



Emerging Roles of Community Pharmacist in Public Health: A Review on ASIA

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ABSTRACT:

This study's aim was to conduct a comprehensive review of previously published research publications related to the emerging roles of community pharmacists in public health in Asia. It aims to analyze the new roles that community pharmacists are being called upon to fill in Asian regions in public health with also a focus on maximizing the full capacity of pharmacist skills and development to public health, a continuing advocate, and first-line empowerment of providing pharmacy information queries. The written works of this study utilized a systematic search of existing literature, including articles reporting on the emerging roles of community pharmacists in public health, using the following databases: Cochrane, Google Scholar, Science Direct, PubMed/Medline, and ResearchGate. Hand-searching relevant articles on the research topic were employed to help ensure the confinement of all necessary existing literature/articles. The intervention or services types are classified based on the following: smoking cessation services, weight management services, alcohol reduction services, chronic disease management, drug misuse prevention and management services, and immunization and vaccination services; each comprises different major processes aiming to improve an individual's health status providing ways upon validation that are crucial for the betterment of public healthcare. In accordance with the studies, community pharmacist-led public-health programs markedly strengthened the efficiency, steadfastness, and cost-effectiveness of the allocation of public health resources whilst still optimizing the health of clients and patients, specifically whenever it arrives at assessing prospective issues and individuals who seek specialized care. Notwithstanding such, community pharmacy operations still necessitate modification to satisfy the evolving demands of consumers of modern medications. Training must attempt to boost pharmacists' confidence in supplying these services if community pharmacies are to elevate the public health services they serve. A proactive approach to the delivery of public health care by confident, well-trained pharmacists should have a favorable impact on client attitudes and health.

Introduction:

Pharmacists are fundamental in the team of medical professionals and contribute significantly to the delivery of the public healthcare system with the increasing health demand worldwide [1]. Community pharmacies have worked hard over time to broaden their responsibilities with more than just dispensing to include increasing their roles in issues regarding public health. Pharmacists are employed in a range of public locations, including nursing homes, drug, supermarket, and retail establishments. This ease of access opens up a wide window of opportunity for public health services, thereby addressing a gap in care and prevention. Additionally, pharmacists in the community are in a great position to serve as providers of knowledge on lifestyle modifications that can affect health outcomes[89]. The practice has been influenced by the continuing growth of medical systems as the consumers' expectations and health needs expand [2]. Many countries, all to varying degrees, have shifted pharmacy education, system, and execution from a narrowly product-oriented approach to patient-centered care due to contemporary policy contexts[3]. In addition to providing medications, community pharmacies now employ pharmacists who counsel customers on a variety of behaviors that might enhance health and optimize the treatment of chronic illnesses[4]. The success of community pharmacy-based public health interventions has been established in programs such as smoking cessation, health promotion, disease screening and preventive activities as well as the delivery of emergency hormonal contraceptives, and vaccination services [5]. As a result, healthcare professions and various governments are now seeking improved knowledge and practice that is focused on public health, preparing healthcare practitioners, including pharmacists, to discern and grasp beyond a single patient to the broader community and the public, itself, as a whole[6].

With very few exceptions, traditional practices of community pharmacies are widespread and prevalent among countries in Asia. On the other hand, present day pharmacists provide more public health assistance, administrative work, and patient-centered approaches. Services related to drug therapy, access to care, and prevention are just a few of the many aspects of public health that can profit from a drug expert's knowledge and competence. Health care provided by pharmacists promotes clinical outcomes, improves the health and the quality of life of the patient as a whole and

minimizes medical costs through the reduction of mortality and morbidity related to the use of drugs [92]. In addition to overseeing medication administration and patient compliance, pharmacists have been crucial in developing remote health care services, promoting infection control awareness, supplying infection control measures, and supplying frontline healthcare workers with drug information[90]. With the change that has taken place, a new set of beliefs and assumptions about how patients should be served have emerged. A patient's satisfaction is a crucial measure of the quality of health care services, their connection with healthcare workers, and their adherence to their treatment course and guidelines [91]. The objective of this article review is to elucidate the emerging roles of community pharmacists in public health in Asia. It aims to analyze the new roles that community pharmacists are being called upon to fill in Asian regions in public health.

Methodology:

2.1 Search strategy

This study utilized a systematic search of existing literature, including articles reporting on the emerging roles of community pharmacists in public health, using the following databases: Cochrane, Google Scholar, Science Direct, PubMed/Medline, and ResearchGate. Hand-searching relevant articles on the research topic were employed to help ensure the confinement of all necessary existing literature/articles. The search was specified to research articles/studies published from 2010 to the present using the related search terms, which are the following but not limited to "community pharmacy-led intervention in public health", "community pharmacy-led services", "community pharmacist roles in public health", "community pharmacist in public health", and more. The search was conducted independently by 8 investigators (Bucalon, Enopia, Lambungog, Letada, Mama, Taer, Togonon, and Yana) who retrieved relevant studies from 2010 to present. Following this, the articles/literature retrieved were classified based on the intervention or type of services led by community pharmacists in public health within Asia. The intervention or services types are classified based on the following: smoking cessation services, weight management services, alcohol reduction services, chronic disease management, drug misuse prevention and management services, and immunization and vaccination services. The following kinds of literature were analyzed and discussed to assess the emerging roles of community pharmacists in public health in Asia. The study inclusion was limited to within the Asia continent and English as the basis of language.

2.2 Study Selection

The inclusion criteria for this literature review were as follows:

1. Articles on services led by community pharmacists in public health
 - a. Articles on community pharmacy-delivered smoking cessation services
 - b. Articles on community pharmacy-delivered weight management services
 - c. Articles on community pharmacy-delivered services rendered in the course of COVID-19
 - d. Articles on community pharmacy-delivered chronic disease management services
 - e. Articles on community pharmacy-delivered drug misuse prevention and management services
 - f. Articles on community pharmacy-delivered immunization and vaccination services
2. Articles on the impact of community pharmacy-delivered services in public health
3. Articles on the effectiveness of community pharmacy services and their implications in public health
4. Articles on the views of the general public on their experiences with public health services in community pharmacies

The exclusion criteria included the following:

1. Articles that are not focusing on the community pharmacy-delivered interventions or services in public health
2. Articles on the emerging roles of community pharmacist in public health that are not under ASIAN Regions

Results and Discussion

3.1 Literature Search

The search yielded 79 articles and each article was screened for a full-text assessment. In this literature review, 79 articles were utilized.

