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Intervention by Clinical pharmacists in Cardiovascular Disease Management: Evidence from Intervention Studies

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Annotation: Cardiovascular diseases (CVDs) represent a range of chronic disorders impacting blood vessels and heart, contributing to the reduction of the quality of life and contributing significantly to increased rate of mortality as well as morbidity. Clinical pharmacists contribute as integral members of the healthcare team concerning treatment of chronic diseases, involving cardiovascular conditions. This review aims to present the responsibility of clinical pharmacists in the treatment of patients diagnosed with cardiovascular diseases. This review was performed as a structured narrative review. Several studies published in Google Scholar, PubMed, and Science Direct which issued between 2012 and 2024 were reviewed. The review summarizes evidence on clinical outcomes, including blood pressure and glycemic control, lipid profile outcomes, medication adherence, and economic impact. By integrating findings across diverse healthcare settings, existing evidence suggests that the active participation of clinical pharmacists may be associated with an improvements in patients counseling, risk factors control, medication safety, medication adherence, and a reduction in hospitalization and medication costs.

Keywords: Cardiovascular diseases, clinical pharmacists, patients counseling, drug related problems, adherence.

1. Introduction

Cardiovascular diseases (CVDs) comprise a range of chronic disorders impacting the blood vessels and heart, which not only impair quality of life but also substantially contribute to higher mortality and morbidity rates [1]. Annually, CVDs account for an estimated 18 million deaths worldwide [2]. The rate of mortality attributable to CVDs boosted by 53.7%, expanding from 12.1 million to 18.6 million during period from 1990 to 2019. Likewise, the rate of mortality demonstrated a 94.4% increase during the same period [3]. Cardiovascular diseases account for approximately 31% of all deaths worldwide [4]. Several risk factors promote to the incident of CVDs, including hyperlipidemia, hypertension, metabolic disorders, obesity, and smoking [5-7].

Clinical pharmacists contribute as integral members of the healthcare team concerning treatment of chronic diseases, involving cardiovascular conditions. Their contribution encompass patient education, identification and management of adverse effects, enhancement of adherence, and reduction of modifiable risk factors [8,9]. The purpose of this review to present the responsibility of the clinical pharmacists as part of healthcare team in managing patients diagnosed with cardiovascular disorders.

2. Methodology

This review was performed as a structured narrative review. Several studies published in Google Scholar, PubMed, and Science Direct which issued between 2012 and 2024 were reviewed. The search phrases encompassed “cardiovascular disease”, “clinical pharmacists”, “clinical pharmacy intervention”, “pharmaceutical care”, “medication adherence”, “heart failure”, and “blood pressure”. Only peer-reviewed articles published in English were taken into consideration.

3. The inclusion and exclusion criteria:

The randomized controlled study, observational studies, and systematic reviews concerning clinical pharmacists interventions in CVD management were included in this review. The studies that conducted on small sample size (fewer than 30 participants), inadequate identifiable outcome, or were performed in non-clinical settings.

4. Clinical pharmacists’ role in patients counseling and education

4.1. Medication adherence

Clinical pharmacists perform a vital responsibility in the patients counseling and promoting adherence among patients with CVDs, extending far beyond their role in medication dispensing [10]. Another prospective single center study demonstrated on 41 patients showed the role of the clinical pharmacists as part of cardiac rehabilitation team was associated with an improvement in patients’ knowledge regarding drug interaction and side effects of medication, and promoting patients’ confidence [11].

4.2. Blood pressure and glycemic control

An Indian study conducted on 97 patients demonstrated that patient education afforded by clinical pharmacists was associated with reduction in severity of hypertension and was associated with an improvement in treatment adherence by about 58.3% [10].

Moreover, a retrospective study conducted on 138 patients diagnosed with myocardial infarction and diabetes indicated the clinical pharmacists consultations may associated with reduction of mean fasting blood glucose from 11.3 to 7.1 (mmol/L) and a glycated hemoglobin from 9% to 8.3% [12]. A randomized study conducted among French patients diagnosed with hypertension, hyperlipidemia, and diabetes resulted in 61.75% of patients accomplishing their therapeutic goal in blood pressure, blood LDL-C level, and glycated hemoglobin. This advancement was ascribed to the pharmacist intervention directing on disease pathology as well as its management [13].

4.3. Lipid profile outcomes

The same retrospective study demonstrated the clinical pharmacists were associated with a reduction in a mean of cholesterol level (low density lipoprotein-cholesterol; LDL-C) from 3 to 1.8 mmol/L [12]. Another study conducted on 820 patients demonstrated an improvement in LDL-C as a consequence of the pharmacist education and lifestyle counseling [14].

5. Clinical pharmacists' role in cardiovascular disorders managements:

The monitoring and adjustment of treatment for patients with CVDs are the responsibilities of the clinical pharmacists. A retrospective cohort study conducted on 66 cardiac patients demonstrated that clinical pharmacists was contributed to optimize warfarin as anticoagulant treatment through controlling adverse effects and monitoring time in therapeutic range (TTR). This study indicated impact of the clinical pharmacists on improving TTR from 46.9% ± 29.5% to 73.4% ± 21.1% [15]. Several implemented interventions was associated with an improvement of adherence to therapy ($p = 0.023$), including intensifying recommendation of statin ($p < 0.0001$) and was associated with reduction of LDL-C levels ($p = 0.0008$) [16]. A randomized study concerning 206 patients receiving both antihypertensive and antiretroviral therapies found that the clinical pharmacists interventions considerably optimized regulation of blood pressure as well as adherence to both antihypertensive and antiretroviral treatments; however, a significant alteration in viral load was not achieved among hypertensive patients with HIV [17].

