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Using the Chronic Care Model to Assess Chronic Illness Care in Two Caribbean Countries

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Abstract

Aim: To describe nurses' assessment of the level of support for the care of patients with hypertension and/or diabetes mellitus in two Caribbean countries using the Chronic Disease Model.

Background: The Caribbean Community (CARICOM) declared the mitigation of the chronic diseases epidemic as a regional priority using a common approach (WHO, 2022) [1].

Introduction: Successful reduction in the incidence of chronic non-communicable disease will require a multidisciplinary approach with nurses playing a critical role in the management of patients diagnosed with hypertension and/or diabetes mellitus. Integration of the Chronic Care Model to guide chronic illness healthcare service delivery has yielded improvements in patient outcomes across multiple countries.

Methods: This cross-sectional study incorporated multiple sampling strategies (convenience and snowball sampling) to recruit nurses in Jamaica and Trinidad and Tobago through their professional organizations. Data were collected using a 28-item questionnaire and subsequently analyzed via the use of IBM SPSS version 27. A total of one hundred and fifty-four (154) nurses completed an online version of the Assessment of Chronic Illness Care (ACIC) survey via Qualtrics software.

Results: The sample included registered nurses, Nurse practitioners and Public Health Nurses practicing in Trinidad and Tobago (n=34) and Jamaica (n=120) with the majority providing direct patient care in urban settings. Nurses reported basic to intermediate support for clients diagnosed with hypertension and diabetes. There was no difference in the level of support for individuals with diabetes mellitus and/or hypertension between Jamaica and Trinidad and Tobago. The level of support for chronic illness care for patients with diabetes mellitus and/or hypertension was perceived as suboptimal by the nurses studied in the Jamaica and Trinidad and Tobago.

Discussion: The basic levels of support for chronic illness care was similar between settings and was perceived as suboptimal. The study was hampered by the lack of information systems in the practice settings studied. This is an important element of the model and is contributory to the low ACIC scores in the countries studied.

Conclusions: The findings of the study suggest that a common region approach to chronic disease reduction remains relevant. However, based on the Chronic Care Model significant investments are indicated to change the perceived from suboptimal to optimal.

Implication for nursing and health policies: Increased engagement of nurses and integration of the Chronic Care Model could prove helpful to the regional response to the non-communicable disease epidemic.

Keywords: CARICOM Countries, Chronic Care Model, Diabetes, Hypertension, Jamaica, Non-communicable diseases, Trinidad and Tobago.

- Study design_ JLML & OO
- Data collection_ JLML
- Data analysis_ JLML
- Study supervision_ JLML
- Manuscript writing_ JLML, KAK, JC
- Critical revisions for important intellectual content_ JLML, KAK, JC, OO

Introduction

Non-communicable diseases (NCDs) are defined as chronic diseases that are not acquired from an acute or infectious process but result from a combination of multiple factors including physiological, genetic, behavioral, and environmental [1]. Globally, on an annual basis nearly 40 million individuals die of a NCD with nearly 75% of those deaths occurring in low and middle-income countries [2,3]. The high rates of NCDs in low and middle-income countries are a concern they can contribute to poverty, place a burden on healthcare systems, and slow economic growth and development [1]. The WHO has deemed that the socioeconomic impacts of NCDs make their prevention and control a developmental imperative [1].

In the Caribbean Community (CARICOM) (composed 15 countries and 7 Associate territories), NCDs are the most common cause of death, with cardiovascular diseases, diabetes, and cancer being the most prominent NCDs [2]. Although governments in the region have prioritized the prevention and control of NCDs, premature mortality from ischemic heart diseases has significantly increased in Trinidad and Tobago with deaths exceeding 200 deaths per 100,000 population in the last decade [2]. Ischemic heart disease remains the third highest cause of death in Jamaica, and data from the Jamaica Health and Lifestyle Survey Report (JHLSR, 2016-2017) [4] suggest more than half of Jamaican adults were obese, and 33% were hypertensive; all reflecting an upward trend since the previous survey completed in 2008 [2,4].

