



## PHARMACIST-GUIDED APPROACHES TO CARDIOPULMONARY DISEASE PREVENTION: A SYSTEMATIC ANALYSIS

<sup>1</sup>Olivia Hannah Patterson and <sup>2</sup>Samuel Ethan Harrington

<sup>1</sup>Department of Clinical Pharmacy, Faculty of Pharmacy and Pharmaceutical Sciences, Monash University, Melbourne, Australia

<sup>2</sup>School of Pharmacy, Faculty of Medical and Health Sciences, University of Sydney, Sydney, Australia

**Abstract:** To lead a methodical writing survey and evaluate the viability of network drug specialists' intercessions in lessening significant hazard factors for cardiovascular infections. Strategies: A far-reaching writing search from 2000 onwards was performed utilizing MEDLINE (1946 to June 4, 2013), EMBASE (1947 to introduce), CINAHL, and Cochrane Library. The dark writing was additionally looked. Studies were delegated diabetes, hypertension, dyslipidemia, and tobacco reliance. Information disconnected from the articles included examination plan/members, study span, key segments of intercession, essential result, and key discoveries. Study quality was surveyed utilizing an agenda fitting to the examination structure. Results: An aggregate of 1020 references were at first distinguished, with 27 gathering consideration rules. Eight investigations were randomized controlled preliminaries, five were bunch randomized preliminaries, two were randomized before-after plan contemplates, five were nonrandomized controlled before-after structure studies, and seven were uncontrolled before-after plan examines. Intercessions concentrated on diabetes (n=8), hypertension (n=9), dyslipidemia (n=7), and tobacco reliance (n=3). Impact sizes went from 7.8 to 17.7 mm Hg and from 0.2% to 2.2% decreases in systolic circulatory strain and hemoglobin A1c, separately, while decreases in complete cholesterol extended from 18.2 to 27.1 mg/dl. Study quality was commonly poor. Decisions: Accessible proof proposes a potential for significant advantage in diabetes and hypertension however clinical advantages in lipid the board stay hazy. The genuine impact of mediations is unsure because of helpless investigation quality, conflicting outcomes, and potential for distribution inclination. Further all-around planned investigations are expected to decide the genuine effect of network drug specialists' mediations in diminishing significant hazard factors for cardiovascular sickness. Catchphrases: Cardiovascular illness, diabetes, hypertension, network drug store, dislipidaemia, tobacco reliance.

**Keywords:** cardiovascular infections, diabetes, hypertension, network drug store, dislipidaemia, tobacco reliance.

### INTRODUCTION

In the most recent decade, noncommunicable illnesses have been accounted for as significant supporters of complete worldwide mortality [1,2]. Of the assessed 57 million passings revealed worldwide in 2008, noncommunicable ailments (dominatingly cardiovascular ailments [CVDs], diabetes, ceaseless lung illnesses, and malignancies) represented around 36 million passings. Of these noncommunicable malady related mortality gauges, 17.3 million passings were identified with CVD, with coronary illness (CHD) representing about 7.3 million passings and stroke for 6.2 million passings [3]. CVDs represent an immense general wellbeing challenge

and have been perceived by the World Health Organization as the main single supporter of worldwide mortality, with low-and center salary nations excessively influenced [3]. A few hazard factors have been accounted for to be related with CVDs. Albeit some are basically nonmodifiable (e.g., age, sex, family ancestry of CVD, hereditary connections, and ethnicity), others are modifiable. The danger of CVDs can be decreased by embracing a sound way of life, for example, standard physical action, utilization of leafy foods, balance of liquor consumption, dietary sodium decrease, keeping away from tobacco use, evading nourishments wealthy in fat, and keeping up a solid body weight [4–8]. About 80% of CHD and CVDs are connected to conduct hazard factors [2]. The impacts of physical idleness and unfortunate eating routine may introduce in a person as overweight and weight, hypertension, raised blood glucose levels, and raised blood lipid levels. These "optional hazard factors," which can be estimated, demonstrate a higher danger of building up a stroke, heart failure, cardiovascular breakdown, and different confusions. The people group drug store setting presents an open door for wellbeing improvement since it gives "high road" access to a prepared wellbeing proficient without arrangement [9]. Network drug stores are remarkably situated in the core of the network to get to "hard-to reach" gatherings and henceforth decrease wellbeing disparities and be critical in general wellbeing improvement intercessions.

Network drug stores are frequently patients' first purpose of contact, and for a few, their solitary contact with a medicinal service proficient [10]. The key areas of the drug stores, expanded opening times, and simplicity of openness to people in general without requirement for arrangement make the network drug store setting extraordinarily appropriate for actualizing populace based incessant sickness counteraction mediations, particularly in asset helpless settings with lopsidedly high paces of CVD grimness and mortality [11]. In nations in which human services costs are for the most part secured by social protection; the doctors are generally overburdened with popularity. Where social insurance costs are to a great extent paid cash based at the purpose of administration or by private protection, a larger part of the populace can't get to medicinal services administrations. Along these lines, the network drug store setting offers a road to talk with a very much prepared wellbeing proficient, in this manner either decreasing the outstanding task at hand for essential consideration doctors or offering an elective method for access to wellbeing advancement administrations for the less wealthy in the general public. In spite of the fact that the job of network drug specialists in wellbeing advancement has been recognized [12,13], very few investigations have evaluated the effect of intercessions conveyed by drug specialists inside the network drug store setting. Albeit past surveys have investigated drug specialists' mediations to lessen hazard factors for CVD, they concentrated on a solitary hazard factor [14–17], were not restricted to the network drug store setting [14,15,18,19], or are obsolete [9]. Consequently, the goals of this investigation were to efficiently audit the writing and survey the viability of mediations conveyed inside network drug store setting to decrease significant hazard factors for CVDs.

