

Management of Dyslipidemia and Hypertension – Journey Mapping in the Philippines

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ABSTRACT

Literature was reviewed semi-systematically with the purpose of generating Philippines-specific data for the patient journey stages for dyslipidemia and hypertension, namely, awareness, screening, diagnosis, treatment, adherence, and control.

A structured search was conducted on EMBASE and MEDLINE databases for studies published in English in the last 10 years, whose full text was available. An unstructured search was conducted on Google, and websites of health ministries and international organizations, without any limits. The last search was run for dyslipidemia on 12.11.2019 and for hypertension on 28.07.2020. For dyslipidemia, six records out of 590 records were retrieved, and for hypertension, seven records and one unpublished conference presentation out of 160 records retrieved, were included in the final synthesis.

The review estimated that in the Philippines, the prevalence of dyslipidemia was 38.8%, while 59.0% of patients were undergoing treatment, with 44.2% of patients achieving control. Prevalence of hypertension was 27.5% and estimated rates at different stages of patient journey were- awareness- 61.5%, screening- 3.2%, diagnosis- 39.7%, treatment- 65.4%, adherence- 57%, and control- 57.6%. Potential contributory factors for low assessment rates and suboptimal management include low doctor-to-population ratio, inadequate time for screening and counseling, absence of locally validated tools for cardiovascular screening, low awareness and utilization of clinical practice guidelines, and some misperceptions of current treatment recommendations.

Effective training of physicians, patient education initiatives, and multi-sectoral coordination are some of the recommendations to improve the status of management of dyslipidemia and hypertension in the Philippines.

Keywords: evidence map, dyslipidemia, hypertension, patient journey, prevalence.

INTRODUCTION

Dyslipidemia and Hypertension are major modifiable risk factors for cardiovascular disease (CVD), which is the leading cause of morbidity and mortality worldwide [1,2]. According to the World Health Organization (WHO), raised cholesterol is estimated to cause 29.7 million disability-adjusted life years (DALYs) and 2.6 million deaths globally every year [3]. Similarly, hypertension is estimated to cause 57 million DALYs and 7.5 million deaths globally each year [2]. The prevalence of dyslipidemia and hypertension in the Asia-Pacific Region has been estimated to be 27% and 30.3% to 36.7%, respectively [4,5].

The coexistence of dyslipidemia and hypertension significantly increases the risk of cardiovascular events in low- and middle-income countries such as the Philippines, where 33.4% of the deaths were attributed to CVDs in 2018 [6]. The Philippines is undergoing a demographic and epidemiological shift, characterized by a change in lifestyle-related risk factors for CVDs [7]. Overweight and obesity, alcohol use, smoking, and physical inactivity are the major behavioral CVD risk factors in the Philippines [8], with a prevalence in adults as 37.2%, 55.7%, 21.5% and 40.6%, respectively, in 2018 [9]. As seen globally, Philippines is also struggling to cope with the increasing burden of non-communicable diseases (NCDs). Understanding the challenges of patients with CVD as they move from a symptomless presentation of dyslipidemia and hypertension to disabling or fatal cardiovascular events like myocardial infarction or stroke is crucial. The challenge of attaining control of these conditions may be dependent on factors external to the patient and may go beyond patient-physician interaction. Local healthcare system issues that challenge effective management of these cardiovascular risk factors must likewise be addressed as they result in suboptimal health outcomes of the patients.

One of the critical steps in optimizing health outcomes is the analysis of the patient journey stages for a disease condition, namely awareness, screening, diagnosis, treatment, adherence, and control. This method of quantification using local data sources is a patient-centric approach to capture the status of current management and can be used as basis for proposing locally relevant solutions in the context of the healthcare systems

where such quantifications were estimated. This methodology has been previously described and termed as "Mapping the Patient Journey towards Actionable beyond the Pill Solutions for Non-communicable Diseases" (MAPS) [10].