Table 1. Services led by community pharmacists in public health

Author(s) and Country	Study Description	Findings/Conclusions
Community pharmacy-delivered smoking cessation intervention		
Lertsinudom et al., 2021 - Thailand	Thirteen health regions in Thailand were studied to report the effectiveness of community pharmacy interventions on smoking cessation using a retrospective data-collecting method from the database of Foundation of Community Pharmacy.	The study concluded that in at least 30 days, 28.8% of cigarette smokers self-reportedly quit with the help of community pharmacy intervention. Despite the fact that some smokers were unable to stop, after using the community pharmacy's smoking cessation services, participants' daily cigarette consumption, exhaled CO level, and %PEFR all dramatically decreased [7].
Onda et al., 2021 - Japan	A group of researchers in Japan initiated a single-arm feasibility trial in two community pharmacies. During the FINE Program, the researchers facilitated the training and follow-ups to help the pharmacists become better qualified health supporters and recruited patients eligible according to their inclusion criteria during the recruitment period.	The easily accessed FINE program paved the way to look into patient's smoking habits. This is only applicable to the patients who frequently visited the same pharmacies. Additionally, the pharmacists confirmed that the program made it feasible to counsel patients appropriately. Given that it can be completed quickly and takes into account the patient's level of motivation in quitting, the FINE program makes it possible to offer smoking cessation support services. The strategy and specifics of the recommended support services for quitting smoking were made known [8].
Kristina et al., 2015 - Indonesia	A one-day workshop for community pharmacists was held in Yogyakarta, Indonesia. The PCE, name of the workshop, is composed of an approximate 6 hour-hour class and was divided further into two: a 3-hour lecture and a 3-hour role play session. After which, an evaluation assessment was done the next day.	Following the PCE training, it was discovered that pharmacists had significantly improved knowledge, perceptions of their roles in helping people quit smoking, and self-efficacy in this area. They also had positive intentions and had good competence to provide cessation counseling. The findings showed that many pharmacists were unable to support patients in quitting, particularly in assisting quit plans (facilitating quit process includes dealing with withdrawal symptoms and other issues related to quit), and to set up follow-up. As a result, more training is needed in these areas [9].
Taha et al., 2014 - Malaysia	A study in Penang, Malaysia wanted to assess the knowledge, attitudes, practice and perceived barriers to smoking cessation of community pharmacists in the area through a cross-sectional survey. A self-administered questionnaire was used as the instrumentation for the said research.	There was an association between knowledge and CSCSP participation in this study, meaning that those who participated in the CSCSP tended to have better knowledge. Nearly three-quarters of the respondents had at least a moderate level of knowledge of pharmacotherapy-related issues in tobacco cessation. It was also importantly noted that in Malaysia, smoking cessation teaching has been incorporated into many undergraduate pharmacy programs, giving community pharmacists access to the fundamentals of this field of medicine [10].
Thavorn et al., 2008 - Thailand	Researchers in Thailand wanted to analyze the cost-effectiveness by comparing usual care and community pharmacist-based smoking cessation (CPSC) Program. Where, the CPSC Program included a systematic identification and documentation of smoking status.	The community pharmacist-based smoking cessation program (CPSC) increases life expectancy while reducing costs. The study indicates that the CPSC program saves money. This is because the program is less expensive than the further complications brought on by smoking in the long-run [11].
El Hajj M et al., 2010 → Qatar	More than 85% of community pharmacists in Qatar who participated in a cross-sectional poll about pharmacists' interests in offering smoking cessation counseling said they were interested in doing so. In view of these findings, the first controlled trial was done in Qatar to examine the efficacy of a smoking cessation program provided by a pharmacist.	314 smokers were randomly divided into the intervention and control groups for this program. Every two to four weeks, participants in the intervention group attended a planned and rigorous four-session smoking cessation program with the pharmacists. Participants in the control group got informal, brief coaching about quitting smoking.[12].

Asayut et al., 2022 → Thailand	A randomized controlled trial study compared the effectiveness of community pharmacists' smoking cessation services utilizing PharmQuit to standard care. The study involved 156 individuals who were 18 years of age or older, had smoked at least one cigarette per day for a month, were prepared to quit, agreed to take part, and owned a smartphone. It was a prospective, multicenter, randomized controlled experiment.	The findings demonstrated the value community pharmacists offer in aiding smokers in quitting. PharmQuit's quit rates were superior to or comparable to those of certain other studies. PharmQuit may aid pharmacists in achieving improved adherence to smoking cessation programs even if it was not more effective than pharmacist counseling. So, one alternative for smokers participating in larger clinical trials with the goal of quitting smoking is to use a smartphone app.[13].
Shafie et al., 2014 → Malaysia	Retrospective analysis was done on the patient medical records at the PM-QSC in a tertiary hospital in Melaka, Malaysia, from January 2009 to December 2010. Patients were divided into three categories: current smokers, considered trying, and quitters.	The provision of cessation services by a pharmacist at a publicly financed QSC was linked to a high default rate. Despite the fact that this research highlights the necessity to address the high default rate before the service is expanded, the pharmacist cannot be completely disregarded as an ineffective health care professional (HCP) for the provision of the cessation service based only on this early data.[14].
Community pharmacy-delivered weight management services		
Blebil et al., 2022 - Malaysia	The study applied the model called capability, opportunity, motivation, and behavior (COM-B) to features related to Weight Management Service deployment among community pharmacies in an effort to generate and suggest improved intervention strategies. This was because previous studies that looked at how community pharmacists (CP) implemented weight management services frequently lacked a theoretical foundation.	Programs or training for CPs should build their psychological capacity to alter their behavior by being more proactive in advocating and delivering services for weight management, with a crucial educational component. The study's findings provided important information about the elements that influence this service in Malaysia and will support efforts to include dietary counseling into academic programs [15].
Phimarn et al., 2013 - Thailand	A comparison study of the pharmacist's interventions and a routine weight management service provided by a primary care unit (PCU) in Maha Sarakham province, Thailand, was conducted to assess essential outcomes. This study utilized a randomized controlled trial with sixty-six (66) patients and one (1) pharmacy of choice. key	There was a significant increase in average sum scores for the experimental group from baseline to intention to perform healthy eating behaviors, subjective norms, behavioral beliefs, normative beliefs, and control beliefs. Thai community pharmacists can help patients understand weight and obesity and improve their eating habits. It is still necessary to conduct a long-term study since the impact on clinical outcomes remains unclear.[16].
Verma et al., 2021 - Malaysia	A qualitative study is conducted to examine the perspectives of Malaysian community pharmacists on their roles in weight management, as well as barriers and facilitators to their expansion.	In general, community pharmacists considered themselves able to contribute to weight management in this study. Their range of weight management interventions and services included education and advice, supplement selection, monitoring, and referrals to other healthcare providers. There are, however, practical limitations, such as a lack of space, time, and reimbursement. [17].
Verma, Paraidathathu, Taha, & Chong, 2018 - Malaysia	The research study investigated the insights and views of the general public regarding the little-known services related to weight management which is provided by the community pharmacists in Malaysia.	Majority of respondents supported weight management programs at community pharmacies, a small proportion actually used them. Community pharmacists may contribute significantly to tackling the obesity problem in Malaysia if they received proper training and the public was made more aware of their services [18].
Hijazi et al., (2020) - Lebanon	An examination of community pharmacists' roles in weight management in Lebanon is undertaken, particularly in regard to their beliefs, current practices, and service and knowledge. Stratified random sampling was used in a cross-sectional national survey of community pharmacists.	Weight management is deemed to be crucial by the majority of participants. Despite this, pharmacists strongly believe weight loss products are unregulated and that companies marketing weight loss products make false claims [68].