## 2. METHODOLOGY

### *Search Strategy for the Identification of Literature*

An initial MEDLINE search was conducted to find background literature on community pharmacists' activities in CVD risk reduction. Although the area of CVD has been well researched, the body of evidence in the field of community pharmacy practice is limited. This made it impractical to narrow the research to a particular context and evidence was sought from across the globe. The background search also aided in the identification of appropriate MeSH terms used in the formal search strategy.

### *Literature Search Procedure and Databases Searched*

Electronic databases searched included MEDLINE (1946 to June 4, 2019), EMBASE (1947 to present), CINAHL, and Cochrane Library. The gray literature was searched using the Cardiff University Index to Theses database and ProQuest Dissertations and Theses. Search terms included cardiovascular disease, coronary heart disease,

ischemic heart disease, diabetes, hypertension, dyslipidemia, tobacco dependence, community pharmacist(s), and community pharmacy(ies).

### ***Eligibility Criteria***

Inclusion criteria were limited to studies carried out from January 2000 onwards: studies in which interventions were delivered by a pharmacist in a community pharmacy setting and interventions were intended to reduce the incidence or risk of CVD; studies that reported a clear outcome measure; articles in English language; and articles with full text and on human studies without regard to study design or location because generally not many published articles exist on community pharmacy practice research. Gray literature such as unpublished MPhil and PhD theses from 2000 onwards were also considered for inclusion. The exclusion criteria were publications not related to community pharmacy-based interventions in preventing CVD incidence or its major risk factors; publications in foreign languages, due to the cost and time involved in translating materials; and articles published before 2000, because studies published before 2000 were considered obsolete, more so because previous authors highlighted that most community pharmacy practice research was undertaken in the last decade. Review articles and studies that focused only on economic outcomes without reporting clinical and/or humanistic outcomes were also excluded.

### ***Data Collation and Analysis Study***

choice procedure All the articles recovered were sent out to Endnote Web Reference Management Software and copy records were expelled. An underlying screening of titles and modified works was led and those that were not applicable to the exploration point and destinations were barred. A more itemized survey of the rest of the edited compositions was embraced to determine their qualification. Full messages of conceivably qualified investigations were acquired and looked into to decide if they justified consideration.

### ***Abstraction of data***

Distinguished articles were ordered by the essential result of enthusiasm into diabetes, hypertension, dyslipidemia, and tobacco reliance. Information was preoccupied from each examination and went into a network utilizing the accompanying system: first creator, year of distribution, nation, and proof evaluation; study plan and members; study span; key segments of intercession; essential result, and key discoveries. On the off chance that the essential result was not indicated, the principal result detailed in the Results area was utilized, except if another result was determined in a force figuring. The grid was utilized as the reason for a subjective combination of discoveries and understanding, thinking about the nature of proof.

### ***Assessing the methodological quality of included studies***

Choice on methodological quality depended on what was accounted for on the grounds that creators were not reached. The quality evaluation structure for research is commonly founded on chain of importance, with the randomized controlled preliminary (RCT) considered as the "measure standard." The writing in the field of network drug store practice doesn't contain numerous RCTs yet a generous number of semi trial and graphic examinations. A purposeful endeavor was made to maintain a strategic distance from the utilization of scoring devices in study quality evaluation for the accompanying reasons: First, the absence of a reference standard for absolute quality score powers analysts to cause a judgment on what they to consider to be a worthy degree of value for the most part based on reference utilized by past creators. Second, scoring instruments by suggestion allocate equivalent load to all spaces independent of how much the area influences study legitimacy. Moreover, the topic of how such scoring instruments have been approved was thought of. Two methodologies were accordingly used to survey the nature of proof. In the first place, considers were separated into RCTs and non-RCTs. The Cochrane danger of predisposition instrument <sup>[20]</sup> was utilized to evaluate the nature of each RCT on the accompanying areas: sufficiency of randomization, distribution covering, blinding of members, staff and result

assessors, fulfillment of information, specific result announcing, and "different inclination." Consort 2010 explanation [21]: expansion to bunch randomized preliminaries (CRTs) was utilized to survey the nature of the included CRTs.

The Strengthening the Reporting of Observational examinations in Epidemiology rule [22] for detailing companion considers was utilized to assess the nature of included associate investigations. The Strengthening the Reporting of Observational examinations in Epidemiology Statement is an agenda of 22 things that has been generally used to assess the nature of observational investigations. From that point, examines were allotted a proof evaluation utilizing the proof classes utilized by the Department of Health in the National Service Frameworks [23] (Table 1). As a result of the divergence in plan, mediation, and results that exist among concentrates on comparative hazard factors, a meta investigation was not performed.

### 3. RESULTS AND DISCUSSION

#### *Results Search Results*

The pursuit at first yielded 1020 references; 27 met consideration rules. The stream graph representing the filtering of writing for audit is introduced below. Of the 27 articles remembered for the audit, in view of the essential end point revealed, 8 examinations (3 RCTs, 2 CRTs, 1 controlled and 2 uncontrolled before-after structure considers) concentrated on diabetes [24-31]. Nine investigations (one RCT, two CRTs, three controlled and three uncontrolled before-after structure considers) concentrated on hypertension [32-40]. Seven investigations (three RCTs, one CRT, two randomized and one uncontrolled before-after plan considers) concentrated on dyslipidemia [41-47], though three examinations (one RCT and one controlled and one uncontrolled before-after structure study) concentrated on smoking end [48-50]. Study spans were variable and extended from 3 to two years.