Following MAPS methodology, the objectives of the current study were to generate country-specific patient journey data for dyslipidemia and hypertension in the Philippines. The study also aimed to identify any gaps across the patient journey touchpoints, contextualized within the current healthcare scenario, that can inform decision-making and improve patient outcomes in the Philippines.

MATERIAL AND METHODS

Overview

A semi-systematic review was conducted to search for records quantifying patient journey stages for dyslipidemia and hypertension. Methods of conducting the review were previously described [10]. Dyslipidemia was defined as high total cholesterol (≥ 6.2 mmol/L), high triglyceride (≥ 2.26 mmol/L), high LDL-C (≥ 4.1 mmol/L) and/ or low HDL-C (≤ 1.03 mmol/L), respectively (Borderline High and above per NCEP-ATP III guidelines) [11]. Hypertension was defined as a systolic BP of ≥ 140 mm Hg and/or diastolic BP of ≥ 90 mm Hg or ongoing treatment for hypertension [12].

Search strategy

An electronic search was conducted in two parts: structured and unstructured. Structured search was performed through Medical Subject Headings (MeSH) terms on EMBASE and MEDLINE, using OVID access using keywords related to dyslipidemia, hypertension, CVD and different stages of patient journey in local region.

Keywords used for dyslipidemia were:

(dyslipidaemia OR hypercholesterolemia OR cholesterol OR triglycerides OR LDL) AND (epidemiology OR prevalence OR incidence OR national OR survey OR registry OR Statistics) AND ("health literacy" OR screening OR awareness OR knowledge OR treated OR treatment OR

diagnosis OR undiagnosed OR diagnosed OR therapy OR controlled OR control OR uncontrolled OR adherence OR adhere OR compliance) AND Philippines

Keywords used for hypertension were:

(Hypertension OR "blood pressure" OR hypertensives) AND (epidemiology OR prevalence OR incidence OR national OR survey OR registry) AND (awareness OR knowledge OR "health literacy" OR screening OR diagnosis OR diagnosed OR undiagnosed OR treatment OR treated OR untreated OR control OR controlled OR uncontrolled OR adherence OR compliance OR adhere OR therapy OR non-adherence) AND Philippines

The last search for dyslipidemia was run on 12 November 2019 and for hypertension was run on 28 July 2020. To address data gaps in structured search, an unstructured literature search was conducted on Google and available databases of Incidence and Prevalence Database (IPD), World Health Organization (WHO) and Country's Department of Health.

Eligibility criteria

Among the structured search results, studies published in English from 2010 to 2019, regarding dyslipidemia and hypertension were selected, whereas in the unstructured search, records were selected irrespective of the year of publication. Studies were eligible for inclusion if they were: (i) published in English language between 01 January 2010 and 10 December 2019; (ii) focused

on the Philippines; (iii) focused on adult human populations ≥ 18 years; (iv) not restricted to a specific patient subgroup, such as patients with comorbidities and pregnant women; (v) peer-reviewed published systematic review and/or meta-analysis, randomized controlled study, observational study and narrative reviews (full-texts published and conference abstracts); (vi) reporting quantitative data from the patient journey stages for dyslipidemia and/or hypertension, which includes awareness, screening, diagnosis, treatment, adherence and control (Table 1); (vii) studies having national representativeness. Case studies, letters to the editor, editorials, and thesis abstracts were excluded.

Duplicates or similar data were identified, and the most recent evidence was retained for inclusion in the analysis. For data gaps that persisted after structured and unstructured literature search, studies/data suggested by the authors and other local experts, who are leading national health specialists from the Philippines, were included in the semi-structured review.