Community pharmacy-delivered services rendered in the course of COVID-19		
Kua, K. P., & Lee, S. W. H. (2021). - Malaysia.	This study intends to analyze the perspectives of community pharmacists' attitudes toward their profession, workplace procedures, and readiness for safe retail customer interaction to halt the spread of COVID-19, as well as to evaluate the variables that influence coping mechanisms during the pandemic.	The results indicate the frontline and crucial responsibilities of community pharmacists in pandemic response, allowing for the identification of areas where community pharmacy services can be implemented to reinforce the public health system and boost patient health outcomes [58].
Nguyen, et al., (2021). - Vietnam.	Addressing the COVID-19 pandemic, this study examines the knowledge, inclinations, and practices of Vietnamese pharmacists. The study also indicates the measures applied by the pharmacists to protect people from COVID-19.	The pharmacists had an excellent understanding and practices in terms of the COVID-19 transmission, symptoms, and prophylaxis. In pharmacies, several effective steps were taken to prevent the spread of this dangerous illness. However, pharmacists should limit the frequency with which they neglect to use face masks when communicating with drug consumers [59].
Zeenny, et al., (2021).- Lebanon.	Community pharmacists are accountable for a variety of tasks, including dispensing prescription medications, storage and distributing sufficient stocks of medicinal products, equipment, and masks, as well as counselling services, alerting, and instructing the masses, triaging and referring patients, and publicising disease mitigation and infection control measures.	Lebanese community pharmacists demonstrated an appropriate and good practice regarding COVID-19. Their concerns of contracting the infection and jeopardizing the security of others are warranted. Unfortunately, they have a limited supply of protective equipment [60].
Al Hasani, et al., (2022). - Iraq	The impetus of this study was to investigate community pharmacists' readiness and adherence to the International Pharmaceutical Federation (FIP) Health Advisory COVID-19 standards for pharmacists (July 2020) amid the COVID-19 outbreak.	This study found differences in several areas of applying cautious measures, along with pharmacists' knowledge of safety protocols to forestall COVID-19 transmissions in community pharmacies. The study identified the real-world challenges that community pharmacists faced and hampered the implementation of preventative strategies. The high volume of patients entering the pharmacy and the need to work long hours were the primary motivators for taking preventive measures. The greatest impediment to executing the precautionary measures was a lack of information on COVID-19 [85].
Community pharmacy-delivered chronic disease management services		
Siaw et. al., (2018) - Singapore	In Singapore, patients who were diagnosed with Type 2 Diabetes were invited in a qualitative study on their perception of pharmacist-managed diabetes services in outpatient settings—ambulatory and community settings.	Patients reported that they have better diabetes-related self-empowerment through the increased medication knowledge and lifestyle modification brought by pharmacist-managed diabetes services (PMDS) in ambulatory care and community pharmacy. Improved medication adherence and glycemic control were also observed [19].
Tunggul Adi et al., (2021) - Indonesia	A randomized controlled trial conducted in Indonesia, specifically, Bnyumas District, Central Java for over a 24-week period highlighting the community pharmacist home visit-based intervention in improving diabetes patients' outcome.	The result showed that the provision of home visit services led by the participating pharmacist showed a significant 0.90% mean change difference of HbA1c values between the study groups. Indonesia's community pharmacist intervention has improved the outcomes of patients with diabetes. Although, issues on sustainability of this and economic outcome of this service remains unelucidated [62].
Liu et.al., (2021) - China	A study in China aimed to investigate the role of community pharmacists in hypertension management where some patients received intervention while others did not.	The patients who received intervention have had a significant increase when it comes to using the information acquired from the pharmacists. Awareness of the patients is also enhanced. The hypertension status of patients who received interventions from the pharmacists showed a significant improvement on their blood pressure status [20].

Malik et al., (2022) - Pakistan	A randomized, controlled, single blinded, pre-post intervention study was conducted in Pakistan to test the effectiveness of community pharmacy diabetes and hypertension care program.	A significant improvement on the knowledge scores of patients having diabetes and hypertension who received the intervention, counseling, for six months. The patients blood glucose levels and systolic blood pressure were found to be significantly controlled after 6 months. In conclusion, the counseling of community pharmacists has a positive impact on blood glucose and blood pressure management among patients having both diabetes and hypertension [21].
Okada et al., (2016) - Japan	A pragmatic cluster randomized trial conducted in Japan focusing on the effects of lifestyle intervention performed by community pharmacists on the glycemic control in patients with Type 2 Diabetes. 132 patients were part of the study where 90 received the intervention and 42 received the usual care.	After 6 months, the group who received intervention has a significant improvement on HbA1c. The intervention led by community pharmacists on lifestyle improved the glycemic control of patients with T2D. More positively, they may participate as lifestyle coaches for diabetes care [22].
Li et al., (2021) - China	A randomized controlled trial study conducted in China to test the effects of Pharmacist Intervention on Community Control of hypertension within 6 months of the study.	The group who received an intervention had a significantly higher percentage when it comes to controlling their blood pressure in 3 months and 6 months after the interventions; they also had a higher odds of not needing any medication adjustments. In this study, it was evident that the intervention of community pharmacists has significant short term effects on improving the knowledge and medication adherence of patients with hypertension which in turn results in lowered blood pressure as well as increased control rate [23].
Abubakar et. al., (2021) - Pakistan	A study was conducted to determine the impact of pharmacist-led interventions on satisfaction, disease state knowledge and perception of self-management of diabetes patient through a quasi-experimental study in Bahawalpur.	It showed that there was a significant improvement seen in patients when it comes to satisfaction, disease state knowledge and self-management of diabetes after the intervention. This concluded that interventions resulted in significant improvement in patients in terms of satisfaction, disease state knowledge and perception of self-management among patients with T2DM [24].
Khan et al., (2019) - Saudi Arabia	A program utilizing community pharmacists to improve diabetes education where it aimed to demonstrate that retail community pharmacists could successfully recruit, engage and counsel people with diabetes by serving as a trusted source of diabetes information.	As stated in the article, patients demonstrated a reduction from 8.50% (69 mmol/mol) to 7.32% (56 mmol/mol) in their blood glucose level. Improvements also were seen in diabetes awareness, attitudes towards diabetes and medication adherence of the patients [25].
Community pharmacy-delivered drug misuse prevention and management services		
Mobrad A. et. al (2020) - Saudi Arabia	In a community pharmacy in Riyadh, Saudi Arabia, the knowledge, attitudes, and beliefs of pharmacists regarding drug addiction and misuse were examined for the purposes of this study. Between April and June 2019, community pharmacists participated in a cross-sectional study utilizing a validated self-administered questionnaire. The poll asked participants 25 questions about their knowledge, attitudes, beliefs, strategies, and opinions regarding drug usage and misuse.	This study revealed that the majority of community pharmacists (85.8%) in this poll said they would want to see more drug abuse education programs in the future. Almost all pharmacists (94.9%) reported providing suitable guidance, either verbally or in writing, to suspected drug abusers at their pharmacy [87].

Bashir et. al.,(2021) - Pakistan	This study's objective is to shed light on illegal drug sales practices at neighborhood pharmacies and drug stores in Punjab, Pakistan. In Punjab, Pakistan, 200 neighborhood pharmacies and drug stores participated in the study. To ascertain the degree of their unethical sales practices, salespeople at pharmacies and drug stores were interviewed, and their allegations were then verified by sending fictitious consumers to their neighborhood pharmacies.	Only 5% of the 200 pharmacies where the pharmacist were physically present while the remaining 95% (n = 190) were run by unqualified individuals and were determined to be engaging in illegal sales activities. Customers were being given controlled medications without a prescription, which is a problem that must be addressed for effective policy making [88].
Nontharit Voravuth (2022) - Malaysia	The goal of this study was to evaluate community pharmacists' knowledge of how to handle Malaysia's problem of inadvertent doping. 384 community pharmacists in Malaysia were surveyed cross-sectionally using a self-administered questionnaire.	The study found that the respondents' knowledge of doping is on a modest level. Community pharmacists in Malaysia don't know enough about doping. To increase community pharmacists' comprehension of the issue of unintentional doping, more programs and activities concerning doping and drugs in sports should be held. [26].
Saleh, Doaa (2021) - Jordan	The purpose of this study was to assess community pharmacists' awareness and perceptions of antimicrobial resistance and Antimicrobial Stewardship Program (ASPs) in Jordan. For this reason, twenty community pharmacists were interviewed in-depth for a qualitative study. The study employed convenience sampling.	The reasons of antibiotic resistance were well understood by all respondents. The non-restricted prescribing of antimicrobials was cited as the most significant culprit of antimicrobial resistance. Most pharmacists stated that they were competent to administer ASPs; nonetheless, they believed that there were various hurdles to ASP implementation in community pharmacies located in Jordan. The hurdles highlighted by the pharmacists were organizational difficulties, resource obstacles, and personal obstacles [27].
Shimane et al., (2014) - Japan	A study was conducted to examine how community pharmacists respond to overdosed patients and their capacity to prevent overdoses and drug misuse. Pharmacists were mailed a questionnaire that could be self-administered anonymously.	Pharmacists evaluated their effectiveness in medication counseling as half as good or excellent in this study. Community pharmacists in Japan are capable of preventing prescription drug abuse. However, their self-evaluations were poor when it came to referring patients to prescribers, especially if they were frightened of causing trouble with prescribers or patients and had limited confidence in communicating with them. [28].
Kotwani et al., (2011) - India	To understand the dispensing practices and behavior of community pharmacists in New Delhi, India, and to design policy interventions to improve antibiotic use in the community, a qualitative study was conducted. The office bearers of pharmacy associations, retail pharmacists, and public sector pharmacists were involved in focus group discussions (FGDs) in five municipal wards of Delhi.	In focus group discussions with pharmacists working in the public sector, factors such as overstocks, near-expirations, and undersupplies of antibiotics were identified as contributing to antibiotic misuse. These qualitative findings were influenced primarily by commercial interests and insufficient knowledge about rational antibiotic use and antibiotic resistance. To minimize the irrational use of antibiotics, pharmacists in the community participated in antibiotic education programs [29].
Siltrakool (2017) - Thailand	Pharmacists' knowledge, attitudes, and practices related to over-the-counter antibiotics, as well as antimicrobial resistance, are explored in this study. This cross-sectional descriptive study of pharmacists in Bangkok and Chonburi was conducted between May and July 2017.	A major contributing factor to antimicrobial resistance is the abuse, misuse, or inappropriate use of antibiotics. The results of this study reveal that over 90% of participants know and understand the problems related to antimicrobial resistance and antimicrobial use. Pharmacists in Thailand can maintain their competency by attending continuing education courses, adhering to antimicrobial guidelines, working with other healthcare providers, and educating the public about resistance to antimicrobials [30].