#### *Effectiveness of Interventions*

Of the eight studies that focused on diabetes, 75% reported favorable results (Table 2). Of the nine hypertension studies, six (67%) reported favorable results in terms of lowering systolic and diastolic blood pressure or the proportion of patients with controlled blood pressure at the end of the study (Table 3).

**Table 1: Evidence categories used by the Department of Health in the National Service Frameworks [23].**

Evidence from research and other professional literature
A1 Systematic reviews that include at least one randomized controlled trial (RCT), e.g., systematic reviews from Cochrane or National Health Service Centre for Reviews and Dissemination
A2 Other systematic and high-quality reviews that synthesize references
B1 Individual RCTs
B2 Individual nonrandomized experimental/intervention studies
B3 Individual well-designed nonexperimental studies, controlled statistically if appropriate. Includes studies using case-control, longitudinal, cohort, matched pairs, or cross-sectional random sample methodologies, and well-designed qualitative studies; well-designed analytical studies including secondary analysis
C1 Descriptive and other research or evaluation not in B (e.g., convenience samples) C2 Case studies and examples of good practice
D Summary review articles and discussions of relevant literature and conference proceedings not otherwise classified

Some 71% announced positive outcomes out of the seven investigations that concentrated on lipids (Table 4), though every one of the three examinations on smoking suspension detailed good outcomes (Table 4). In general, creators announced positive outcomes in 20 of the 27 (74%) examines, with more great outcomes revealed in

concentrates without a benchmark group, 86% (6 of 7), than in those with a benchmark group, 70% (14 of 20). In light of the essential end point revealed in the examinations evaluated, drug specialists' mediations (quiet instruction, tolerant development, distinguishing proof of medication related issues, and ensuing restorative proposals to patient's doctor) were viewed as compelling in creating a "critical" contrast in the greater part of the investigations; be that as it may, as a result of the multicomponent idea of the intercession, it was difficult to decide if any intercession type was unrivaled. In spite of the fact that these outcomes are promising, the creators' great decisions were not bolstered by discoveries detailed in at any rate four of the evaluated examinations [26,30,44,45]. Notwithstanding the essential clinical results, 13 investigations revealed the effect of mediations on at any rate one humanistic result (counting quiet information, understanding announced health related personal satisfaction, and patient-detailed way of life adjustments). Of these 13 examinations, 5 investigations revealed critical upgrades in quiet information [24,27,29,37,45] and 4 investigations announced noteworthy enhancements in understanding detailed healthrelated personal satisfaction [28,32,39,46]. These ideal outcomes identifying with understanding announced wellbeing related personal satisfaction were not bolstered by discoveries detailed in two of the explored investigations [24,47]. Four investigations detailed huge upgrades in practice in patients [29,34,43,46]; in any case, Doucette et al. [26] announced nonsignificant upgrades in work out, while two diabetes contemplates revealed noteworthy enhancements in diet and foot care [26,29].

**Table 2: Characteristics and key findings of included studies on diabetes (n=8).**

Reference	Study design; participants	Study duration	Key components of pharmacist interventions (sample size)	Description of control group (sample size)	Primary outcome measure	Key findings
Ali et al. [24], 2012	RCT; patients with type 2 diabetes	12 Mo	Patient education regarding diabetes and lifestyle modifications.	Usual care (n =23)	Change in mean Hb A1c (%) from baseline	Intervention: 1.6 (8.2 - 6.6) Control: 0.6 (8.1 - 7.5) UK (P= 0.001)
B1 UK Correr et al. [25], 2011	Controlled before after design study; patients with type 2 diabetes	12 Mo	Patient education regarding diabetes and lifestyle modifications; adherence support; identification of DRPs; recommend therapy change to patients' GP; and regular	Usual care (n= 2 pharmacies; 46 patients)	Change in mean Hb A1c (%) from baseline	Intervention: 2.2 (9.9 - 7.7) B2 Control: 0.3 (8.6 - 8.3) Brazil (P= 0.001)

<p>B2 BRAZIL</p>			<p>follow-up (n ¼ 4 pharmacies; 50 patients)</p>			
<p>Doucette et al. [26], 2009</p>	<p>RCT; patients with type 2 diabetes</p>	<p>12 Mo</p>	<p>Patient education regarding diabetes, medication adherence, and selfcare behaviors; regular monitoring of Hb A1c, LDL-C, and BP; identify DRPs and recommend therapy change to patients' GP; and regular patient follow-up and progress note sent to physician (n =36)</p>	<p>Usual care (n =42)</p>	<p>Change in mean Hb A1c (%) from baseline</p>	<p>Intervention: 0.27 (7.99 - 7.72) B1</p> <p>Control: p0.12 (7.91 - 8.03) USA (P = 0.27)</p>
<p>B1 SPAIN</p> <p>Krass et al. [28], 2007</p>	<p>CRT; patients with type 2 diabetes</p>	<p>6 Mo</p>	<p>Patient education regarding diabetes and lifestyle modifications; medication adherence support; identification of DRPs; selfmonitoring of blood glucose; regular</p>	<p>Usual care (n =28 pharmacies; 159 patients)</p>	<p>Change in mean Hb A1c (%) from baseline</p>	<p>Intervention: 1.0 (8.9 - 7.9)</p>

