonesia encourages each pharmacist to brand their profession by having branding activities listed as a recertification process requirement [26]. Pharmacists in Indonesia have also been encouraged by the Ministry of Health to be involved in health education programmes where pharmacists become health educators about drug use in the community [55].

### Regulatory aspects

Regulatory challenges encompassed all three dimensions of the framework, with specific implications for competencies, scopes, and workforce capacity. Over the past 10 years, both policymakers and pharmacy stakeholders, such as professional associations and educational institutions, have shown enthusiasm in supporting the pharmacists' role development [28]. This enthusiasm was shown by establishing national regulations and policies to regulate pharmacy practice and the workforce in Indonesia. For instance, a clear framework regarding pharmacists' role, expertise, and authority is available for community pharmacies through the Pharmacy Practice Act and Community Pharmacy Decree [28]. Some policies and regulations were also available to regulate pharmaceutical services in each sector of practice, specifically in community pharmacies, hospitals and community health centres [30, 32, 52, 57, 60]. A standard for continuing professional development through the recertification process has been launched [25, 26, 60] to maintain pharmacy competency in Indonesia. Moreover, the Ministry of Health has also endorsed some pharmaceutical pocketbooks for specific diseases, e.g., patients with coronary health disease, to improve the pharmacy workforce's knowledge in Indonesia [30], technical guidelines for minor ailments management [58], an informative book about traditional medicines [59]. Nevertheless, some papers conducted in the community setting found that there was an *inconsistency in policy implementation* in Indonesia [27, 30–32, 48, 53, 54, 57], including the law related to the mandatory presence of pharmacists in the practice setting [28, 57]. Two national studies reported that law enforcement was imperative in improving pharmacy services and that this might be a general challenge across Indonesia [32, 57]. One study also highlighted a need to have specific standards for the length of pharmacists' consultations

to support a thorough discussion and education with patients [47].

Some articles that mentioned the unpreparedness of the pharmacy workforce highlighted that a new curriculum, including pharmacy practice, clinical pharmacy, and concepts of disease management, has been implemented in pharmacy schools in Indonesia [25, 34, 60]. However, there was still *a need to update this curriculum to adapt to the needs of the practice*, as indicated by several papers that pointed out the relevance of pharmacy education to a pharmacy practice's needs [24, 26, 27, 29–32, 41, 54, 59]. These papers also found that the revision and standardisation of pharmacy curricula were necessary as not many universities were accredited nationally [26]. In contrast, two papers conducted in a hospital setting relating to asthma and tuberculosis management did not report this challenge [25, 34]. This might be because there was no gap identified in the pharmacy curricula related to these services. However, all of these papers were only conducted in some parts of Indonesia. In addition to the curriculum review, the importance of early career training strategy to support pharmacists in being better prepared for practice was also highlighted in a national study [26].

Several papers stated that pharmacists need support from the Indonesian Pharmacists Association (IAI) [25, 30–33]. A *variety of support from the IAI* across the practice sector was observed, where pharmacists in the community setting appeared to have less support than those in the community health centre and hospitals [25]. One study in one urban city in Indonesia reported that there were frequent CPD workshops organised regularly by the regional professional organisation in the city, showing the *variety of CPD opportunities across countries* [62]. There was a *need for a tailored CPD programme* according to practice sectors [28] and the inclusion of general skills, such as research skills, from pharmacists' perspectives [29, 44]. Similarly, a *need for specific training and programmes* on certain topics was identified, such as counselling practices [42] and minor ailment management [26, 51, 55, 58], health promotion [40], natural medicines [59], vaccine administration [43], and returned medicines policy and management [63]. Another support identified was related to a *structured accredited formal training* [38, 39], *accreditation programme for specialised service providers* and *micro-credentialing model* for pharmacists [25, 26, 29, 33, 51, 54, 55, 58].

### Discussion

This narrative review categorises the challenges of the pharmacy workforce into four interrelated themes: personal challenges, workplace, societal contribution, and recognition and regulation aspects. These themes reflect

the three core dimensions of the multidimensional healthcare workforce model—competencies, scope, and capacity—that are critical to building a robust pharmacy workforce. Each identified challenge is dynamic and interconnected, often influencing other aspects of workforce development.

For example, the competency dimension is reflected in the lack of motivation and career development opportunities in the workplace, which can lead to variability in pharmacists' skills, knowledge, and behaviours [26, 57]. Variances in university accreditation, standardisation of pharmacy curricula, and quality assurance may contribute to differing levels of preparedness among graduates, further affecting competencies [26, 30, 31]. Similarly, a lack of confidence among pharmacists, identified as a personal challenge, may be linked to workplace environments and the recognition of pharmacists' roles by other healthcare professionals. An implementation of an interprofessional learning approach [26, 29] could address this perceived lack of confidence; studies have reported that interprofessional learning can positively impact the confidence and competencies of healthcare professionals to collaborate effectively [64, 65]. Implementing strategies to encourage interprofessional learning is recommended, and this can be initiated through collaboration among stakeholders such as the university and the professional leadership bodies of each healthcare profession. Having multi-sector collaboration and engagement between sectors was also recommended by a study conducted in Jordan on the challenges to pharmacy advancement [21].