Nga et al., (2014) - Vietnam	For three consecutive days in 2010, all drug sales at thirty private pharmacies in the Hanoi region, 15 urban and 15 rural, were observed and recorded in a cross-sectional study. The incentive structure of antibiotic dispensing was explored using a semistructured questionnaire and in-depth interviews with pharmacists and drug sellers.	The amount of antibiotics being sold without a prescription is 88% in urban pharmacies and 91% in rural pharmacies. There is a lack of knowledge about antibiotics and antibiotic resistance among drug sellers and customers in rural areas. Increasing knowledge among drug sellers and raising community awareness are recommended measures to reduce demand-side pressure on drug sellers to dispense antibiotics inappropriately. These measures can be implemented by regulating drug sellers, executing pricing policies, and conducting educational programs. [31].
Community pharmacy-delivered immunization, screening and vaccination services		
Kangwol & Anantachoti (2016) - Thailand	In Bangkok, a cross-sectional study utilizing a self-administered mail survey implemented. The study evaluated knowledge, examined intentions to offer each service, and identified influences on community pharmacists' intentions to provide services such as disease screening (DS) and medication management programs (MMP).	The study's result showed that the service model for MMP needed to be as consistent as possible with the professional pharmacy act and avoid duplication with other healthcare professional responsibilities. The service model for DS needs to be simpler, especially in terms of knowledge and skill requirements, and it needs to be made to streamline the documentation process. It is essential to practice strategies that affect community pharmacists' decisions to offer MMP and DS [32].
Kristina & Hanifah (2021) - Indonesia	In Yogyakarta province, Indonesia, community pharmacies during August and October of 2019 a cross-sectional survey was utilized. It primarily aims for the evaluation of pharmacists' preparation for and obstacles to provide vaccination services whereas a self-administered questionnaire was made.	The result of this study indicates that practically all neighborhood pharmacists have a favorable opinion about offering immunization services. Community pharmacists believed they might play a significant role in boosting the immunization rate and enhancing the vaccination program because of their accessibility, distribution, and knowledge of the available medicines [33].
Yang et al., (2015) - China	The study aimed to determine whether pharmacy-delivered harm reduction services (PDHRS) could be adopted for persons who inject drugs (PWID) in Liangshan, China, where the prevalence of HIV is high (1.1%).	Although community pharmacists have been offering PWID services in various nations and regions of China, full PDHRS has not been reported in Liangshan, where HIV is common, and injection drug use is the primary method of HIV infection. The results showed that while NPSS from pharmacies gave the majority of PWID new needles, disposal of spent syringes was difficult [34].
Jarab, Al-Qerem & Mukattash (2022) - Jordan	From February to June 2021, community pharmacists in community pharmacy settings throughout several Jordanian regions participated in an anonymous cross-sectional online survey.	Despite the widespread intention to offer vaccination in community pharmacies, the current study discovered various barriers to vaccination. Implementation of training courses and educational initiatives should be considered to remove changeable barriers and improve accessibility to pharmacist-delivered immunization services [35].
Almanasef et al., (2021) - Saudi Arabia	This cross-sectional study employed a self-administered online survey. Between September 2019 and February 2020, the study was conducted in the Saudi Arabian province of Asir. A convenience sample strategy was used to select and enroll study participants.	In accordance with the findings of the current study, community pharmacists in the Asir region perform a variety of public health activities. Further research is required to understand the barriers to the delivery of public health services and the best approaches to increase the public health role of community pharmacists in Saudi Arabia [36].
Youssef, Abbas, & Hassan (2021) - Saudi Arabia	A cross-sectional study incorporating an online survey was conducted among Lebanese community pharmacists between the first of November and the end of December 2020. The questionnaire covers their sociodemographic characteristics, willingness to receive immunizations, and perceived immunization service barriers.	67.48% of the 412 community pharmacists surveyed stated that they would be willing to widen their scope of practice to include vaccines. Conflicts with other professionals, concerns about liability and reimbursements, a lack of time for professional growth, and a lack of knowledge regarding adverse reactions to immunizations were the most often mentioned obstacles [37].

Almansour et al., (2020) - Saudi Arabia	In Saudi Arabia, a qualitative study including community and hospital pharmacists was conducted using semi-structured in-depth interviews and focus group discussions. Data collecting continued until saturation was attained. Each interview was audio recorded, transcribed verbatim, and thematically evaluated.	Saudi pharmacists are keen to take on new duties and provide pharmacy-based services, but influencing factors at the personal, professional, and health-care system levels must be addressed. It is still necessary to clarify and establish valuable and appropriate processes for pharmacist cardiovascular disease prevention and management services within the Saudi public and health care systems [38].
Balkhi et al., (2018) - Saudi Arabia	The study utilized a cross-sectional paper-based survey carried out between February and April 2016 in the community pharmacy setting in the Riyadh region.	Saudi community pharmacists are eager to provide immunization services. Nonetheless, addressing the challenges indicated in this study is the foundation for success in any planning for the future for integrating immunization services in the community pharmacy context [39].
Alnahar et al., (2022) - Jordan	A cross-sectional study of Jordan's qualified and active community pharmacists was conducted. To discover qualified individuals, the Jordan Pharmacists Association (JPA) database and personal ties were used. All active community pharmacists in Jordan were eligible to participate in the study.	The experience of the pharmacists, the drugstore architecture and supplies, patient acceptability, and the legal and regulatory environment all influence how vaccination services are established and administered in community pharmacy settings. Patients' safety and satisfaction could be ensured by having pharmacists who have obtained the necessary training and are properly prepared to operate in well-equipped and well-designed community pharmacies [40].
Youssef et al., (2021) - Lebanon	A cross-sectional investigation was conducted prior to the arrival of the COVID-19 vaccination in Lebanon. Justifications for using pharmacists as immunizers, as well as the items sought to include immunization in pharmacists' practice scope, were gathered from Lebanese community pharmacists (CPs) via an online survey using a stratified random sample method.	In Lebanon, most community pharmacists are willing to administer immunizations. For the pharmacist's practice to be expanded to include the dispensing of immunizations, a comprehensive plan that involves increasing pharmacovigilance, improving expertise, training, accreditation for eligibility to provide vaccinations, and law reform is required [41].
Nusair et al., (2020) - Jordan	The study uses semi - structured telephone interviews to conduct a cross-sectional exploratory investigation. In accordance with the study's objectives, the researchers devised a semi-structured interview schedule that included open-ended questions.	The three primary subjects that highlighted the viewpoints of the participating pharmacists on giving influenza vaccine administration services in local pharmacies were benefits, facilitators, and barriers. The participating pharmacists' thoughts toward giving the flu shot in neighborhood pharmacies were mostly favorable. The study also made clear the importance of including vaccine administration in courses for new pharmacy graduates [42].
El Hajj et al., (2022) - Qatar	A self-administered validated questionnaire was used in a cross-sectional study of a randomly selected sample of community pharmacists in Qatar. The items on potential influences of adult vaccination attendance in the questionnaire were prepared using a theoretical domain structure.	Most of respondents (83.5%) had no prior vaccination administration training, and 78.9% were not involved in vaccine advocacy initiatives. It may be necessary to address pharmacists' perceptions of their knowledge, talents, confidence, and behavioral control in order to make it simpler for them to participate in vaccination administration in Qatar [43].
Qamar et al., (2022) - Malaysia	From February to May 2020, a validated, self-administered survey was employed in a cross-sectional study of community pharmacists in the Malaysian state of Selangor.	Most CPs had a fair amount of understanding about vaccinations. The majority of them supported the implementation of community-based immunization programs because they could boost the country's coverage rate as well as the population's access to and resiliency toward the public health system. Other services that CPs can provide include vaccination information, reminders, and recognizing the high-risk population [44].

