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Relieving the Burden of Cardiovascular Disease in Canada Using Current Therapies: A Literature Review

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Abstract

Introduction: Cardiovascular disease (CVD) is a leading cause of mortality and morbidity in Canada. In 2016 alone, 91,524 Canadians died of cardiac conditions, strokes, or other vascular cognitive impairments. As a major contributor to reduced quality of life, CVDs are characterized by their effect on the heart or blood vessels and consist of many diseases, including ischemic heart disease, stroke, and heart failure. The established Canadian burden of CVD demands a need for more effective management and reduction of CVD prevalence. This review investigates the current, evidence-based therapies used to combat CVD in patients across Canada.

Methods: A literature search was conducted in PubMed using MeSH terms and keywords such as "cardiovascular disease", "therapy", "Canada", and "adult". Clinical trials and independent studies in English that were published in the last two decades and investigated current therapies for alleviating symptoms or slowing CVD progression were selected and reviewed.

Results: Various therapies are used to prevent, manage, or treat CVD, and are often individually reported in literature. However, these therapeutic interventions can be classified into distinct groups such as medication, rehabilitation, lifestyle changes, and surgical devices. Some CVD therapies have been proven to be more effective than others and it is important to apply the findings of these studies to make evidence-based treatment and management decisions. By synthesizing findings about common CVD therapies, a limitation of current literature can be addressed.

Discussion: The revision and appraisal of CVD therapies will allow for a more accurate assessment of their clinical applicability, and hence the identification of optimal treatment strategies. Doing so will also improve the feasibility of achieving shared and informed decision-making in a patient-centered care framework. Ultimately, this review can facilitate discussion around cardiovascular health, and provide a comprehensive approach for developing evidence-based health policies targeted towards the global management of CVD.

Conclusion: There is a need for evidence-based implementation of therapies to effectively address the burden of CVD. Lack of evidence or knowledge translation will have significant consequences on patient health outcomes. Future research should address other variables such as culture, gender, age, and geography, to expand generalizability.

Keywords: cardiovascular disease; heart disease; therapy; Canada; adult

Introduction

Cardiovascular diseases (CVDs) are a major cause of illness, disability, and death in Canada, and their incidence is on the rise globally [1]. CVDs refer to a cluster of disorders affecting the cardiovascular system (i.e., heart and blood vessels) [2]. The most frequent CVDs include ischemic heart disease, stroke, and congestive heart failure (HF), which account for at least 80 percent of the CVD burden in all socioeconomic classes, based on their country [3]. Although CVD may directly arise from numerous etiologies, the underlying pathogenesis of nearly all CVDs are closely related to the development of atherosclerosis. Atherosclerosis is a condition that results in the buildup of plaque within the walls of arteries, thereby blocking nutrients and oxygen from reaching the heart. Other mechanistic insights, such as high blood pressure or thrombosis, and the formation of blood clots, can also cause vascular dysfunction leading to cardiovascular disease [4,5]. While the clinical presentation of CVD varies, typical symptomatology includes chest pain, shortness of breath, nausea and fatigue, and sudden weakness of the face, arm, or leg [6–8]. More importantly, despite being classified as a chronic condition, CVDs are preventable and treatable; therefore, certain therapies and risk-reduction strategies must be closely evaluated to reduce the global burden. The presence of risk factors, such as tobacco use, high blood pressure, high blood glucose, lipid abnormalities, obesity, and physical inactivity, are major contributors to the onset

of cardiovascular disease [3,8]. Furthermore, strong efforts toward prevention are pertinent for all patients, particularly those with non-modifiable risks, including a family history of CVD [6].

Notably, 750,000 Canadians are afflicted with heart failure (HF), with a staggering 100,000 Canadians being diagnosed with this impairment each year [9]. The continuous academic pursuit to better understand the empirical basis for changes in CVD deaths and incidence rates are driven by the fact that 9 in 10 Canadians have at least one risk factor for cardiopathies [10]. While this statistic may be strenuous to corroborate, it does, however, highlight the distinguished importance of identifying optimal therapeutic strategies for the effective treatment and management of CVDs. This review, through appraisal of CVD therapies, will allow for a more accurate assessment of their clinical applicability. In doing so, it may even allow for a more systematic approach for the implementation of evidence-based policies and the natural integration of health system mechanics vital for reducing the burden of CVD.