Background

The Caribbean Community (CARICOM, 2022) [5] is an intergovernmental organization, built upon four pillars which include economic integration, foreign policy coordination, human and social development, and security. CARICOM recognized the threat of the high incidence of NCDs to economic and social development and collectively declared the mitigation of chronic diseases as a regional priority [1,6]. All member states have all adopted the Port of Spain Declaration (POSD), and developed chronic disease mitigation, multi-sectorial action plans (MAPs) to slow the chronic disease epidemic within the region [6]. This regional policy approach has seen varying levels of implementation with NCD trends (over a 10-year period) unchanged in many of the countries, and in some instances, the incidence of NCDs has increased [7,8,9].

Jamaica, and Trinidad and Tobago have implemented more than 60% of the indicators in the MAPs and were among the four most compliant countries in the region. Abdulkadri et al. (2021) [7] performed an evaluation of the policy approach to NCDs, and the findings suggest that institutional legitimacy, material resources, and alignment of institutional mandates with commitments were directly associated with compliance with the commitments set out in the Port of Spain Declaration (POSD). The evaluation highlighted the importance of stakeholder engagement in achieving the success of the MAPs and identified nurses as major stakeholders in the healthcare system on the frontlines of identifying and caring for individuals diagnosed with NCDs. The report claimed that full engagement of nurses at every level was likely essential for the successful mitigation of NCDs in the region.

The MacColl Center's, Improving Chronic Illness Care program (ICIC, 2016-2019) cited deficiencies such as inadequate training, rushed practitioners and failure to follow established practice guidelines as affecting the quality of care provided to clients in the USA. The lack of care coordination, active follow-up and or client education to support self-management skills were identified as core causes for the poor chronic illness care outcomes [10]. These factors are major elements of care provided by the nurse. Factors such as the inadequate deployment of the NCD guidelines, insufficient stakeholder engagement and deficiencies in the nurses' knowledge regarding evidence-based practice have also contributed to suboptimal patient care [11].

The Chronic Care Model

The Chronic Care Model (CCM) has been used to guide improvements to the NCD healthcare service delivery across several countries with strong support of its widespread implementation [12]. The CCM was developed as a framework in the 1990s by Wagner in response to the needs of chronically ill individuals by restructuring the healthcare system and shifting primary care providers' focus to proactive management of patients with NCDs [13]. The model continued to evolve and is used by healthcare providers to manage the care of individuals with NCDs on a global scale. This evidence-based model assumes that improvements in the individual's care requires an approach that incorporates not only the patient, but also the healthcare provider, and interventions in the healthcare system [14,15]. Registered nurses (RNs), nurse practitioners (NPs), and other advanced practice nurses are ideally positioned on the front lines of patient care to implement the CCM [14,16,17].

The CCM framework is comprised of six components: organizational support, clinical information systems, delivery system design, decision support, self-management support, and community resources. The first four concepts address healthcare system practice strategies, and the last two concepts are centered around the patient [14]. The CCM has been used successfully in different types of NCD studies including hypertension, diabetes, and endometriosis [15].

The CCM is a flexible framework that can be implemented in its entirety or selected components and is not limited to one NCD. In a retrospective study from 2012 to 2016 in two primary care clinics with primarily uninsured, Hispanic patients, researchers evaluated the effect of CCM implementation on systolic blood pressure (SBP) control in minority patients with diabetes in Texas [18]. Researchers found that implementation of the CCM for patients with diabetes resulted in SBP control being significantly increased over a period of 3-4 years. Turner et al., (2018) [18], surmised that the delayed length of time to see results of using the CCM may be delayed in low-income, minority patients. Other successes with the use of the CCM to improve and coordinate the care and improve long-term outcomes were seen among women in Pakistan suffering from endometriosis and marked improvement among clients

engaged in diabetes self-management in systems where the CCM model was implemented [19,15]. Based on the above, CCM is an ideal context in which to assess the implementation of the MAPs for NCD control in CARICOM countries.