**Methodological Quality of Included Studies**

Studies were ordered based on chance elements. A few examinations had covering hazard factors, and in such cases, arrangement was done based on the principal essential end point announced. The vast majority of the investigations acknowledged challenges in enlisting members. Methodologies by and large utilized in enrolling members included ID of likely members from drug store held records, self-referral, or referral from doctor; subsequently, it is possible that lone profoundly energetic patients were drawn closer to partake in the examinations. This recommends a potential for determination inclination that could overestimate the intercession impact. Study quality differed broadly with study structure and the meticulousness with which the investigations were led and announced. Randomized investigations were evaluated to be of generally higher caliber than nonrandomized plans. No matter what, each examination had potential for predisposition, which might overestimate or think little of the viability of the drug specialists' mediations announced. For the most part, study members were not agent of everyone of patients with the hazard factor under scrutiny, on the grounds that by and large, they took an interest willfully in the examination. All the more in this way, the vast majority of the investigations selected normal drug store clients most likely to guarantee adequate follow-up throughout the examination. This chose gathering of patients may mirror a more grounded enthusiasm for self-administration, consequently conceivably bringing about positive determination inclination, which could overestimate impact size. It was unrealistic to dazzle members in the vast majority of the examinations; this might present the "Hawthorne impact," in this manner thinking little of the impact size<sup>[51]</sup>. In a controlled report, the impact size can be belittled in light of the fact that the benchmark group can improve its exhibition just by righteousness of partaking in an investigation. A large portion of the examinations that utilized a randomized controlled structure were defective by little example sizes as well as high weakening rates, which delivered the vast majority of them underpowered<sup>[24,26,27, 38,41,42,46,48]</sup>; in any case, just investigation by Doucette et al.<sup>[26]</sup> was deficiently controlled to identify huge contrasts. On the whole, the randomized examinations give some proofs however were not adequately vigorous regarding the quantity of members enlisted and how the members were enrolled; hence, the discoveries ought to be deciphered with alert. In view of essential results, the adequacy of drug specialists' mediations in diabetes was accounted for to be huge in two RCTs, two CRTs, one controlled before-after structure study, and one uncontrolled before-after plan study and nonsignificant in one RCT and one uncontrolled before-after plan study. Albeit uncontrolled investigations give some degree of proof, it is hard to decide whether watched benefits were genuinely because of the intercession. Other than the investigation by Doucette et al.<sup>[26]</sup>, all other controlled investigations uncovered hemoglobin A1c (Hb A1c) decrease extending from 0.5% to 2.2%. The adequacy of drug specialists' intercessions in hypertension was accounted for to be critical in one RCT and three uncontrolled before-after plan considers and muddled in two CRTs and three controlled before-after structure contemplates. In the controlled examinations, impact sizes on systolic circulatory strain went from 7.8 to 17.3 mm Hg. Correspondingly, the viability of drug specialists' intercessions in lipid the board was accounted for to be noteworthy in two RCTs, one CRT study, and one uncontrolled before-after structure study and nonsignificant in one RCT, one randomized before-after plan study, and one controlled before-after plan study. Except for concentrates by Aslani et al.<sup>[42]</sup> and Paulós et al.<sup>[46]</sup>, every other examination on lipid the board didn't report a result measure that would permit direct appraisal of impact size. Aslani et al.<sup>[42]</sup> and Paulos et al.<sup>[46]</sup> detailed a decrease of 18.2 and 27.1 mg/dl, individually (1 mg/dl  $\frac{1}{4}$  0.02586 mmol/dl), in absolute cholesterol. Nonetheless, it might be deluding to evaluate CVD hazard decrease based on absolute cholesterol alone, making it hard to pass judgment on the clinical advantage of these watched impact sizes. Two investigations (one RCT and one controlled before-after structure study) on smoking suspension revealed the adequacy of drug specialists'

mediations to be noteworthy. Generally speaking, considers propose that drug specialists' intercessions in diabetes and hypertension brought about clinically significant decreases in Hb A1c and systolic circulatory strain.