The purpose of this literature review is to investigate and highlight the evidence-based therapies that can be employed to combat CVD in Canadian adults aged 18 or older. In high-income countries, CVD therapies have reduced CVD death rates by nearly 50% within the past 20 to 30 years [11]. This reduction in deaths can be partly attributed to various therapeutic strategies depending on the regions they are implemented in [11]. Although many evidence-based CVD prevention and management guideline recommendations exist, there are significant gaps between the evidence and its application [12]. To continue advancing CVD therapy research and reducing disease burden, a more comprehensive understanding of existing therapies, which are often reported as individual entities in the literature, is highly warranted. This review seeks to determine which therapies are currently used to combat the CVD burden in Canada. The following review will detail the literature search that was conducted, report CVD medications, rehabilitation, lifestyle changes, and surgical devices, and finally discuss the implications of these therapeutic strategies on CVD burden in Canada.

Methods

A literature search for studies investigating Canadian CVD therapies was conducted in the PubMed database. The inclusion criteria were defined as: 1) a publication date between 2012 and 2021, 2) written in English, 3) peer-reviewed, 4) randomized controlled trials (RCTs), 5) relevance to the research question (i.e., therapies that are currently used to manage or treat cardiovascular diseases in adults living in Canada). Conference abstracts, trial protocols and reviews were excluded. Additionally, studies investigating CVD prevention, education or diagnostic strategies, interventions that support the implementation of therapies, and experimental therapies not recommended in clinical contexts were excluded. MeSH terms and keywords such as “cardiovascular disease”, “therapy”, “Canada”, and “adult” were used in the search. Based on the inclusion criteria, 105 titles and abstracts were screened by at least two co-authors. Studies that did not meet the inclusion criteria on full text review were further excluded. Any discrepancies concerning an article’s applicability were then assessed by a third blinded co-author. After the inclusion and exclusion criteria was applied, 22 full text studies were screened and later, an additional 10 were excluded. In total, 12 studies were reviewed and organized into the following categories: 1) Medication 2) Rehabilitation 3) Lifestyle Changes and 4) Surgical Devices, as depicted in Figure 1.