Lum et al., (2021) - Asia Pacific	A survey and a systematic review were both used in a mixed-method study. From commencement to March 2021. Studies conducted in Asia and the Pacific that involved pharmacist involvement in immunization advocacy and training were considered, as were randomized controlled trials and observational studies.	Studies from the Asia-Pacific region, however few, revealed higher vaccination rates when pharmacists were involved. Pharmacists in the Asia-Pacific region should be supported for their involvement in the vaccination community as part of the global battle against vaccine-preventable infectious diseases, particularly given Singaporean pharmacists' eagerness to be trained in immunization advocacy and delivery [45].
Noori Istehkam et al., (2020) - Malaysia	In this cross-sectional survey of Malaysian community pharmacists, a validated questionnaire modified from a Canadian study was employed.	Malaysian community pharmacists' knowledge of vaccination and immunization must be improved by modifying the curriculum of pharmacy programs and providing training and workshop sessions for practicing pharmacists. Because community pharmacists from several states participated in this study, the findings are applicable to the entire country [46].

The role of pharmacists, most especially, community pharmacists, is vital in maintaining and promoting public health. Be it global, national, state, regional, and institutional, the pharmacists have a responsibility to promote public health [66]. In this article review, several interventions have highlighted the emerging roles of community pharmacists on public health especially on smoking cessation [7-14], weight management [15-18, 68], COVID-19 [58-61], chronic disease management [19-25, 62], drug misuse prevention and management [26-31], and immunization and vaccination [32-46].

Interventions on smoking cessation led by the community pharmacists have significantly led to their decrease in daily cigarette consumption [7], increased their motivation to quit [8], and offered benefit in helping smokers quit smoking [13]. Although there are still studies indicating that pharmacists' role is not that effective in the smoking cessation of patients [9, 14], there has been a lot of initiatives on improving community pharmacists competencies through community-based smoking cessation programs and training for the pharmacists [9, 10, 11, 12]. Relevantly, it was highlighted that many undergraduate pharmacy schools in Malaysia presently incorporate education on smoking cessation, enabling community pharmacists with access to the principles of this branch of medicine [10].

On the aspect of weight management services delivered by community pharmacists, several studies had a positive response on the interventions that help patients in improving their eating habits and knowledge on their weight as well as obesity [16]. Community pharmacists are receptive to the idea that they can contribute to the weight management of the patients [17], not only that, respondents also supported the weight management programs delivered by community pharmacists in community pharmacies and agreed on their important roles in weight management of patients [18, 19, 68]. On the facet of services provided during COVID-19, community pharmacists' role emerged even so. It was emphasized during the time of pandemic that they had indispensable roles as the public's frontline and their responsibilities are important to reinforce the public health system and improved patient health outcomes [58].

Following the findings of the current survey, 50% of the pharmacists thought they were competent or exceptional at rendering medication counseling. Community pharmacists in Japan have demonstrated the requisite confidence to converse with prescribers and the expertise to minimize prescription drug dependency [28]. By employing pharmacists who have obtained the appropriate training and are effectively prepared to operate in community pharmacies that are well-equipped and well-designed, patients' security and gratification may be guaranteed [42].

On the condition of chronic disease management services delivered by pharmacists, patients who underwent community pharmacists-led interventions had a significant improvement on their hypertensive [20] and diabetic [19, 21-22, 24-25, 62] disease management. According to the patient, they had an increase in understanding about their diseases and medication [19-21, 24, 25], better medication adherence [19, 25]. This indicated that diabetic patients' perceptions of self-management, disease state cognition, and patient satisfaction significantly augmented as a byproduct of interventions conducted by pharmacists in a community pharmacy context [24].

On the aspect of community pharmacy-delivered drug misuse prevention and management services, efforts on drug abuse education programs that supplement community pharmacists' adequacy to offer appropriate advice to potential drug misusers has been enacted upon as revealed by a study that the majority of community pharmacists (85.8%) would want to see more drug abuse education programs in the future and almost all pharmacists (94.9%) reported offering appropriate advice to suspected drug misusers at their pharmacy, either in writing or orally [87]. However, the implementation of drug abuse education programs for community pharmacists alone is not enough. Studies show that pharmacists take part in illegal sale activities, leading to customers' inadequate knowledge of drug misuse and abuse complications in some Asian countries [26-27, 29-31, 88]. These complications is not imposed on the patient alone but the community as antimicrobial resistance play part. Furthermore, the area, whether urban or rural, shows little difference in significantly high percentages of antibiotics being sold without prescription [31]. However, a the antibiotic resistance was well understood by the pharmacists along with its complication and cited that the main culprit of it was non-restricted prescribing and dispensing of antimicrobial thus the pharmacists understood the need for Antimicrobial Stewardship Program and was more than capable to provide such services but expressed that there are many hurdles in providing such program [29]. There were also unintentional doping happening in Malaysia, the pharmacists admitted to have only moderate knowledge about doping-related drug issue thus more program involving doping and drugs in sports should be held in order to improve community pharmacists' understanding of the issue of unintended doping [28].

On the aspect of community pharmacy-delivered immunization, screening and vaccination services, most believe that community pharmacists carry a variety of public health tasks [36] of which vaccination and immunization should take part. Worries of other professionals facilitating this role include worries about liability and reimbursements, lack of time for professional development, and ignorance of adverse reactions

to vaccinations as main hurdles [37]. Thus, the need of this intervention has been collectively emphasized on to boost immunization rates, strengthen vaccination programs as it is relatively more accessible for community pharmacist who has sufficient knowledge of and may easily distribute necessary medicines and aides [33, 44-45]. Most Asian country pharmacists agree and are willing to play part to boost pharmacovigilance through a series of trainings and certifications for eligibility to administer vaccinations and dispensing immunizations [38-41, 43]. Moreover, some studies believe that a change in curriculum of pharmacy programs for new pharmacy graduates must include the knowledge of vaccination and immunizations in training courses and other educational programs [35, 42, 46].