Study selection and data extraction

Based on these criteria, two reviewers screened records for eligibility by looking at titles, abstracts and full papers. Disagreements were resolved by discussion between the reviewers and the co-authors. Data from the included studies were extracted into a data extraction grid. These included: (1) title of the article, (2) article citation, (3) authors, (4) year of publication, (5) abstract,

Table 1. Definitions of terms used in the study

Term	Definition
Dyslipidemia is represented by Hypercholesterolemia	Hypercholesterolemia was defined as high total cholesterol, high triglyceride, high LDL-C and/ or low HDL-C, which were ≥ 6.2 mmol/L, ≥ 2.26 mmol/L, ≥ 4.1 mmol/L, ≤ 1.03 mmol/L, respectively (borderline high and above per NCEP-ATP III guideline)
Hypertension	Hypertension was defined as % of respondents having average SBP ≥ 140 mmHg and/or average DBP ≥ 90 mmHg
Awareness	Self-reported or any prior diagnosis of high total serum cholesterol or hypertension by a healthcare professional
Screening	Proportion of respondents who had their cholesterol levels or BP measured by a doctor or any other health worker
Diagnosis	Patients diagnosed with dyslipidemia or hypertension by a healthcare professional
Treatment	Use of medication for management of the respondent's high cholesterol or BP
Adherence	Proportion of respondents indicating adherence and/or compliance to the prescribed cholesterol lowering medications or BP medications
Control	Proportion of patients achieving a target total cholesterol of ≤ 5.0 mmol/L OR ≤ 200 mg/dL or BP of $\leq 140/90$ mmHg with treatment

Abbreviations: BP, blood pressure; DBP, diastolic blood pressure; SBP, systolic blood pressure, TC, total cholesterol.

(6) population characteristics, (7) sample size, (8) prevalence of each condition in the sample, and (9) available data in the article that correspond to each patient journey touchpoint namely awareness, screening, diagnosis, treatment, adherence and control. Narrative description or qualitative data on possible causative issues surrounding the observed data points and any suggested interventions for the same were captured from the included records.

Statistical analysis

Data from the included studies with respect to the patient journey touchpoints of dyslipidemia and hypertension were pooled. Wherever there was more than one value of estimation for the disease journey stages, weighted means were calculated using the sample size of the individual studies. For prevalence, arithmetic mean was calculated based on values from included records. The pooled data were validated through discussion with key opinion leaders in the Philippines, including three of the authors, for local relevance and real-world congruence and a tabular summary of data points was presented.

RESULTS

Studies included in the review

Dyslipidemia studies retrieved in this review covered a duration of 14 years (2004 to 2018) and hypertension covered a duration of six years (2013 to 2019). Of the 591 studies retrieved for dyslipidemia, 575 were from structured and 15 were from unstructured search. While applying limits to structured search results, 480 retrievals were filtered. The remaining 95 records were screened for eligibility. Eventually, no records from the structured search met the inclusion criteria, while four records (research papers [n=3], report [n=1]) from the unstructured search were included in the final data synthesis (Figure 1a).

For hypertension, 153 records from structured and seven records from unstructured search were retrieved. One unpublished record was also added to the final data synthesis. While applying limits to structured search results, 12 retrievals were filtered. The remaining 141 records were screened

for eligibility. Eventually, no records from the structured search met the inclusion criteria, while seven records (reports [n=3], research papers [n=3] and conference abstract [n=1]) from the unstructured search were included in the final synthesis. Additionally, unpublished data from one conference presentation was considered for screening and diagnosis stages of patient journey for hypertension. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart for the studies is presented in Figure 1b. Overview of the included studies is provided in Table 2.

Pooled estimates of patient journey touchpoints

The total population of Philippines is estimated to be 109,581,000 [13]. The prevalence of dyslipidemia was higher in the Philippines than nearby nations, whereas the prevalence of hypertension in the Philippines was comparable to Vietnam, Singapore, and North Korea, but lower than in Indonesia, Malaysia, and Myanmar. Pooled estimates for dyslipidemia and hypertension prevalence were 27.7% and 38.8%, respectively. Two out of three diagnosed hypertensive patients were being treated and a little over half of these treated patients were adherent to treatment and have attained the target blood pressure. Similarly, a little over half of patients diagnosed with dyslipidemia received treatment and around 44% of those who were treated attained optimal control. The pooled estimates are shown in Table 3. The results of the pooled analysis of this semi-systematic review were compared with prevalence and patient journey stages data reported by national surveys or nationally representative studies conducted in the nearby countries of East Asia, Southeast Asia, and Asia Pacific, to understand the regional challenges with a broader perspective, although the availability of data for dyslipidemia was low. Proportion of people put on treatment for dyslipidemia and hypertension after diagnosis, and proportion of people having achieved control of the two conditions, were higher in the Philippines than most other countries [14-23]. There was no data available for awareness, screening, diagnosis, and adherence for dyslipidemia. Unpublished data from the included conference presentation was considered for screening and diagnosis of hypertension.