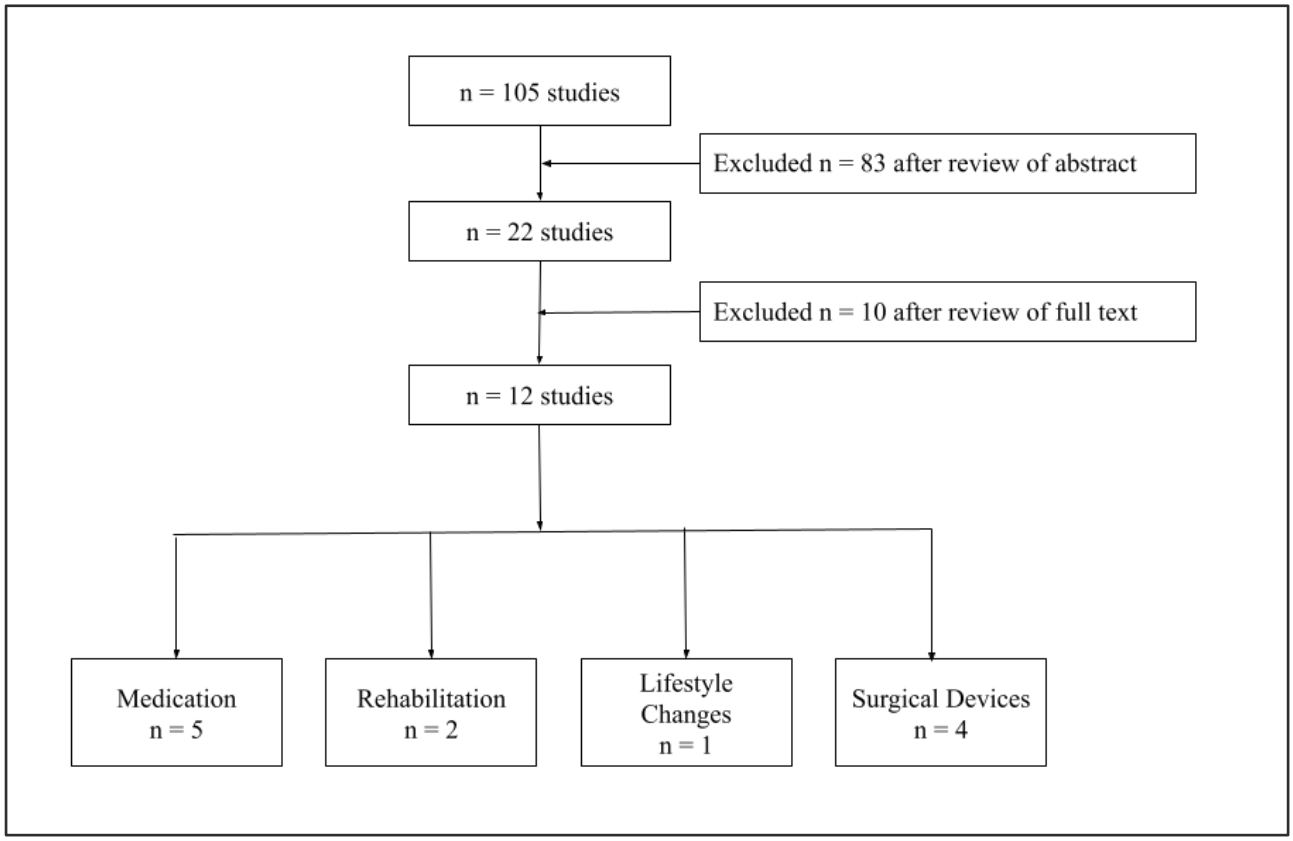

Figure 1. Flowchart outlining the method of literature search, study selection and organization of results.

Results

Medication

Medication is a critical intervention for preventing and treating CVD. There are various classes of medication, such as beta-blockers, ACE inhibitors, statins, and more, employing diverse mechanisms to target various CVDs. Drugs that target CVD (Table 1) are the most used therapeutic classes of drugs and it has been established that various drug therapies reduce the risk of developing CVD and death from CVD. Several drugs have been widely recommended by international guidelines for the primary and secondary prevention of CVD [13].

For instance, Srivastava et al. added a neprilysin inhibitor to standard therapy involving a renin-angiotensin system blocker for patients with HF and reduced ejection fraction. Angiotensin receptor-neprilysin inhibitors are a class of CVD agents that regulate the cardiovascular system including the renin-angiotensin system and natriuretic peptide systems. The 5-year number needed to treat (NNT) values were estimated for different endpoints (e.g., cardiovascular death, HF, hospitalization, and all-cause mortality) using data from another RCT involving 8399 men and women with ejection fraction <40%. The value of adding neprilysin inhibitors is comparable with those of standard HF interventions and better than commonly prescribed prevention drugs [14].

Ambrosy et al. explored the role of digoxin therapy in HF. Digoxin is one of the oldest cardiac drugs still in contemporary use. However, its role in the management of HF remains controversial. 2331 outpatients with HF were randomized to aerobic exercise training or standard care. Patients were then grouped according to prevalent digoxin status at baseline. The associations between digoxin therapy and outcomes such as mortality and hospitalization were analyzed. Digoxin use was found to be associated with a select few high-risk clinical features; however, it has also been proven to reduce all-cause and cause-specific hospitalizations [15].

Porter et al. found that intensification of deferoxamine monotherapy (DFO) with or without a deferiprone combination was effective at improving left ventricle function and myocardial T2 relaxation time. A 1-year prospective study comparing deferiprone with DFO with placebo in patients and decreased left ventricular ejection fraction was conducted. The study used cardiovascular magnetic resonance (CMR) scans to assess cardiac function at various time intervals. However, the study was underpowered suggesting it is plausible that a difference in left ventricular function between the treatment arms improved, but further research is needed to corroborate this finding [16].