Table 2. Impact of community pharmacy-delivered services in public health

Author(s) and Country	Study Description	Findings/Conclusion
Community pharmacy-delivered services in public health		
Okuyan et al., (2021). - Turkey	In Turkey, a study was carried out to determine how community pharmacists affected older Turkish seniors who had non-communicable diseases.	The study found that community pharmacists significantly improved patient-related outcomes, including such medication adherence and medication beliefs, via pharmaceutical care services.[47].
Yang et al., 2016. - China	A cross-sectional study is used to evaluate the experience, attitudes, likelihood, and acceptability of implementing eight pharmacy-delivered interventions among PWID (n = 403), a cross-sectional study is employed. Analyzed have been the attitudes, likelihood, and acceptability of PWID and pharmacy personnel (n = 50).	In Xichang, pharmacy-delivered services for PWID were partially real and might be practical. The issue of pharmacies' legal obligations and compensation is urgently needed. Additional training on services relating to knowledge and skills, cultural sensitivity toward PWID, and pharmacy staff should be provided. The identification of mutual benefits for pharmacy-delivered services would be beneficial. Pharmacy and PWID interests and benefits.[64].
Al Alawneh et al., 2018. - Jordan	Between May and October 2016, a prospective, randomized, single-blinded intervention-control trial was carried out in Jordan's three largest cities. Chronically ill Syrian refugees were enlisted and randomly assigned to intervention and control groups. For all patients, the HMMR service was used to detect baseline TRPs. For all study participants, two home visits were used to gather data. Only the doctors caring for the patients in the intervention group received the clinical pharmacist's advice in the form of a letter.	TRPs have been discovered to be elevated among Syrian refugees in Jordan. The number of Treatment Related Problems (TRPs) was dramatically reduced by the HMMR service, and it was also well-liked by doctors. The service received good marks from refugees for satisfaction.[65].
Kawaguchi-Suzuki et al., (2019) - Indonesia	To generate pharmacists capable of performing their duties and providing pharmacy services, the Ministry of Education has established the standard minimum of credits for undergrad degree and competent pharmacy programs in accordance with the Association of Colleges of Pharmacy Indonesia and the Indonesian Pharmacist Association (Ikatan Apoteker Indonesia, or IAI).	The Indonesian government has also standardized the rules for pharmaceutical employment services. New educational initiatives and facilities are being established by numerous private and public entities. To satisfy the demands of public health, pharmacists are seeking to increase their power inside the healthcare system. As an illustration, some pharmacists are starting to assess blood pressure readings taken on the outpatient basis.[67].
Taha et al., (2016) - Indonesia.	A self-administered KAP questionnaire was given to a convenience sample of pharmacists in Kuala Lumpur who were chosen from the list of community pharmacists in Malaysia who were licensed in the year 2014 in order to conduct a study to evaluate travel medicine knowledge, attitudes, and practices (KAP) among community pharmacists.	The majority of people viewed travel medicine favorably. The vast majority offered advice on travel medicine mostly to individuals going on vacation, with the main concern being traveler's diarrhea. The quality of travel advice provided may be improved by positive attitudes of pharmacists toward travel medicine and appropriate interventions, such as including travel medicine in local pharmacy curricula, ongoing pharmacy education, or certified training. This will enable pharmacists to be recognized as a reliable source of information on travel medicine.[69]

Siddiqua et al., 2018. - UAE	In Al Ain City, United Arab Emirates, 500 patients who frequented neighborhood pharmacies were surveyed. Measures for concepts including patients' perceptions of pharmacist communication, pharmacist technical competence, patients' medication self-efficacy, patients' happiness with pharmacies, and patients' reliance on pharmacists were addressed in the questionnaire.	According to the study, patients' evaluations of pharmacist communication and their expertise both favorably influence patients' trust in pharmacists as antecedents but do not, contrary to what was discovered in earlier research, actually constitute trust. To increase patients' reliance in pharmacists, pharmacy organizations and governments should also work to increase patients' contentment with pharmacies and their ability to self-administer medications.[70].
Mathialagan et al., 2015 - Malaysia.	A cross-sectional assessment of Malaysia's five regions' registered community pharmacies' pharmacists with at most two years of work experience (Johor, Negeri Sembilan, Selangor, Perak and Penang).	To ensure that pharmacists who graduate are capable of performing a public health role, this research revealed that undergraduate pharmacy curriculum be revised to include public health training. In the interim, CPD training—which is a prerequisite for pharmacist licensure in Malaysia—should concentrate on enhancing pharmacists' public health roles.[71].
Xuan do et al., (2021) - Vietnam	A cross-sectional study was done on a sample group of 354 customers from 13 neighborhood pharmacies in five different Hanoi, Vietnam, districts.	According to the data analysis, five key factors—including the attitude and communication of pharmacy staff and pharmacists, medication and illness consultation, facilities and convenience, availability and variety of pharmaceuticals, and cost—determine how satisfied customers are with community pharmacy services. The attitude and communication of the pharmacist were the most crucial elements affecting general satisfaction (beta coefficient=0.207).[82].
Al Tannir et al., (2016) - Saudi Arabia	A questionnaire was given out to 650 Saudi citizens who were randomly selected from a sample of 650 to be interviewed in Riyadh pharmacies and public spaces in March 2014.	Saudi people have varying degrees of satisfaction with their local pharmacies. If satisfaction levels are to increase, community pharmacies must provide enough pharmacist training. Out of 500 totally completed questionnaires that were collected, 77% of them had responses. When questioned why they weren't satisfied, 82% of those who weren't claimed that pharmacists didn't ask about comorbid disorders and 78% said that there weren't any dedicated pharmacists available for patient counseling.[83].
Alfadl, Alrasheedy, & Alhassun (2018) - Saudi Arabia	In the Qassim region, eleven neighborhood pharmacies participated in the study. Considering their willingness to participate, a convenient sample of neighborhood pharmacies was selected. The study was carried out by watching how the community pharmacists who took part in it provided counseling services.	In eleven community pharmacies, 235 forms were filled out. Only 20.1% of the counseling elements were found to be adequately completed, compared to a total of 44.4% of the counseling skills. The general quality of the pharmaceutical counseling services offered to patients to enhance their medication use and, as a result, their wellbeing, was subpar [84].
Hamidi et al., 2019. - Malaysia	Data from the 2019 National Health and Morbidity Survey, a cross-sectional household survey conducted countrywide with a two-stage stratified random sampling design, were utilized for secondary data analysis. The characteristics of the respondents were described using comprehensive sample descriptive statistics.	In Malaysia, self-reported health issues, sex, age, education level, and location were all significant socioeconomic and demographic predictors of community pharmacy use. These results provide support for policy changes that are essential for increasing access to healthcare services.[79].
Loh et al., (2021). - Malaysia	An online survey was used in a cross-sectional observational study. Email invitations were sent to community pharmacists in Malaysia inviting them to take part in the study. The questionnaire was designed using the Malaysian Community Pharmacy Benchmarking Guidelines, the American Pharmacists Association's five practice standards for pharmaceutical treatment, and other research.	According to the findings of the current study, Malaysian community pharmacists' pharmaceutical care services come up short of best practices around the world. Collaboration with patients' other healthcare professionals, proactive medication management, appropriate patient monitoring and follow-up systems, and documentation are some areas that could use improvement.[80].

Abu-Farha et al., (2022). - Jordan.	From March to April 2022, a cross-sectional observational study was carried out. The study's target population was community pharmacists employed by several community pharmacies in Jordan. Facebook was used to disseminate the survey among groups of Jordanian community pharmacists.	The large percentage of participating pharmacists in this study were eager to use the service at their community pharmacies, especially those who dealt with a high amount of patients each day, which may clearly show that somehow this service has the potential to alleviate the pressure on community pharmacies and free them up to effectively serve more patients.[81].
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Community pharmacies that provide high-quality pharmaceutical treatment should focus on patients' needs and be flexible, patient-oriented, and patient-centered [47]. To increase patients' trust in pharmacists, it is urgently necessary to address the legal requirements and compensation for pharmacies, where pharmacy staff should receive additional training on services-related knowledge and skills, cultural sensitivity, and enhancing pharmacists' technical competence and communication [64, 70]. It is advised that undergraduate pharmacy education be revised to include public health training to ensure that graduating pharmacists are capable of performing a public health role. The pharmacist's attitude and communication had a positive impact on overall satisfaction and significantly decreased the number of Treatment Related Problems (TRPs), according to research [71, 82, 65].