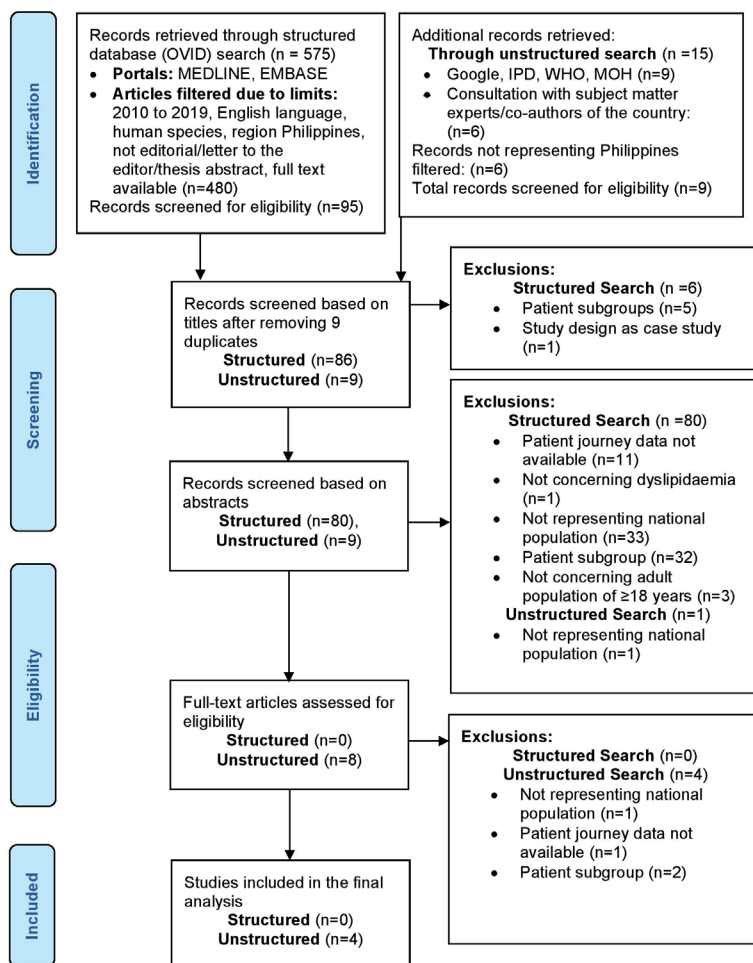


Figure 1. PRISMA diagram showing selection of studies for inclusion in the review.