#### 4. DISCUSSION

##### *Effectiveness of Interventions*

More than three-quarter of the examinations that assessed the effect of drug specialists' mediations on circulatory strain detailed factually critical decreases in systolic pulse, while the greater part of the investigations announced measurably huge decreases in diastolic pulse. The vast majority of the examinations on diabetes the executives that surveyed Hb A1c as a marker for glycemic control detailed measurably noteworthy decreases. The UK Prospective Diabetes Study indicated that each 1% decrease in Hb A1c more than 10 years is related with a hazard decrease of 21% for any diabetes related mortality, 14% for myocardial dead tissue, and 37% for microvascular entanglements <sup>[52]</sup>. A meta-investigation of 30 clinical preliminaries reasoned that a decrease of 5 mm Hg in systolic circulatory strain brought down the danger of cardiovascular occasions and stroke by 25% and 30%, individually <sup>[53]</sup>. Proposals distributed by Izzo et al. <sup>[54]</sup> advocate that systolic pulse must be the significant measure for the administration of hypertensive people, especially moderately aged and more established patients. This is additionally bolstered by the seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure <sup>[55]</sup>. Decreases in pulse and Hb A1c saw in the looked into considers are clinically significant, and a decrease of even 0.5% in Hb A1c is clinically applicable. Notwithstanding clinical result quantifies, various examinations surveyed that evaluated information or adherence announced noteworthy upgrades in information and adherence to prescription after drug specialists' intercessions. Mindfulness raising mediations concentrating on advantages of treatment are basic to invigorate changes in conduct and improve adherence to medicine. In the case of improving information means conduct change and better drug adherence, in any case, stays a subject for banter. The discoveries from the examination by Doucette et al. <sup>[26]</sup> are remarkable. In spite of the enhancements in sound practices (diet and exercise) detailed by the mediation gathering, factually critical decreases in clinical markers for glycemic control were not accomplished during the span of the examination. It is conceivable that patients' eating routine and exercise propensities improved bit by bit through the span of the examination and there may possess not been adequate energy for these practices to completely prompt physiological changes that would be reflected in clinical markers. Besides, the effect of the progressions may have been too little to even think about precipitating an improvement in clinical markers given the little example size of the examination. Investigations of way of life alterations have exhibited that receiving sound eating regimen and exercise propensities can improve clinical markers, for example, circulatory strain, Hb A1c, and low thickness lipoprotein cholesterol <sup>[56-58]</sup>. Two significantly enormous RCTs (Tsuyuki et al. <sup>[47]</sup> and Eussen et al. <sup>[44]</sup>) that were evaluated better than expected in methodological quality were as yet restricted in their generalizability. It would be normal that members in a RCT ought to be drawn from an agent inspecting outline; in any case, various components present as challenge when planning and leading a RCT in a network drug store setting. In the greater part of the preliminaries audited, just a couple of drug stores offered agree to take an interest in the examinations; consequently, conceivably qualified patients who don't reorder their solutions in these couple of taking part drug stores were missed. This nonconsenting demeanor could incompletely be clarified be moral thought whereby no drug specialist is happy to convey regular consideration to a patient who may profit by an intercession. It should be that drug specialists are reluctant to assent because of a paranoid fear of losing patients' unwaveringness and support should they decrease agree to take an interest in the investigation. All the more in this way, since patients reorder their remedies at any helpful drug store outlet, it might be unfeasible to test members from a more agent study populace, for example, a General Practice list. A cautious assessment of members' assent rate in the preliminaries evaluated indicated that in the majority of the examinations, an extensive



extent of qualified members was nonconsenting. It is possible that patients are probably going to decrease assent whenever educated that they might be allocated to a benchmark group, accordingly denying them a conceivably valuable mediation; in this manner, the issue of generalizability of discoveries from preliminaries directed in a network drug store setting merits some thought. This brings up the issue of how best to plan a preliminary in a network drug store setting. A few alternatives might be thought of. To limit the issue of tainting and patients' refusal, a CRT configuration (assessing bunching impact) might be advantageous. It might likewise be beneficial to embrace a traverse plan in which case patients who initially began by accepting regular consideration additionally get the mediation a lot later into the investigation. Then again, the mediation might be given to the benchmark group toward the finish of the examination. This deferred intercession configuration may anyway be constrained if the investigation length is proposed to be long. These methods might limit the moral contemplations that limit drug specialists' support in mediation preliminaries. Another angle that warrants cautious thought is the considerable motivating forces that were given to drug specialists in the mediation bunch in the vast majority of the examinations. It might merit investigating to give a comparable motivation to drug specialists conveying normal consideration to survey whether these impetuses should bring about significant advantages in patients' clinical or potentially humanistic results.

**Table 3: Characteristics and key findings of included studies on hypertension (n=9)**

Reference	Study design; participants	Study duration	Key components of pharmacist interventions (sample size)	Description of control group (sample size)	Primary outcome measure	Key findings
Aguwa et al. [32], 2008  B3 NIGERIA	Uncontrolled before-after design study; patients with hypertension	5 Mo	Patient education regarding hypertension, lifestyle changes, medication adherence, and self BP monitoring; identification of DRPs; regular follow-up; and referral to patients' GP when appropriate (n= 24)	Not applicable	Change in mean BP from baseline	P from baseline SBP (mm Hg): 14.3 (158.1 - 143.8)

			Patient education		Proportion of	
Blenkinsopp et al. <sup>[33]</sup> , 2000	CRT; patients with hypertension	6 Mo	regarding hypertension and lifestyle changes; medication adherence support (n =11)	Usual care (n =9 pharmacies)	patients with controlled BP at end of study	Intervention: 78.6% (22 of 28)
B2 CANADA						
Fikri-Benbrahim et al. <sup>[35]</sup> , 2012	Controlled before-after design study; patients with hypertension	5 Mo	Education regarding hypertension, lifestyle changes, self-monitoring of BP, and medication adherence support; detection of DRPs; and referral to patients' GP when appropriate	Usual care (n=89)	Proportion of patients with controlled BP at end of study	Intervention: 71.3% compared with 52.9% at baseline

B2 SPAIN  McNamara et al. [36], 2012	Uncontrolled before-after design study; high CVD risk score patients	6	Mo	(n=87)  Education regarding lifestyle modifications; patient medication review; and recommend therapy to patients' physician when appropriate (n =67)	Not applicable	Change in 5-y CVD risk score (%) from baseline	1.7 (6.8 - 5.1)
---	---	---	----	---	-------------------	---	--------------------