Aim of Study

The aim of the study was to evaluate nurses' perception of the level of chronic illness care support in Jamaica and Trinidad and Tobago. Using the ACIC survey scores the integration of the CCM in caring for clients diagnosed with diabetes and hypertension by nurse in these English-speaking countries was assessed.

Methods

Design

This descriptive, cross-sectional study adhered to the STROBE-Strengthening the Reporting of Observational Studies in Epidemiology Guidelines. Study participants completed an electronic version of the ACIC questionnaire using Qualtrics®.

Setting

Nurses in Jamaica and Trinidad and Tobago, which are two of the largest English-speaking countries in the Caribbean, were invited to participate in the online survey. These CARICOM countries have similar health care systems; primarily government operated through decentralized Regional Health Authorities (RHAs). Experienced nurses as PHNs or NPs serve key roles in the delivery of independent and interdependent care to clients diagnosed with CNCDs in community health settings in both countries.

Ethical Issues

Ethical approval was obtained from the University of Central Florida STUDY00000665 and The University of the West Indies, Mona ECP 13, 19/20, and St. Augustine CREC - SA.0267/03/2020 campuses. Each participant completed the anonymous survey following a review of the informed consent. Participants were advised that completion of the survey inferred informed consent and that they could withdraw from the study without penalties. Data were kept confidential and securely stored.

Participants

RNs, NPs, and public health nurses (PHNs) practicing in Jamaica and Trinidad and Tobago were invited complete the ACIC online survey. Participants were required to have at least one year of experience providing direct and or indirect care to patients diagnosed with chronic illnesses to be eligible for inclusion in the study.

Power analysis and sample size estimations were used to determine the required sample size. G*Power facilitated an *a priori* analysis, a moderate/medium effect size, 80% power, and significance set at 95%, $p < .05$ were accepted. A minimum sample of 150 nurses was recommended. Multiple sampling strategies including convenience, snowball, and purposive sampling were used to recruit study participants. Participants were invited to participate using recruitment flyers sent to professional organizations, emails, and in-person invitations to complete the online survey.

Data collection instruments and methods

With permission, the ACIC survey was used to determine the degree to which countries were perceived to be consistent with the CCM. This diagnostic survey identified the current state of chronic illness care in healthcare settings.

The 28-item survey assessed six subscales: Organization of the healthcare delivery system (6 items), community linkages (3 items), self-management support (4 items), decision support (4 items), delivery system design (6 items), and clinical information systems (5 items) [20].

The Likert like responses for each item spanned four levels of implementation with possible scores of 0-11 scale, and categories defined as follows: 0-2 (little or no support for chronic illness care); 3-5 (basic or intermediate support for chronic illness care); 6-8 (advanced support); and 9-11 (optimal, or comprehensive, integrated care for chronic illness). Alternatively, the scale ranged from level A "fully implemented" to D "little or none", with one of three ratings on each level. Subscale scores for the six subscales were derived by summing the responses. Therefore, the lowest possible score for the subscales was "0", which corresponded to limited support for chronic illness care and the highest was "11" which indicated the presence of fully developed chronic illness care.

Data Analysis

Data were analyzed using IBM SPSS® for Windows, version 27. The scores of each subscale and total scores were reported and interpreted as recommended by the developer. Surveys with fully completed subscales were included in this analysis. Descriptive and inferential statistics including measures of central tendencies were employed to describe nurses' assessments of chronic illness care in the study countries under investigation. T-tests and ANOVA were used to determine differences between mean scores for specific chronic diseases (diabetes and hypertension), locations and specialization.