a. Dyslipidemia

DISCUSSION

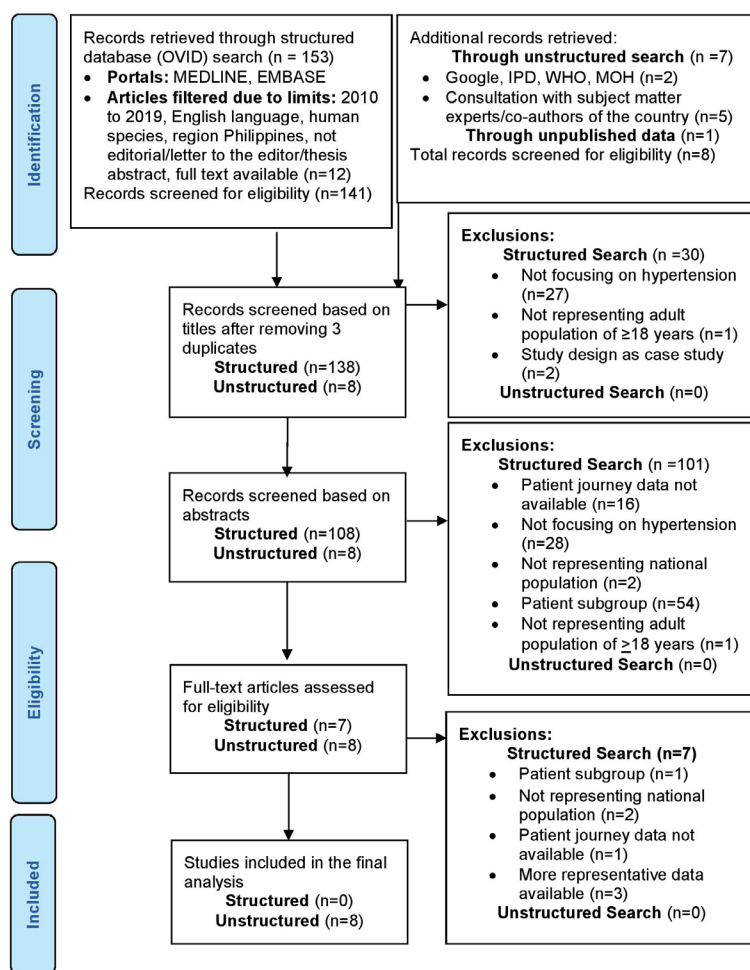
The semi-systematic review aimed to determine the prevalence of dyslipidemia and hypertension, quantify patients in the different stages of the patient journey, and identify any gaps in the patient journey that should be addressed. This semi-systematic review demonstrated low screening and diagnosis rates for hypertension and suboptimal management and control for both conditions, which was consistent with or better than other countries in the region.

Factors possibly contributing to low screening rate and suboptimal management

Dyslipidemia and hypertension often are asymptomatic hence may be frequently ignored by patients who may not be aware of the potential target organ damage and cardiovascular events, thus delaying their consultation. This situation

is further aggravated by suboptimal preventive services available to the general population and the lack of standardized methods of screening in the private sector further contribute to low screening and diagnosis rates leading to suboptimal management.

In addition, screening for dyslipidemia and hypertension also depends on the priority of the primary care physicians (PCPs) and their time on hand for consultation [14,15]. High patient load in the clinic would reduce time for screening and patient education regarding dyslipidemia and hypertension. In contrast to the recommended doctor-to-population ratio of 1:1000 by WHO [16], the Philippines has only 3.9 doctors per 10,000 population [17] thus limiting cardiovascular risk assessment.



Abbreviations: IPD, Incidence and Prevalence Database; MOH, Ministry of Health; WHO, World Health Organization.

Figure 1. PRISMA diagram showing selection of studies for inclusion in the review.

b. Hypertension

Adapting the WHO guidelines, the Philippine Department of Health, has implemented the Philippine Package of Essential Non-communicable Disease Interventions (Phil PEN) for the management of NCDs [18].

The Philippine Lipid and Atherosclerosis Society recently published updated clinical practice guidelines for management of dyslipidemia in the Philippines [19]. Likewise, the Philippine Heart Association together with the Philippine Society of Hypertension updated the local clinical practice guidelines on the detection and management of hypertension [20].

Gaps in the beliefs and practice in dyslipidemia management of Filipino PCPs were demonstrated in a web-based survey participated in mostly by general practitioners. Target LDL-C levels recommended by the surveyed Filipino physicians

differed from those recommended by guidelines. There was also note of concern for side effects of guideline-recommended pharmacologic treatment in the survey [21]. Both of these would contribute to suboptimal management and control of dyslipidemia.