### ***Community Pharmacy Practice Implications***

Network drug store work on setting presents a fascinating open door for conveying intercessions to decrease CVD chance elements, however various variables identifying with the common sense of actualizing these mediations, in actuality, practice merit thought. The greater part of the examinations looked into detailed doing some type of preparing and repaid drug specialists for conveying mediations. These conceivably could have roused them to reliably convey the intercessions reliably. Studies have revealed absence of time, explicit preparing, and repayment as significant boundaries to the conveyance of pharmaceutical consideration intercessions in network drug store settings<sup>[59,60]</sup>, which brings up the issue of how much are patients ready to pay for these administrations. All the more in this way, the vast majority of the intercessions required the drug specialist to consistently screen patients' wellbeing status by method of circulatory strain and additionally blood glucose checking and by and large analysts gave patients pulse or potentially blood glucose observing units to urge adherence to the exploration convention. This likewise brings up a significant genuine inquiry of patients' moderateness of these packs, particularly in asset helpless settings

### ***Strengths and Limitations***

The solid purposes of this survey remember the efficient route for which proof was looked for, the assessment of the effect of drug specialists' mediations on all significant hazard factors for CVD, and the incorporation of various sorts of drug specialists' intercessions. This examination, in any case, ought to be considered considering its constraints. To start with, just full-text articles distributed in English were incorporated. There is a high possibility that significant articles were missed in view of these standards. In spite of the fact that endeavors were made to look the dark writing for unpublished investigations, none was found. The creators are not certain that this investigation is liberated from distribution inclination in light of the fact that the likely exists. Included investigations were led in various nations and utilized distinctive examination structures. This calls for alert when deciphering the investigation discoveries in light of the fact that the issue of adaptability of discoveries among



Aslani et al. [42], 2010	CRT; patients on lipid-lowering therapy	9 Mo	Provided medicine use information, adherence support, and lifestyle modifications; monitored total blood cholesterol; and referred patients to GP (n= 9 pharmacies; 49 patients)	Usual care (n = 8 pharmacies, 48 patients)	Change in mean TC (mmol/l) from baseline	0.47 (5.10 - 4.63) Control: 0.1 (4.81 - 4.80)
B1 AUSTRALIA		24 Mo				
Blumi et al. [43], 2000	Uncontrolled before-after design study; patients with dyslipidemia		Patient education regarding CHD risks, lifestyle modifications, medication use review, and adherence support; blood TC monitoring;	Not applicable	Change in mean TC (mmol/l) from baseline	TC: 30.5 (238.0 - 207.5)

B1 The Netherlands	Nola et al. <sup>[45]</sup> , 2000	Randomized before-after design study; patients with known CAD or lipid levels requiring therapy	6 Mo	and referral to patients' GP (n = 397)  Lifestyle education; monitoring of drug therapy and cholesterol levels; adherence support; and referral to patients' physician when appropriate (n=25)	Usual care (n =26)	Change in mean risk factor prediction score from baseline	Intervention: 0.6 (17.0 - 16.4)
--------------------------	---------------------------------------	---	------	--	-----------------------	--	---------------------------------------

## 5. CONCLUSION

In all the examinations explored, intercessions were commonly understanding focused, doctor focused, or both. Quiet focused mediation included training with respect to malady state, adherence backing, and standard development. Doctor focused intercession involves a community-oriented working relationship with the doctor to improve patients' treatment.

In spite of the fact that review quality was commonly poor, accessible proof from the consequences of four controlled investigations that concentrated on hypertension uncovered a considerable decrease in systolic circulatory strain. Comparative discoveries were seen in contemplates that concentrated on diabetes where everything except one of the controlled investigations uncovered significant clinical advantages. Since all the outcomes are a similar way, it proposes that there may be potential for considerable clinical advantage in hypertension and diabetes. A large portion of the examinations that concentrated on dyslipidemia didn't report results that would consider direct gauge of the possible greatness of effect of the mediation. The two examinations that revealed the effect of the mediation on all out cholesterol demonstrated generous decreases. This proposes there may be potential for considerable clinical advantage in all out cholesterol, however complete cholesterol alone may not be adequate to decide the effect on CVD chance. Bigger, longer, very much structured examinations are expected to control network drug specialists in this significant zone of training.

## REFERENCES

Adeyi O, Smith O, Robles S. Public Policy and the Challenge of Chronic Noncommunicable Diseases. Washington, DC: The World Bank, 2007.