To satisfy the demands of public health, pharmacists are seeking to increase their power inside the healthcare system. As an example, some pharmacists are starting to advise patients on travel medicine and monitor blood pressure readings in an outpatient setting [67, 69]. Additionally, the most beneficial service offered by neighborhood pharmacists is counseling [83]. The general quality of the pharmaceutical counseling services provided to patients to improve their prescription use and, as a result, their welfare, was substandard. If satisfaction levels are to increase, adequate pharmacist training must be made available in community pharmacies[83, 84]. The service at their community pharmacies, particularly those serving a large number of patients per day, may indicate the potential of this service in relieving the pressure on community pharmacies and allowing them to serve more patients efficiently. Pharmaceutical care services provided by community pharmacists need to work collaboratively with patients' other health-care professionals as these may serve as crucial for improvements in accessibility to healthcare services [81, 80, 79].

Table 3. Effectiveness of community pharmacy services and their implications in public health

Author(s) and Country	Study Description	Findings/Conclusion
Effectiveness of community pharmacy services and their implications in public health		
Akazawa et al., 2018 - Japan	The researchers developed a patient registry system allowing the community pharmacies to track the continuing medicine use of patients with chronic diseases. The pharmacist would call or visit the patients at home to check on their medicine adherence status and any potential issues at least once a month between patient hospital visits.	The study's patient registration system is a useful and beneficial strategy for encouraging community pharmacists to engage in active intervention with the patients. It is vital for patients who have potential issues or who require specialized care to be registered and followed up on by pharmacists. Furthermore, for this registry system to persist, pharmacists should be provided with a support system [48].
(Ou & Yang, 2020) - Taiwan	The study presents how the task of distributing and allocating masks to the general population was delegated to community pharmacies which were strategically positioned and incorporated with NHI information systems. Each assigned drugstore instantly implemented a concurrent and open tracking system for mask availability by utilizing a website and mobile applications to assist people who are in need of masks.	The study concluded that the reduced patient demand for prescriptions in hospital pharmacies has been made possible and critically influenced by the dispensing services offered in community pharmacies. For the provision of services and goods to improve the patients' overall health conditions, a dependable network of medical professionals like pharmacists in nearby areas is essential to ensure that everyone is well supported [49].
Lin, Lin, Wang, & Lin, 2020 - Taiwan	The study, with regards to the COVID-19 virus, aimed to promote equity and economic efficiency in the distribution and sale of masks to all Taiwanese citizens. It was participated by 6336 special community pharmacies which functioned as sales locations for face masks in part of the National Health Insurance.	Community pharmacies can significantly improve the efficiency, dependability, and cost-effectiveness of the distribution of public health resources to local communities, particularly during a pandemic like COVID-19. The approach of utilizing community pharmacies in the distribution of face masks to the citizens in a country is a fresh and innovative way for health workers like pharmacists to participate in the promotion of public health and patient-protection initiatives. [50].

Basak, S. C., van Mil, J. W., & Sathyanarayan a, D. (2009). - India	The quality of patient care, pharmacy instruction, the pharmaceutical market, healthcare delivery, community pharmacy services, the professional role of community pharmacists, and prospective expansions. a summary of the condition of community pharmacy in India.	Community pharmacies' healthcare services, which are currently inconsequential, must be reformed to fulfill the changing needs of modern medicine users. As professional and educational standards evolve, the pharmacist's role in patient care is predicted to grow. Although pharmacists' contributions to health care are still not accepted, there are numerous reasons to be optimistic about the success of patient care in the community pharmacy setting [51].
Fang, Y., Yang, S., Zhou, S., Jiang, M., & Liu, J. (2013).. - China	Community pharmacies and pharmacists in China were to be granted further responsibility in primary healthcare by providing pharmaceutical care services in addition to their existing roles of dispensing prescriptions and selling medicines.	A number of initiatives, such as the Chinese Pharmacist Law, the development of a standard for pharmaceutical care activities, the evolution of the pharmacy workforce, raising public awareness of pharmacists, and proper reimbursement for care provision, still require progression [52].

A reliable and efficient network of healthcare providers in close proximity to a locality is essential for offering services and products for self-management and treatment during unprecedented global public health emergencies. Community pharmacy services impacted greatly public health outcomes through the use of registry systems and being mobilized to distribute masks during the pandemic [48, 49, 50]. Large hospitals in Japan are increasingly prescribing a lot of long-term medications to patients, which are then filled by neighborhood pharmacies. The registry system was helpful in locating medication-related issues, patient concerns, and changes in the patients' conditions [48]. Community pharmacists successfully concluded the online processes of NHI for local residents while also repackaging the bulk mask packages into unit packets containing the allotted number of masks. Community pharmacists provided interventions, useful insights, and advice on proper sanitation and hygiene practices, circulated accurate information to refute fake news and disinformation, and provided emotional assistance to calm public fears about the COVID-19 outbreak [49]. One of the various actions implemented by the government was the creation of a mechanism for restricting and distributing surgical masks to the public while prioritizing mask allotment to everyone equally. In Taiwan, the role of community pharmacy allowed the country to report moderately low positive cases during the surge of COVID-19. This enables pharmacists to make a difference in the efficient management of the health of the majority of the country's population by working with organizations and the government to guarantee that there are enough supplies of face masks as well as the establishment of a well-managed system of sales to residents all throughout the nation [50].

Community pharmacists have the prospects to enhance the health of the public, notably the underserved segments of society who lack the monetary resources to frequent clinics (both the poor and rural population). Nonetheless, significant impediments to the provision of pharmaceutical treatment exist in India, including a shortage of adequate pharmacist education and training, a lack of enforcement of existing legislation, and an absence of recognition of pharmacy as a profession by other healthcare professionals [51]. China introduced a new healthcare system in 2009, with fundamental healthcare reform as its backbone and emphasis, to permit residents to attend primary healthcare for minor health issues rather than seeking treatment at hospitals. In addition to dispensing prescriptions and selling medicines, community pharmacies and pharmacists were to be allocated more involvement in primary healthcare by offering pharmaceutical care services in China. Although pharmaceutical care services are relatively underdeveloped, they will become a vital facet of all pharmacists' professional activities in the future, especially in community pharmacy settings [52].

Table 4. Views of the general public on their experiences with public health services in community pharmacies.

Author(s) & Country	Views of the general public	Findings/Conclusion
Vreeland, et. al., (2022) - Philippines	A study conducted in the Philippines to ascertain the public's awareness, expectation, and views on community pharmacist's roles and practices in the Philippines.	Majority of the respondents agreed that community pharmacists are an integral part of the healthcare system and that they expect that the community pharmacists respond to their drug-related questions. Moreover, they are viewed to be knowledgeable enough to attend to their concerns [53].
Hirota, et. al., (2020) - Japan	A questionnaire survey was carried out in Japan, to analyze the awareness and opinions of the population regarding their primary-care and health-support roles, as well as to find out what fresh problems community pharmacies in Japan are confronting.	Patients who had a higher level of health promotion awareness showed a comprehension of the range of services offered by community pharmacies and tended to give their pharmacy favorable reviews. A positive attitude on the activities related to health-support function of community pharmacies were evident in the observation of the study: 74.4% - expressed interest in joining pharmacist-led health-promotional activities in the community. 30.1% - were willing to attend pharmacist-led information seminars on medicine and general health [63].