Another factor contributing to suboptimal management of dyslipidemia and hypertension is the lack of locally validated tools to assess CVD risk. The American College of Cardiology has a standardized risk calculator for atherosclerotic CVDs [22]. Similarly, the European CVD risk assessment model is known as a Systematic Coronary Risk Evaluation (SCORE) tool [23]. These tools however are not specifically validated for use in the Asian population. Among Asian countries, Malaysia has validated and uses the Framingham Risk Score and Thailand uses panel scoring method [24,25].

Table 2. Characteristics of the included studies

S. No	Authors/organization	Year	Population under study	Sample size	Patient journey data
Dyslipidemia					
1	Food and Nutrition Research Institute ¹¹	2015	18 years and older	20,244*	Prevalence (46.9%)
2	Park et al ³¹	2011	18 years and older	834	Control (48.6%)
3	Punzalan et al ³²	2014	20 to 50 years healthy individuals	3,072	Prevalence (30.67%)
4	Tongol ³³	2004	29 to 86 years old dyslipidaemia patients	118	Treatment (59%), Control (13.3%)
Hypertension					
1	WHO Country Profile NCD Philippines ³⁴	2018	Aged 18 years or more	Not specified	Prevalence (19%)
2	Department of Science & Technology, Food & Nutrition Research Institute 2018 ³⁵	2018	20 years and above	87,639	Prevalence (19.2%)
3	PRESYON 3 ³⁶	2013	More than 18 years	3,334	Prevalence(28%), Awareness(67.9%), Treatment(56%), Adherence (57%), Control (27%)
4	Castillo et al ³⁷	2019	Adult population in major industrial outlets	271,604	Prevalence(34.3%), Screening(0.4%) ¹ , Treatment (65.6%), Control (58.4%)
5	Palafox et al ³⁸	2016	35 to 70 years	1,671	Prevalence(51.2%), Awareness(54.5%), Treatment (46.1%), Control (13.5%)
6	Galema ³⁹	2019	All Government Employees ≥25 years	NA	Screening (0.2%) ²
7	Punzalan et al ³²	2014	20 to 50 years healthy individuals	3,072	Prevalence (14.5%)
8	Unpublished Phil PEN data presented during convention			47,380,414	Screening(10.9%) ³ , Diagnosis (39.7%)

Notes: *Subset of survey population that underwent lipid profile

¹271604/63775200 (total adult population in 2017)

²98380/63775200 (total adult population in 2017)

³5175095/47380414

Abbreviations: NA, not available; Phil PEN, Philippine Package of Essential Non-Communicable Disease Interventions; PRESYON, Philippine Heart Association—Council on Hypertension Report on Survey of Hypertension.

Table 3. Pooled estimates of patient journey touchpoints from included studies

Condition	Awareness	Screening	Diagnosis	Treatment	Adherence	Control
Dyslipidemia	No data	No data	No data	59.0% ^{†,b}	No data	44.2% ^{†,b}
Hypertension	61.5% ^{†,b}	3.2% ^{†,a,b}	39.7% ^a	65.4% ^{†,b}	57.0% ^b	57.6% ^{†,b}

Notes: [†]Weighted average; ^a unpublished data; ^b published data

Compared with these countries, the Philippines does not have a locally validated CV risk scoring system. Risk assessment in clinical practice involves mainly counting the number of risk factors present in a patient without numerical quantification of risk of occurrence of cardiovascular events which could

have facilitated a better understanding of risk from the patient's point of view [26].

Finally, the healthcare system is challenged by tough geography, social barriers and limited healthcare facilities, medical supplies and health personnel [7].

The availability and accessibility of resources are not equitable due to regional and socioeconomic disparities [17] and the cost of accessing healthcare facilities must also be considered as they impact healthcare access [7].

Addressing the gaps in assessment and management of dyslipidemia and hypertension

Measures should be taken to ensure that guidelines, when released by specialty societies, are effectively disseminated to PCPs to ensure awareness, understanding and adaptation into their clinical practice. The dyslipidemia guidelines will clarify the uncertainty related to LDL-C targets in different patient groups, the safety of statins (especially for effects on cognitive, renal, and hepatic function and for hemorrhagic stroke risk), and lipid management strategies in patients with chronic kidney disease, including those with concomitant hypertriglyceridemia.