The capacity dimension is evident in the shortages of pharmacists in various locations and sectors of practice, which is consistent with a recent study that found a variation in the density (by population) of pharmacists between the islands [14]. Only one study included in this review explored particular shortages of pharmacists in urban and semi-rural areas [48]. Research on the health workforce in Indonesia has found an uneven distribution of health workforce members, including pharmacists, between rural and urban areas [66–69]. Possible reasons for these variations include poor health facility infrastructure, poor working and living conditions in rural areas, and the opportunity to earn additional income from side jobs in urban areas [69]. Further research and interventions are needed to explore the reasons for this shortage in both rural and urban areas.

This review has identified a pharmacy workforce shortage across the practice sector in Indonesia, which could be linked to inadequate support and availability of education, training, and career opportunities in the workplace. Currently, at a national level, the professional development of Indonesian pharmacists focuses solely on collecting credits rather than on pharmacists' reflective

learning. One study suggested a shifting of the national professional development system towards evidencing learning and formal recognition through a micro-credentialing model to motivate pharmacists in advancing their practice [29]. Having a clear professional development pathway and opportunities, such as specialisation and advancement, could provide pharmacists with more opportunities for growth and development [70], ultimately increasing workforce retention and resulting in better-trained, high-performance, and motivated pharmacists capable of providing quality primary health pharmaceutical care. In addition to career opportunities, some other strategies for workforce retention were highlighted in the literature on the health workforce, such as flexible working and decent working conditions [71] and recognition and remuneration of the health workforce [72].

The scope dimension is reflected in the variety of services provided by pharmacists, particularly in the community setting, which raises concerns about patient safety. Workplace management plays a crucial role in providing support to pharmacists, particularly if the community pharmacy is not owned by a pharmacist [48]. In order to ensure the quality of pharmaceutical care services delivered by pharmacists, workplace accreditation has been shown to be effective in improving practice in hospitals [56]; this could also be implemented in the community setting [31, 32, 54] to assure the quality of pharmaceutical care services delivered by pharmacists. Accreditation ensures the availability of standard operating procedures and sufficient facilities to provide pharmaceutical care services, ultimately improving patient safety. Continued efforts are needed to develop a national accreditation system, particularly in community settings, to ensure that pharmacists are providing high-quality services that prioritise patient care.

Addressing these challenges in Indonesia not only supports national healthcare goals but also aligns with global efforts to tackle similar workforce issues. A comparative study on pharmacy workforce needs across Commonwealth countries highlights similar workforce challenges to Indonesia, such as workforce shortages, uneven distribution, and capacity constraints [22]. Geographical disparities in pharmacist distribution have been observed in Nigeria [73], India [74] and Australia [75], mirroring Indonesia's rural–urban disparities. Likewise, Sri Lanka faces a shortage of trained pharmacists in community settings [76], a challenge also reported in this review.

A narrative approach was used to present the findings of this review, which can be criticised as being subjective in nature. This review has, however, provided a comprehensive understanding of pharmacy workforce development in Indonesia by providing sufficient



analysis of the main challenges facing the pharmacy workforce in Indonesia. Many studies were conducted only in one sector of practice and in one location in Indonesia. Only five national studies were found [26, 28, 32, 38, 57], and no studies discussed pharmacy workforce challenges on a national and multi-sectoral level. Some qualitative studies had a small sample size with a small variance of characteristics. This limits the representativeness of the findings covered in this review. Some studies reported the results insufficiently, such as a very brief description of the results and not enough information about methods, which affects the validity of the findings of the study [45, 62, 63]. However, the lack of more comprehensive and inclusive published literature on this area of the health workforce is noteworthy. While this review aimed to cover all sectors of the pharmacy workforce in Indonesia by using broad keywords in the systematic search. However, the available literature mainly highlighted challenges in the patient care setting sectors. The limited availability of research in other sectors reveals a need for further study to ensure a comprehensive approach to workforce development across all sectors of pharmacy in Indonesia.

## Conclusion

This review set out to investigate the challenges faced by the pharmacy workforce in Indonesia across all practice sectors and to identify strategies or initiatives implemented to address these issues. A number of interconnected challenges were identified, including personal challenges, workplace conditions, societal recognition of pharmacists, and regulatory issues. These challenges highlight gaps in workforce development, particularly in competencies, scope, and capacity, as defined by the multidimensional healthcare workforce model. Strategies such as improving competency development, implementing workplace accreditation, and providing decent working conditions can support the delivery of high-quality pharmaceutical care while ensuring patient safety. A multi-sectoral approach involving collaboration among stakeholders—including policymakers, professional organisations, educational institutions, and healthcare providers—is essential to addressing these challenges and advancing the pharmacy workforce in Indonesia. Future research should focus on evaluating and scaling successful initiatives to inform sustainable workforce development.

## Acknowledgements

The authors want to express their gratitude to the President of the national professional leadership body serving from 2014 to 2022 for his support of the study.

## Author contributions

SM developed the literature review question, conducted the review and wrote the first draft of the manuscript. FS and IB provided feedback on the review question and analysis. AF and NM supported in visualising and drafting the manuscript. All authors have contributed to the final version of the manuscript. All authors read and approved the final manuscript.

## Funding

This work was made possible by PhD scholarship and research funding from the Indonesia Endowment Fund for Education (Lembaga Pengelola Dana Pendidikan), Ministry of Finance, the Republic of Indonesia (S-295/LPDP3/2017).

## Availability of data and materials

Not applicable.

## Declarations

## Ethics approval and consent to participate

Not applicable.

## Consent for publication

Not applicable.

## Competing interests

The authors declare that they do not have any competing interests.

Received: 12 January 2024 Accepted: 11 December 2024

Published online: 14 February 2025

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