Table 1. Summary of medication studies included for review

	Authors	Study Design	n =	Time Frame	Outcome Measurement	Intervention	Key Findings
1	Srivastava et al. [14]	Double blind, RCT	8399	2009-2014	• Cardiovascular death • HF hospitalization • All-cause mortality quantified by 5-year NNT values	• Adding neprilysin inhibitor to standard therapy, including a renin-angiotensin system blocker	• 5-year estimated NNT with adding neprilysin inhibitor to standard therapy is comparable to other HF interventions and recommended
2	Ambrosy et al. [15]	Multicenter, placebo RCT	2331	2003-2007	• Patient characteristics • Exercise capacity • Quality of life • Long-term morbidity and mortality	• Digoxin therapy	• Patients with HF taking digoxin had worse baseline exercise capacity, reduced all-cause and cause-specific hospitalizations
3	Porter et al. [16]	Phase II, multi-site, group-sequential, double-blind, placebo RCT	20	2005-2008	• Change in left ventricular ejection fraction by cardiovascular magnetic resonance	• Intensification of DFO with or without a deferiprone combination	• Effective at improving left ventricle function and myocardial T2
4	Kelly et al. [17]	Double blind, placebo RCT	7141	2007-2011	• 30-day mortality • HF hospitalization • 180-day mortality	• Nesiritide peptide	• Of patients with worsening HF, those treated with nesiritide had improved clinical outcomes compared to patients treated with placebo
5	Liuni et al. [18]	Double blind, randomized, placebo-controlled trial of parallel design	30	N/A	• Blood pressure measurements and venous sampling for baseline lipid analysis were obtained before and after intervention	• Rosuvastatin HMG-CoA reductase inhibitors	• Acute administration prevents IR-induced endothelial dysfunction while chronic treatment does not

Kelly et al. sought to investigate peptide nesiritide, compared to placebo, with the usual treatment for acute decompensated HF. Nesiritide helps to improve breathing difficulties, reduce HF readmissions to hospitals and help patients live longer. 7141 participants were randomized to either arm and primary outcomes such as shortness of breath were self-assessed via Likert scales. Analyses revealed that patients randomized to treatment with nesiritide had improved clinical outcomes compared with placebo [17].

Lastly, Liuni et al. reported rosuvastatin, a 3-hydroxy-3 methylglutaryl coenzyme A (HMG-CoA) reductase inhibitor, has protective effects in patients with ischemia-reperfusion (IR). HMG-CoA are cholesterol-lowering agents and are among the most widely used medications in treating hypercholesterolemia and preventing coronary artery disease. Standing blood pressure measurements were obtained and participants were randomized to receive a single dose of placebo or rosuvastatin. The protective effects, such as decreased infarct size, maintenance of vascular function, and improved functional recovery were deemed potent when acutely administered [18].

Rehabilitation

Cardiac rehabilitation [CR] is a multidisciplinary intervention that seeks to improve cardiovascular function and capacity in patients with heart disease [19,20]. CR programs (Table 2) often involve exercise training, health education, cardiovascular risk management, nutrition counselling, and psychosocial support, which are tailored to the individual needs of patients with various CVDs. The overall goals of CR focus on slowing or reversing the progression of atherosclerosis by teaching patients the skills they need to regain independence and improve daily functioning [21]. Substantive evidence from RCTs support that CR is a clinically effective and cost-effective intervention for patients with CVD [19].

Table 2. Summary of rehabilitation studies included for review

	Authors	Study Design	n =	Time Frame	Outcome Measurement	Intervention	Key Findings
1	Adamit et al. [22]	Single blind, RCT with assessments pre (T1), post (T2) and 3-month follow-up (T3)	66	2017-2020	• PROMs to quantify participant's perception of their functional status. • Canadian Occupational Performance Measure	• FaCoT	• Mild stroke • Compared to standard care, FaCoT is effective for improving daily functioning and occupational performance in individuals with mild stroke
2	McEwen et al. [23]	Exploratory, single-blind, RCT	35	2011-2013	• Change in actual performance quality of self-selected activities measured with the PQRS	• CO-OP	• Ischemic stroke • Assessment of CO-OP treatment compared with usual outpatient rehabilitation alone on activity and participation poststroke • CO-OP associated with a large treatment effect on follow-up performances

Adamit et al. studied 66 individuals with mild stroke to examine the effectiveness of Functional and Cognitive Occupational Therapy (FaCoT) in improving daily functioning and participation compared to standard care. Participants were assessed pre (T1) and post (T2) intervention and at 3-month follow-up (T3) using patient-reported outcome measures (PROMS) to quantify functional status. Compared with the control (standard care), it was established that FaCoT achieved a clinically significant difference in improving occupational performance in individuals with mild stroke [22].

In another study, McEwen et al. investigated the Cognitive Orientation to daily Occupational Performance (CO-OP) approach for improving activity and participation post-stroke, compared with usual outpatient rehabilitation. The study employed 35 patients who had sustained an ischemic stroke who were randomized to receive either usual care or CO-OP. The primary outcome measure was the change in actual performance quality of self-selected activities measured with the Performance Quality Rating Scale (PQRS). Researchers found a large treatment effect associated with CO-OP, compared to typical outpatient rehabilitation [23].