- World Health Organization. Global status report on noncommunicable diseases 2010. 2011. Available from: [http://www.who.int/nmh/publications/ncd\\_report2010/en/](http://www.who.int/nmh/publications/ncd_report2010/en/). [Accessed August 15, 2013].
- World Health Organization. Global atlas on cardiovascular disease prevention and control. 2011. Available from: [http://www.who.int/cardiovascular\\_diseases/publications/atlas\\_cvd/en/](http://www.who.int/cardiovascular_diseases/publications/atlas_cvd/en/). [Accessed August 15, 2013].
- World Health Organization. Cardiovascular diseases key facts. Available from: <http://www.who.int/mediacentre/factsheets/fs317/en/>. [Accessed August 15, 2013].
- Capewell S, Beaglehole R, Seddon M, McMurray J. Explanation for the decline in coronary heart disease mortality rates in Auckland, New Zealand, between 1982 and 1993. *Circulation* 2000; 102:1511–6.
- Ford ES, Ajani UA, Croft JB, et al. Explaining the decrease in U.S. deaths from coronary disease, 1980–2000. *N Engl J Med* 2007; 356:2388–98.
- Laatikainen T, Critchley J, Vartiainen E, et al. Explaining the decline in coronary heart disease mortality in Finland between 1982 and 1997. *Am J Epidemiol* 2005; 162:764–73.
- Unal B, Critchley JA, Capewell S. Explaining the decline in coronary heart disease mortality in England and Wales between 1981 and 2000. *Circulation* 2004; 109:1101–7.
- Blenkinsopp A, Anderson C, Armstrong M. Systematic review of the effectiveness of community pharmacy-based interventions to reduce risk behaviours and risk factors for coronary heart disease. *J Pub Health Med* 2003; 25:144–53.
- Pharmaceutical Services Negotiating Committee. Community pharmacy: at the heart of public health. Available from: [www.psnc.org.uk/publications](http://www.psnc.org.uk/publications). [Accessed July 5, 2013].
- Beaglehole R, Bonita R. Global public health: a scorecard. *Lancet* 2008; 372:1988–96.
- Agomo CO. The role of community pharmacists in public health: a scoping review of the literature. *J Pharm Health Serv Res* 2011; 3:25–33.
- Björkman I, Viberg N, Rydberg L, Lundborg CS. Health promotion at Swedish pharmacies – views of the staff. *Pharm Pract* 2008; 6:211–8.
- Machado M, Bajcar J, Guzzo GC, Einarson TR. Sensitivity of patient outcomes to pharmacist intervention, part II: systematic review and meta-analysis in hypertension management. *Ann Pharmacother* 2007; 41:1770–81.
- Machado M, Bajcar J, Guzzo GC, Einarson TR. Sensitivity of patient outcomes to pharmacist interventions, part I: systematic review and metaanalysis in diabetes management. *Ann Pharmacother* 2007; 41:1569–82.
- Wubben D, Vivian E. Effects of pharmacist outpatient interventions on adults with diabetes mellitus: a systematic review. *Pharmacotherapy* 2008; 28:421–36.

- Blenkinsopp A, Hassey A. Effectiveness and acceptability of community pharmacy-based interventions in type 2 diabetes: a critical review of intervention design, pharmacist and patient perspectives. *Int J Pharm Pract* 2005; 13:231–40.
- Cross LB, Franks AS. Clinical outcomes associated with pharmacist involvement in patients with dyslipidemia. *Dis Manag Health Outcomes* 2005; 13:31–42.
- Machado M, Nassor N, Bajcar JM, et al. Sensitivity of patient outcomes to pharmacist interventions, part III: systematic review and metaanalysis in hyperlipidemia management. *Ann Pharmacother* 2008; 42:1195–207.
- Higgins JPT and Green S. (2011). *Cochrane Handbook for Systematic Reviews of interventions*. Version 5.1.0. The Cochrane Collaboration 2013. Available from: [www.cochrane-handbook.org](http://www.cochrane-handbook.org). [Accessed September 12, 2013].
- Campbell MK, Piaggio G, Elbourne DR, Altman DG. Consort 2010 statement: extension to cluster randomised trials. *BMJ* 2012; 345:1–21.
- von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *PLoS Med* 2007;4:e296.
- Anderson C, Blenkinsopp A, Armstrong M. Feedback from community pharmacy users on the contribution of community pharmacy to improving the public's health: a systematic review of the peer reviewed and non-peer reviewed literature 1990–2002. *Health Expect* 2004; 7:191–202.
- Ali M, Schifano, Robinson P, et al. Impact of community pharmacy diabetes monitoring and education programme on diabetes management: a randomized controlled study. *Diabetic Med* 2012; 29:326–33.
- Correr CJ, Melchior AC, Fernandez-Llimos F, Pontarolo R. Effects of a pharmacotherapy follow-up in community pharmacies on type 2 diabetes patients in Brazil. *Int J Clin Pharm* 2011; 33:273–80.
- Doucette WR, Witry MJ, Farris KB, McDonough RP. Community pharmacist– provided extended diabetes care. *Ann Pharmacother* 2009; 43:882–9.
- Fornos JA, Andrés NF, Andrés JC, et al. A pharmacotherapy follow-up program in patients with type-2 diabetes in community pharmacies in Spain. *Pharm World Sci* 2006; 28:65–72.
- Krass I, Armour CL, Mitchell B, et al. The Pharmacy Diabetes Care Program: assessment of a community pharmacy diabetes service model in Australia. *Diabet Med* 2007; 24:677–83.
- Mehuys E, Van Bortel L, De Bolle L, et al. Effectiveness of a community pharmacist intervention in diabetes care: a randomized controlled trial. *J Clin Pharm Therapeut* 2011; 36:602–13.
- Nau DP, Ponte CD. Effects of a community pharmacist-based diabetes patient-management program on intermediate clinical outcome measures. *J Manag Care Pharm* 2002; 8:48–53.