Almanasef et al., (2021) - Saudi Arabia	A cross sectional study design was used to evaluate the contribution of community pharmacists in the provision of public health services as well as investigate the perceived barriers in the provision of services in Saudi Arabia.	Results of the study showed that respondents believed that community pharmacists were “very involved” or “involved” in services such as weight management (61.7%), sexual health (60.6%), for healthy eating (57.5%), for physical activity promotion (53.4%), for screening for hypertension (35.7%), diabetes (39.4%), dylipidemia (30.6%), alcohol dependence and drug misuse counseling (31.1%) and more. This research suggests that community pharmacists in Asir regions have varying involvement in public health role and that further studies should be done to know what strategies would be best for the enhancing of their roles in public health [54].
Zolezzi et al., (2019) - Qatar	A cross sectional study to evaluate the preparedness of community pharmacists on the provision of cardiovascular disease risk assessment and management services.	The results of this study shows that many community pharmacists are not displaying competencies necessary for the cardiovascular diseases prevention in Qatar [55].
Almohammed & Alsanea, (2021) - Saudi Arabia	A study conducted in Saudi Arabia to assess the public’s perception and attitude towards pharmacists in Saudi Arabia.	The study’s respondents acknowledged that community pharmacists were amenable to providing unprompted patient consultation on matters of health.[56].
Saramunee et al., (2015) - Thailand	A mixed-methods study was used to analyze the general public’s view on pharmacy public health services.	Respondents who participated in the study with specific health needs have showed greater willingness to use services that are specific to their problems. However, it is also reported in this study that community pharmacists still underutilize public health services and that it is suggested that they should identify barriers to these service use to maximize its uptake. Overall, this study concludes that the general public are receptive to the pharmacists provision of public health services [57].
Aziz et al., (2018) - Pakistan	In this study, licensed community pharmacies in Punjab, Pakistan, were selected to determine patients' needs and current pharmacy standards. Over the course of October 2016 to June 2017, a cross-sectional study was conducted.	There was a low level of satisfaction in Punjab for community pharmacy services compared to hospital pharmacy services (59.7% and 65%, respectively). Older patients are more satisfied with the care they receive. Additionally, the pharmacy store, location, and staff were weak domains. Moderate satisfaction levels were reported for medicine and practice standards. [73].
Chen et al., (2018) - China	In this study, the researchers examine how consumers perceive pharmacists' provision of pharmaceutical care for OTC medications. An in-depth interview was conducted with 97 consumers from Yinchuan City, China, using semistructured interviewing techniques.	Pharmacies in the community were expected to make appropriate recommendations, advise about drug usage, counsel about safe drug use, and recommend affordable medications to the majority of patients. They distrust pharmacists' qualifications, knowledge, communication skills, and attitudes as a result of their past experiences at community pharmacies. Their self-medicating was influenced by their personal experiences, their relatives' experiences, and information on drug labels [74].
Rayes et al., (2014) - United Arab Emirates (UAE)	It is the purpose of this study to determine how the public perceives and expects community pharmacists to perform in Dubai, United Arab Emirates (UAE). There were four focus groups consisting of 25 participants. Different racial and economic backgrounds were represented in the group.	Community pharmacists in Dubai are perceived positively by the general public. Several factors contribute to the perception of pharmacists in Dubai, such as the level of information pharmacists possess, their attire, nationality, age, and location of their pharmacy [72].
Iskandar et al., (2017) - Lebanon	An assessment of public satisfaction with community pharmacy services in Lebanon between January and April 2016 was conducted using a cross-sectional study.	Local pharmacists in Lebanon are highly qualified however, they are not well-perceived or treated by the public. According to patients, pharmacy services should be characterized by respect, empathy, helpful staff, listening carefully, spending quality time with them, and responding quickly to their needs [75].
Awad et al., (2017) - Kuwait	This study sought to identify general patterns of pharmacy use, perceptions of pharmacists, trust in pharmacists, expectations concerning pharmacists' responsibilities, as well as public opinion and satisfaction with pharmacy services.	Generally, respondents viewed community pharmacists negatively, expected moderate roles from them, and had a slightly favorable view of the services they currently provide. To advance community pharmacy practice in Kuwait multifaceted interventions must be developed that focus on specific areas [76].

Chen et al., (2011) - Taiwan	A large-scale national survey was conducted in Taiwan to assess the opinion and perception of the general public regarding community pharmacists, their services, and their need.	Community pharmacists were perceived to be trustworthy, aware of the services pharmacists provide, and satisfied with the assistance they offer to consumers [77].
Al-Arifi (2012) - Saudi Arabia	Using a community pharmacy setting in Riyadh, Saudi Arabia, the aim of this study is to assess the perspectives, opinions, and satisfaction with pharmacists' performance. July through December 2010 was the period in which it was conducted.	It has been noted that community pharmacists have been improving Saudi Arabia's image and performance. Pharmacists are perceived positively by patients, and the role of pharmacists in the healthcare system is more appreciated than in other countries [78].

To understand the expectations, needs, and satisfaction of the public sets the foundation on how the pharmacy practice and service will be improved, more specifically, in the aspects of patient-customer and pharmacist relationship [53]. In this article review, a lot of the respondents in the studies mentioned above pose a high expectation on community pharmacists in their provision of their intervention on public health [74]. Studies [53-54, 63, 72, 78] have shown that the general public has viewed the roles of community pharmacists in their delivery of public health services positively. Patients rated pharmacy services highly based on respect, empathy, helpful staff, being listened to carefully, receiving quality time, and receiving prompt service [75]. With this, it has been evident in various countries in Asia that the role of community pharmacists in providing health services specific to public health is relatively expected of them which was evident in their imposition of high expectation on the said profession. The good thing found in this was their roles on public health was viewed positively by many.

However, there are also studies concluded that community pharmacists were not displaying competencies that are necessary [54, 55]; there are also respondents who were not satisfied with their experiences with community pharmacists and had negative perceptions on the current community pharmacy services that are available [73, 75, 76]. Despite community pharmacists' high qualifications, there is still a negative perception of them among the public [74]. Thus, this goes to show how improvements in the said profession shall be developed. In the development of contemporary patient care, it is important for community pharmacies to improve their quality of service continuously [93].

Moreover, community pharmacists are perceived to be open in offering health-related consultation with patients [56]. Several factors influence pharmacists' perceptions, including health authorities, pharmacists' level of knowledge, their attire, their nationality, their age, and the location of their pharmacy [72]. Patients from Asian regions have increasingly recognized the significant role pharmacists play in the healthcare system. As community pharmacists become more prominent in society, patients become more knowledgeable and aware of the services they deliver [77]. Similarly, by going beyond their traditional roles and implementing patient-centered programs across nations, community pharmacists can transcend their roles and adopt innovations. The following articles conclude that the general public well-received the health services provided by pharmacists [57].

Conclusion:

In summation, this article review has evidenced how the functions of community pharmacists in global health have shifted, stretching their capabilities to conduct interventions for immunization and vaccination, dietary adjustments, COVID-19, chronic illness management, and substance misuse mitigation and therapy.

In accordance with the studies, community pharmacist-led public-health programs markedly strengthened the efficiency, steadfastness, and cost-effectiveness of the allocation of public health resources whilst still optimizing the health of clients and patients, specifically whenever it arrives at assessing prospective issues and individuals who seek specialized care.

Notwithstanding such, community pharmacy operations still necessitate modification to satisfy the evolving demands of consumers of modern medications. Training must attempt to boost pharmacists' confidence in supplying these services if community pharmacies are to elevate the public health services they serve. A proactive approach to the delivery of public health care by confident, well-trained pharmacists should have a favorable impact on client attitudes and health [86].

The burgeoning contributions of community pharmacists have been positively acknowledged throughout Asian nations, as is revealed from the existing literature. Nevertheless, despite these beneficial assessments of their expanding responsibilities in public health, most nations still regard community pharmacists as being under qualified and as a profession that has to be reformed.

Conflict of Interest:

No conflict of interest was found.

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