Lifestyle Changes

Lifestyle changes describe a host of non-pharmacological interventions aimed at limiting the psychological and physiological stresses of CVD [24]. Components of this category include cessation of smoking, dietary modifications, stress-management, and increases in physical activity, amongst others. Lifestyle changes are useful for a wide range of patients with cardiovascular disease, with an increasing body of evidence supporting this intervention as an economically feasible and effective alternative to traditional drug-based treatments for CVD [24–26].

A study by Davis et al. examined the impact of aerobic exercise on slowing the progression of subcortical ischemic vascular cognitive impairment (SIVCI). The single-blinded RCT included 70 adults who presented with mild SIVC. Participants underwent a 6-month, thrice weekly, progressive aerobic exercise training programme and had their health status (using the EQ-5D-3L) assessed at baseline, trial completion, and 6-month follow-up. The primary outcome was the total quality-adjusted life years (QALYs) lost or gained. Findings showed a significant improvement in QALY for the aerobic training group compared with the usual care group at trial completion and 6-month follow-up, indicative of a promising treatment for CVD [27].

Surgical Devices

Cardiovascular surgery is the exacting and technical speciality of medicine involving the surgical treatment of the heart or any related blood vessels [28]. It may include procedures (Table 4) such as bypass grafting, interventional revascularization, angioplasty, transcatheter aortic valve replacement (TAVRs), and other catheter-based interventions depending on the pathophysiology and etiology of the CVD being targeted [29]. With certain procedures, including coronary artery bypass graft surgery, now being considered standard practice, it is important to note that surgery is not always necessary, but rather highly recommended for several reasons [30]. This intervention may encompass the treatment or prevention of valvular stenosis, pulmonary embolisms, and irregular regurgitations, among other factors [31]. The massive surge of minimally invasive endoscopic surgical procedures involving the use of pacemakers, assist devices, and in some cases, even robotic surgery such as the Da Vinci Surgical System has uniquely positioned cardiovascular surgery as a highly viable and efficient approach to reducing the burden of CVD in patients [33].

Table 3. Summary of lifestyle changes studies included for review

	Authors	Study Design	n =	Time Frame	Outcome Measurement	Intervention	Key Findings
1	Davis et al. [27]	Single-blinded RCT with a 6-month follow-up study	70	2009-2014	• Conducted a cost–utility analysis: to estimate costs and consequences (i.e., health gains or losses) related to the aerobic training intervention • Main outcome: the total QALYs lost or gained at 6 (trial completion) and 12 (follow-up completion) months • Health status (using the EQ-5D-3L) was used to calculate QALYs	• Progressive aerobic training intervention compared with usual care	• SIVCI • Significant improvement in QALY for aerobic training compared with the usual care group at trial completion and 6-month follow-up

A first-in-human study by Rodés-Cabau et al. explored the efficacy of a self-expanding, first-generation V-Wave Interatrial device in 38 high-risk HF patients with anomalous ejection fraction. This shunting device was implanted percutaneously via transseptal catheterization and was designed to span the fossa ovalis to facilitate the interatrial pressure gradient whereby allowing for the left-to-right atrial shunting of blood. Most patients exhibited an improved New York Heart Association (NYHA) Functional Classification, improved quality of life, and an increase in the 6-minute walk distance (6-MWD) from baseline. With no reported cases of embolization, device malposition, or bio-incompatibility, it proved to be a promising surgical intervention associated with reduced CVD-related adverse events and enhanced cardiac function [26].

Another study by Ong et al. aimed to investigate the effects of the SAPIEN 3 TAVR on diastolic dysfunction (DD) in patients with aortic stenosis. The 1,750 participants enrolled in this RCT underwent endocardiography and were assigned a DD grade/classification depending on the severity of their clinical conditions. The participants implanted with the SAPIEN 3 transcatheter pulmonary valve conferred an improvement in LV ejection fraction, LV concentric hypertrophy or mass reduction, and overall enhanced systolic function associated with a notable survival benefit. Thereby, proving to be yet another implantable device associated with improved DD grades, and fewer combined rehospitalizations and CVD-related deaths, with generally favourable clinical outcomes [34].