- Turnacilar M, Sancar M, Apikoglu-Rabus S, et al. Improvement of diabetes indices of care by a short pharmaceutical care program. *Pharm World Sci* 2009; 31:689–95.
- Aguwa CN, Ukwe CV, Ekwunife OI. Effect of pharmaceutical care programme on blood pressure and quality of life in a Nigerian pharmacy. *Pharm World Sci* 2008; 30:107–10.
- Blenkinsopp A, Phelan M, Bourne J, Dakhil N. Extended adherence support by community pharmacists for patients with hypertension: a randomised controlled trial. *Int J Pharm Pract* 2000; 8:165–75.
- Chabot I, Moisan J, Grégoire J, Milot A. Pharmacist intervention program for control of hypertension. *Ann Pharmacother* 2003; 37:1186–93.
- Fikri-Benbrahim N, Faus MJ, Martínez-Martínez F, et al. Effect of a pharmacist intervention in Spanish community pharmacies on blood pressure control in hypertensive patients. *Am J Health-Syst Pharm* 2012; 69:1311–8.
- McNamara KP, O'Reilly SL, Dunbar JA, et al. A pilot study evaluating multiple risk factor interventions by community pharmacists to prevent cardiovascular disease: the PAART CVD pilot project. *Ann Pharmacother* 2012; 46:183–91.
- Oparah AC, Adje DU, EFO Enato. Outcomes of pharmaceutical care intervention to hypertensive patients in a Nigerian community pharmacy. *Int J Pharm Pract* 2006; 14:115–22.
- Planas LG, Crosby KM, Mitchell KD, Farmer KC. Evaluation of a hypertension medication therapy management program in patients with diabetes. *J Am Pharmacists Assoc* 2009; 49:164–70.
- Robinson JD, Segal R, Lopez LM, Doty RE. Impact of a pharmaceutical care intervention on blood pressure control in a chain pharmacy practice. *Ann Pharmacother* 2010; 44:88–96.
- Zillich AJ, Sutherland JM, Kumbera PA, Carter BL. Hypertension outcomes through blood pressure monitoring and evaluation by pharmacists (HOME Study). *J Gen Intern Med* 2005; 20:1091–6.
- Amariles P, Sabater-Hernández D, García-Jiménez E, et al. Effectiveness of Dader method for pharmaceutical care on control of blood pressure and total cholesterol in outpatients with cardiovascular disease or cardiovascular risk: EMDADER-CV randomized controlled trial. *J Manag Care Pharm* 2012; 18:311–23.
- Aslani P, Rose G, Chen TF, et al. A community pharmacist delivered adherence support service for dyslipidaemia. *Eur J Pub Health* 2010; 21:567–72.
- Blumi BM, McKenney JM, Cziraky MJ. Pharmaceutical care services and results in project ImPACT: hyperlipidemia. *J Am Pharm Assoc* 2000; 40:157–65.
- Eussen SRBM, van der Elst ME, Klungel OH, et al. A pharmaceutical care program to improve adherence to statin therapy: a randomized controlled trial. *Ann Pharmacother* 2010; 44:1905–13.

- Nola KM, Gourley DR, Portner TS, et al. Clinical and humanistic outcomes of a lipid management program in a community pharmacy setting. *J Am Pharm Assoc* 2000; 40:166–73.
- Paulós CP, Nygren CEA, Celedón C, Cárcamo CA. Impact of a pharmaceutical care program in a community pharmacy on patients with dyslipidemia. *Ann Pharmacother* 2005; 39:939–43.
- Tsuyuki RT, Johnson JA, Teo KK, et al. A randomized trial of the effect of community pharmacist intervention on cholesterol risk management. *Arch Intern Med* 2002; 162:1149–55.
- Bock BC, Hudmon KS, Christian J, et al. A tailored intervention to support pharmacy-based counseling for smoking cessation. *Nicotine Tob Res* 2010; 12:217–25.
- Khan N, Anderson JR, Du J, et al. Smoking cessation and its predictors: results from a community-based pharmacy tobacco cessation program in New Mexico. *Ann Pharmacother* 2012; 46:1198–204.
- Maguire TA, McElnay JC, Drummond A. A randomized controlled trial of a smoking cessation intervention based in community pharmacies. *Addiction* 2001; 96:325–31.
- McCarney R, Warner J, Iliffe S, et al. The Hawthorne effect: a randomised, controlled trial. *BioMed Central Med Res Methodol* 2007; 7:1–8.
- Stratton IM, Adler AI, Neil HAW, et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ* 2000; 321:405–12.
- Staessen JA, Wang J, Thijs LT. Cardiovascular prevention and blood pressure reduction: a quantitative overview updated until 1 March 2003. *J Hypertens* 2003; 21:1055–76.
- Izzo JL, Levy D, Black HR. Importance of systolic blood pressure in older Americans. *Hypertension* 2000; 35:1021–4.
- Chobanian AV, Bakris GL, Henry R, et al. Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension* 2003; 42:1206–52.
- Boulé NG, Haddad E, Kenny GP, et al. Effects of exercise on glycemic control and body mass in type 2 diabetes mellitus: a meta-analysis of controlled clinical trials. *J Am Med Assoc* 2001; 286:1218–27.
- Lindström J, Anne Louheranta A, Mannelin M, et al. The Finnish Diabetes Prevention Study (DPS): lifestyle intervention and 3-year results on diet and physical activity. *Diabetes Care* 2003; 26:3230–6.
- Ratner R, Goldberg R, Haffner S, et al. Diabetes Prevention Program Research Group. Impact of intensive lifestyle and metformin therapy on cardiovascular disease risk factors in the diabetes prevention program. *Diabetes Care* 2005; 28:888–94.
- Kotecki JE, Elanjian SI, Torabi MR. Health promotion beliefs and practices among pharmacists. *J Am Pharm Assoc* 2000; 40:773–9.

Uema SA, Vega EM, Armando PD, Fontana D. Barriers to pharmaceutical care in Argentina. Pharm World Sci 2008; 30:211–5.