STROBE Statement-Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Page. No
Title and abstract	1	*(a)* Indicate the study's design with a commonly used term in the title or the abstract ***Included in the Abstract***	p. 2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found ***The Abstract covers all major sections of the paper***	p. 2-3

Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	p.4-7
Objectives	3	State specific objectives, including any prespecified hypotheses ***A purpose statement is included***	p. 8
Methods			
Study design	4	Present key elements of study design early in the paper	p. 8
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	p. 8
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	p. 9
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	p. 9-10
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	p. 9-10
Bias	9	Describe any efforts to address potential sources of bias ***Multiple sampling strategies were used to ensure inclusion of nurses who may not be tech savvy.***	p. 9 & 14
Study size	10	Explain how the study size was arrived at	p. 9
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	p. 9
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	p. 9
		(*b*) Describe any methods used to examine subgroups and interactions	p. 9
		(*c*) Explain how missing data were addressed	p. 10
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	n/a
		(*e*) Describe any sensitivity analyses	n/a
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	n/a
		(b) Give reasons for non-participation at each stage	n/a
		(c) Consider use of a flow diagram	n/a
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	p. 11
		(c) Indicate number of participants with missing data for each variable of interest ***See Page 10 and tables***	p.10
Outcome data	15*	Report numbers of outcome events or summary measures	n/a

Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	n/a
		(*b*) Report category boundaries when continuous variables were categorized	p.10
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	n/a
Discussion			
Key results	18	Summarise key results with reference to study objectives	p. 13
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	p.15
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	p.16
Generalisability	21	Discuss the generalisability (external validity) of the study results	p. 13 & 15
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	n/a

Results

Demographic Characteristics of the Sample

The sample included 34 nurses practicing in Trinidad and Tobago and120 nurse from Jamaica of which 72% were RNs, 13.7% were NPs, and 5.7% were PHNs. The majority reported they provided direct patient care (77%), most of which occurred in urban settings (64.3%). Nurses were employed in hospitals (62.8%), clinics (26.2%), private practice (3.7%) and health planning (1%). The mean length of years of experience was 12 ± 8.9 years among nurses studied. This was not different based on country of practice (Jamaica 12.6 ± 9.5yrs; Trinidad 11.0 ± 5.48years) [*p*=.195].

Nurses' perception of chronic illness care and the level of integration of the CCM as measured by the ACIC survey scores.

Based on the CCM the support for hypertension care was rated similarly in Jamaica (5.3 ± 2.4) and Trinidad (4.4 ± 2.7), [*p*=.108] which indicated basic or intermediate support for clients diagnosed with hypertension. All six subscales of the ACIC received similar mean scores reflecting basic support for chronic illness care in both countries (*p*>.05). There was no difference in the level of support for care for clients diagnosed with hypertension or diabetes mellitus [Table 1].

Table 1: *Mean Chronic Illness Care Scores for Diabetes and Hypertension*

ACIC Hypertension Subscales	N	Mean	SD	*p*
Chronic Illness Care Mean Score Diabetes	34	5.07	2.44	.369
Chronic Illness Care Mean Score Hypertension	120	5.09	2.46	
**p*<.05, ***p*<.01				

The perceived level of support for chronic illness care by nurses with post basic training {nurse practitioners and public health nurses} (5.89 ± 2.71) was greater than that of registered nurses (4.87 ± 2.37) [*p*=.007] when measured using the dimensions of the ACIC for both hypertension and diabetes mellitus. This trend was noted across each dimension of the ACIC except the clinical information systems (*p*=.507) [Table 2].

Table 2: *Nurses' perceptions of the level of support for chronic illness care in the study countries based on professional category [Hypertension].*

ACIC Hypertension Subscales		N	Mean	SD	*p value*
Organization of the healthcare delivery (6 items)	RN	120	5.44	2.83	.045*
	NP and PHN	34	6.29	1.90	
Community linkages (3 items)	RN	120	5.43	3.18	.009**
	NP and PHN	34	6.69	2.14	
Self-management support (4 items)	RN	120	4.36	2.80	.002**
	NP and PHN	34	5.98	2.37	
Decision support items (4 items)	RN	120	4.59	2.93	.034*
	NP and PHN	34	5.58	2.16	
Delivery system design (6 items)	RN	120	4.96	3.08	
	NP and PHN	34	6.16	1.88	.006**
Clinical information systems (5 items)	RN	120	4.44	2.92	.507
	NP and PHN	34	4.73	2.03	
Chronic Illness Care Integration Score Hypertension (total score)	RN	120	4.87	2.37	.007**
	NP and PHN	34	5.89	2.71	