A non-randomized, prospective, multicenter early feasibility study performed by Bergersen et al. assessed the efficacy and performance of the Harmony transcatheter pulmonary valve (TPV) in 66 patients diagnosed with formerly defined cardiac conditions (Table 4). Of the 60 participants, 20 were catheterized and implanted with this pericardial tissue valve using a 25-F coil-loading catheter and underwent numerous imaging techniques to assess for pulmonary regurgitations, paravalvular leaks, and overall device performance. In most cases, it was observed that the Harmony TPV demonstrated promising structural integrity, with substantial improvements in pulmonary regurgitations [35].

Lastly, a study set out to investigate the device performance of Symphony DR 2550 cardiac pacemakers equipped with the SafeR algorithm compared to that of dual-chamber pacemakers equipped with dual-chamber antibradycardia (DDD) pacing on overall ventricular function and atrial fibrillation (AF) burden. This multicenter prospective double blinded RCT involved the 1:1 randomization of 373 patients to SafeR or DD pacing with a long atrioventricular (AV) interval (250 ms). Pacemakers equipped with SafeR were associated with a larger improvement in ventricular function as compared to those equipped with the modified DDD pacing, while AF burden was significantly reduced by DDD pacing in relation to the other. However, since neither one of the assessed interventions entirely fulfilled the primary outcome, the high procedural safety through which they were offered exhibited some promising results that may be translated to enhance right ventricular (RV) pacing since no ventricular tachyarrhythmia events had occurred [36].

Table 4. Summary of surgical devices studies included for review

	Authors	Study Design	n =	Time Frame	Outcome Measurement	Intervention	Key Findings
1	Rodés-Cabau et al. [32]	First-in-human trial	38	2013-2016	• MACNE • NYHA Functional Classification used to assess condition severity • KCCQ & MLHFQ used to assess quality-of-life • 6-MWD used to assess respiratory functional capacity	• First-generation V-Wave Interatrial shunting device	• High-risk heart failure patients • Improved NYHA Functional Classification • Improved quality-of life • Improved 6-minute walk distance • Reduced CVD related events – No MACNE
2	Ong et al. [33]	RCT	1750	2013-2015	• LVEF • LVCH • DD grades to assess condition severity • Echocardiographic examination	• SAPIEN 3 TAVR	• Patients with aortic stenosis • Improved LVEF • Improved LVCH (mass reduction) • Improved DD grades • Improved systolic function and significant survival benefit
3	Bergersen et al. [34]	Non-randomized, prospective, multicenter, early feasibility study	66	2013-2015	• Transthoracic echocardiography • Biplane cinefluoroscopy to assess stent fractures • CT angiography to access device loading conditions • CMR imaging to assess enrollment eligibility	• Harmony TPV device	• Patients diagnosed with tetralogy of Fallot, pulmonary regurgitations, and valvular stenosis • Significant improvement in pulmonary regurgitations • Improved long-term quality of life
4	Thibault et al. [35]	Prospective double blinded RCT	373	2006-2012	• Device recordings to access ventricular pacing and AF burden data • Predefined adverse events (device-related complications) • Medcalc™ and SAS™ software used to perform data analyses	• A Symphony DR 2550 cardiac pacemaker with SafeR algorithm compared to DDD pacing with long AV intervals	• No ventricular tachyarrhythmia events • Symphony pacemaker was highly effective in reducing RV pacing • Significantly fewer AF-related events with modified DDD pacing • Intervention was offered with high precision

Discussion

The results section outlined a multitude of primary treatment regimes involved in reducing the burden of CVD, however, it is well established that the level of intervention required is largely dependent on the etiology, prognosis, and pathophysiology of the disease in question. Moreover, as patients with CVDs are often afflicted with other comorbidities, the use of treatment modalities involving the amalgamation of numerous therapeutic interventions are often advocated, given their enhanced combined efficacy [37]. While the advantages of multimodal therapy are well recognized, elucidating the mechanisms of action by which these interventions produce their joint effects is especially challenging given their actions as independent entities. With the advice of recommended treatments as per the physician's medical expertise, the integration of systems supporting the patient-centred care framework allowing for shared and informed decision-making may also provide a survival benefit and improved quality of life in response to the patients' needs and values [38]. The results will be published to elucidate the clinical applicability of the discussed CVD therapies, with the potential of facilitating discussion around CVD, as well as comprehensive approaches for developing evidence-based health policies to support patient-care decisions. Moreover, the categorical approach adopted in this paper to recapitulate the numerous therapeutic interventions associated with improved clinical CVD patient outcomes will also allow for accessible knowledge translation and comparison of information.