The hypertension guidelines can clarify cut-offs for diagnosis and targets for treatment of hypertension. The updated local guidelines will provide standards to physicians that are relevant and applicable to the local healthcare situation to guide their practice.

PCP education in the assessment and management of dyslipidemia and hypertension, and in behavioral change communication through a national program for NCD seems a good investment [28]. A potential roadmap for improving the practices of physicians needs to be formulated leveraging the multi-sectoral partnerships.

Physician-driven patient education at the clinic can raise patient awareness and knowledge and can help patients complete their journey through the various stages to achieve adequate control of these conditions. To address time and patient load limitations at their clinics, collaboration with other allied medical and healthcare professionals may be practiced for more effective and widespread screening and patient education using a team-based approach.

Other partners in the healthcare system like pharmacists and allied health professionals can be tapped to screen, guide, and oversee NCD outcomes by accredited training programs. Patients' family members and care providers can be educated and trained to support monitoring and adherence to management of NCDs [29].

Improving health literacy, treatment adherence, and health-seeking behavior of Filipinos must also be addressed through patient awareness efforts. Raising lay awareness about dyslipidemia and hypertension requires collaborative initiatives of a larger scale by the government, medical societies, and the private sector. These initiatives can be driven by traditional mass media and social media and by coordinated mass awareness programs by the Department of Health and relevant medical societies.

The government through the Philippine Health Agenda (2016) policy also aims to address challenges by implementing individual directives, inter sector collaborations, and strategies to promote health and prevent diseases like NCDs [17]. Despite the availability of comprehensive packages provided with government support, their utilization rates are very low, hence, access to these programs should be optimized.

A very important factor in better management of NCDs is the promotion of healthy lifestyle practices. Introduction of risk factor awareness, health promotion programs, and healthy meal programs across all ages, from schools to workplaces, is recommended.

A national multi-sectoral cross-agency level coordination mechanism is required to strengthen existing initiatives on NCDs [30]. Such collaboration is seen between the Philippine Society of Hypertension, the Department of Health region IV-A, and a local medical society to implement a modified Phil PEN protocol to standardize CV risk assessment and management in the private sector. The outcome of the program could serve as a guide for expansion of similar programs across the country.

Limitations and strength of the review

Limited data were available to extract the complete picture, particularly with respect to dyslipidemia. Moreover, patient journey mapping did not include analysis of both as co-morbidities in the same patients. The strength of the review was that it was able to reflect the country-specific available data on the status of screening and management of dyslipidemia and hypertension in the Philippines, bringing out locally relevant issues. The review provides country-based data on the patient journey, which can be useful for designing locally effective

and engaging interventions for improving the overall management and control of dyslipidemia and hypertension. Existing gaps in the local data, especially for dyslipidemia, were also brought to light in this review.

CONCLUSION

Dyslipidemia and hypertension increase the risk for CVD. The lack of local data on awareness, screening, diagnosis, and adherence for dyslipidemia highlights the need for further research to bridge these data gaps. The opportunity to improve the control of these two conditions can be found in each stage of the patient journey. The primary care physician's role in the management of cardiovascular disease risk factors such as dyslipidemia and hypertension are best supported by well disseminated and periodically updated clinical practice guidelines that contextualize international guideline recommendations within the local healthcare scenario. Initiatives to improve awareness, screening, diagnosis and treatment is best coordinated amongst the different public and private health sectors to produce the greatest impact on patient outcomes.

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Author contribution

Study conception and design: AAA, EJBL, DIDO, GEB; data collection: AAA and GEB; analysis and interpretation of results: AAA and DIDO; draft manuscript preparation: AAA, EJBL, DIDO and GEB. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval

This review study does not require ethical approval.

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Conflict of interest

The authors declare that there is no conflict of interest.

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