6. Clinical pharmacists' role in drug related problems identification and management

The therapeutic efficacy and safety of cardiovascular disease treatments can be optimized through active involvement of the clinical pharmacists in the assessment as well as management of drug related problems (DRPs). An observational study conducted on 94 CVDs patients demonstrated contribution of clinical pharmacists in categorization of DRPs, including 67.3% of patients experiencing drug interaction and 7.2% of patients suffering untreated indications. Additionally, clinical pharmacists play active roles through implementing interventions, such as adjusting drug dosages as well as discontinuing in appropriate therapies reportedly making 74 such interventions in clinical practice [9]. Another prospective interventional study conducted on 381 hypertensive patients indicated the clinical pharmacists contributed to the identification of 820 DRPs and 739 interventions [18]. Moreover, another study emphasized influence of the clinical pharmacists on optimizing medication safety and efficacy among CVDs patients by their role in documentation of 180 DRPs and attainting of 196 interventions in drug regimen optimization [19].

7. Clinical pharmacists' role in cost reduction

Several studies showed the contribution of clinical pharmacists was associated with reduction of cost among patients with CVDs through their responsibilities in management of DRPs, optimization of adherence to therapy, and reduction of hospitalization [20, 21]. An Jordan's study emphasized the importance of clinical pharmacists interventions, including patients counseling, optimization of medication adherence, identification and management of DRPs, and reduction of hospital admissions, all of which contributed to lowering overall healthcare costs [22]. On other hand, an observational study conducted at heart failure ambulatory care center verified cost saving following the clinical pharmacists interventions, which included medication addition, dose modification, and patient education; however, details regarding currency and timeframe were not steadily reported [23].

8. Clinical pharmacists' role in patient adherence

Several studies indicated the responsibilities of clinical pharmacists in optimizing adherence to their prescribed medications among patients with chronic disease as a consequence of their roles in evaluations of treatments, including medications regimens, assessment of adverse effects of medications, and individualizing the education [24,25].

The clinical outcome of treatment among patients with chronic disease is related to adherence to treatment. Clinical pharmacists play an effective role in optimizing medication adherence through its role in patients consultations and DRPs managements [26]. A cohort of 240 participants getting either angiotensin-converting enzyme inhibitors (ACEI) or angiotensin receptor blockers in the intervention arm in combination with 480 patients who acted as randomly chosen control was involved in this study. After follow-up period of six months, an statistical significant improvement in adherence level was demonstrated among patients who were received pharmaceutical intervention ($\beta = 0.06$; $p = 0.03$) in comparison with the control. Furthermore, the level of adherence among intervention group was maintained at the 12 months [27]. Additionally, a prospective randomized study involving 316 patients diagnosed with coronary heart disease who were receiving aspirin, beta-blockers, statins, as well as renin–angiotensin–aldosterone system inhibitors demonstrated the positive impact of pharmaceutical care. When compared to the control arm, the intervention group demonstrated significantly better compliance to statins (88% vs. 77%; $P = 0.033$) and aspirin (97% vs. 91%; $P = 0.036$) [28].

9. Clinical pharmacists' role in modifiable risk factors reduction

9.1. Blood pressure and glycemic control

Through multidimensional clinical pharmacists interventions, patients with CVDs may ensure modifiable risk factors minimized. These interventions, including treatment administration and patient consultations, can optimize therapy adherence as well as patient clinical outcomes [29]. A meta-analysis of 15 randomized investigations verified the pharmaceutical care was associated with a reduction of risk factors for CVDs through reduction of diastolic blood pressure (-4.5 mmHg), systolic blood pressure (-6.2 mmHg), as well as body mass index (-0.9 kg/m^2) [30].

9.2. Lipid profile outcomes

Significant reduction in LDL-C and HbA1C were demonstrated in systematic reviews valuing pharmaceutical care [30,31].

10. Conclusion

In conclusion, existing evidence suggests that the active participation of clinical pharmacists may be associated with an improvements in patients counseling, risk factors control, medication safety, medication adherence, and a reduction in hospitalization and medication costs. However, the strength of evidence varies, and further

high-quality randomized and multicenter studies are essential to confirm clinical and economic advantages. Future research should focus on well-designed multicenter randomized controlled trials, standardized outcome measures, and robust economic evaluations to better delineate the clinical and cost-effectiveness of pharmacist-led interventions in cardiovascular care.

11. Limitations

This review has several limitations. The majority of integrated studies were single-center or observational with small sample sizes, which restricts generalizability. Considerable heterogeneity happened in study design, outcome measures, and settings. Publication bias cannot be excluded, and causal assumption cannot be ascertained attributable to the predominance of non-randomized studies.

Ethical issue

Not applicable.

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Conflicts of Interest

The author declares no conflicts of interest.

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