Although many CVD therapies have been identified, accessibility barriers and suboptimal adherence may limit the extent to which these therapies can reduce CVD burden. There are significant gaps between the evidence and its implementation [12]. To better tackle the Canadian and global burden of CVD with existing therapies, there need to be better strategies for implementation and/or sufficient evidence to support their effectiveness and safety [12]. Barriers to evidence-based CVD care include the availability and cost of care [12]. At the patient level, a lack of concordance with treatment recommendations is a barrier [39]. Poor medication adherence, when a patient does not take medication as prescribed, can be viewed as a problem that is diagnosable and treatable [38]. The most common predictors to target include poor adherence, lack of knowledge, negative perceptions about the medication, side effects, and cost [38]. At the physician level, there may be limitations in time, practice infrastructure and disagreement with guidelines [12]. At the health systems level, lack of policy support and healthcare resources play a major role [12]. However, implementing pre-existing CVD therapies more effectively is likely to have a more positive effect on patient outcomes compared to newly developed therapies [12].

While there is promising evidence for the treatment of cardiovascular disease, much of the current literature revolves around pharmacological interventions. Studies on non-pharmacological approaches to CVD management are still emerging, thus, this review yielded only a handful of research articles within this classification. Despite this, studies examining the role of cardiac rehabilitation and lifestyle changes demonstrated their effectiveness in treating CVD and highlighted the universal applicability of utilizing non-drug-based treatments. Along with having minimal side effects, non-pharmacological interventions are known to exhibit low drug interference, thus, several studies support their widespread use [40]. Furthermore, the use of a single database (PubMed) and strict inclusion criteria of exclusively Canadian populations limited the scope and comprehensiveness of this review.

Conclusions

Many different therapies are used to manage or treat CVD; however, the burden of CVD in Canada suggests the need for more evidence-based implementation. To begin to address this knowledge gap, various therapies, such as medications, rehabilitation, lifestyle changes, and surgical devices, were reviewed in this article. It is essential that the most effective therapies are implemented appropriately to address the burden of CVD, as it is one of the leading causes of mortality and morbidity in Canada. Ineffective use of CVD therapies or lack of evidence will result in significant consequences on patient population outcomes. Future research should take variables such as culture, geography, age, and gender into account to expand current knowledge on broader populations to fully understand the relationship between treatment and cardiovascular disease. Effective implementation of CVD therapies from an evidence-based review of existing therapy options, will improve the patient-centred decision-making process, and relieve part of the burden.

List of Abbreviations Used

6-MWD: 6-minute walk distance
AF: atrial fibrillation
AV: atrioventricular
CMR: cardiovascular magnetic resonance
CO-OP: cognitive orientation to daily occupational performance
CR: cardiac rehabilitation
CVD: cardiovascular disease
DD: diastolic dysfunction
DFO: deferoxamine monotherapy
FaCoT: functional and cognitive occupational therapy
HF: heart failure
HMG-CoA: 3-hydroxy-3 methylglutaryl coenzyme A
IR: ischemia-reperfusion
KCCQ: Kansas City Cardiomyopathy Questionnaires
LVCH: left ventricular concentric hypertrophy
LVEF: left ventricular ejection fraction
MACNE: major-device or procedure-related major adverse cardiovascular and neurological events
MLHFQ: Minnesota Living Health Failure Questionnaire
MeSH: medical subject headings

NNT: number needed to treat
NYHA: New York Heart Association
PROMs: patient-reported outcome measures
PQRS: Performance Quality Rating Scale
QALYs: quality-adjusted life years
RCT: randomized controlled trial
RV: right Ventricular
SIVCI: subcortical ischaemic vascular cognitive impairment
TAVR: transcatheter aortic valve replacement
TPV: transcatheter pulmonary valve

Conflicts of Interest
The authors declare that they have no conflict of interest.

Ethics Approval and/or Participant Consent
This literature review did not require ethics approval and/or participant consent as it is a literature review.

Authors' Contributions
ZZ: made contributions to the design of the review, collected, and analyzed data, drafted the manuscript, and gave final approval of the version to be published.
AR: made contributions to the design of the review, collected, and analyzed data, drafted the manuscript, and gave final approval of the version to be published.
PM: made contributions to the design of the review, collected, and analyzed data, drafted the manuscript, and gave final approval of the version to be published.

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