*RN Registered Nurses; NP Nurse Practitioner; PHN Public Health Nurse *p<.05, **p<.01*

Discussion

The similarities in demographic characteristics and associated health outcomes forms the foundation for strong support for a regional approach to prevent and control CNCDs [2]. The study indicated that in both countries, the nurses believed there was basic support for the care provided for clients diagnosed with hypertension and diabetes as measured by the ACIC. However, nurses with post-basic training (NPs and PHNs) perceived greater levels of support for chronic illness care (hypertension). Currently, across much of the Caribbean, a baccalaureate degree is required for entry-level RN positions. Therefore, continuing education is crucial to fill this in the successful implementation of the model. This has implications for the level of preparedness of nurses to provide care at a minimum level. The Triple Impact Report, (WHO, 2016) [21], cited a lack of emphasis on the role of the nurse in the coordination and implementation of interventions geared at primary-tertiary prevention as a major factor in the failure to attain the desired NCD patient outcomes. The report suggested that improving the profile of nursing, making nurses central to health policy, is key to advancing health and economic successes. Major gaps in the development of the nursing workforce and the need for management of care to administering of care was highlighted in two major publications [22,23]. In particular, the policy document examined the role of the advanced practice nurse must play a role in healthcare to respond to the needs of the Latin American and Caribbean region [23]. Training needs in the framework of the Chronic Care Model must be determined in a similar context. These findings are supported by the regional Caribbean Cooperation in Health IV Report [24] which described the lack of regional training modules, and tools for the implementation of the CCM.

The report also highlighted the slow progress of implementation of the regional policies and guidelines to improve compliance with interventions for prevention and treatment of NCDs [25,26]. Limitations of the full implementation of the model, included the required resources for elements of the model such as clinical information systems and adequate community infrastructure for the requisite linkages. Agarwal et al., (2019) [19] implemented components of the CCM for the management of diabetes mellitus in rural Pakistan. This small retrospective, quantitative study implemented two components of the CCM: patient self-management support and delivery system design in primary healthcare settings for clients who were diagnosed with type 2 diabetes. The strategy was found to be viable for the self-management of diabetes with a positive effect on the clinical outcomes of the patients.

Trinidad and Tobago and Jamaica have similarly organized health care systems with NPs and PHNs generally assigned to primary care settings. Across the Caribbean, PHNs and NPs play an essential role in primary healthcare and must be prepared with the requisite autonomy, available resources and competencies needed for the desired response to chronic diseases [27]. Nurses must engage optimally in strategic planning and program evaluation for successful NCD mitigation at the national level. Possible solutions include enhancing the NP's ability to design, launch, and assess health improvement programs that could positively impact health outcomes associated with NCDs at the national level [28].

Among English-speaking Caribbean countries, chronic NCDs account for more than 70% of all deaths [9]. The WHO has established the 2012-2025 target of reducing premature mortality from NCDs by 25%. Achieving this target necessitates major modifications to the current model of care, strengthening health systems, improved chronic disease surveillance, and a strong reliance on evidence-based practice [24,29,27]. The need to maximize the potential for nurses to enhance workforce capacity has been endorsed by the WHO, (2016) [21], the Institute of Medicine (IOM, 2010) [31] and Htay & Whitehead, (2021) [27]. These organizations, and the WHO (2020) [1], have called for nurses to practice to the full extent of their education and training. Nurses must engage as full partners with physicians and other health professionals in redesigning

healthcare systems to improve NCD outcomes. This may be particularly informative in the strategic response to chronic diseases in the Caribbean region.

The success of this regional NCD agenda will be hampered without sustained collaborative efforts to expand the nurses' role within interprofessional health teams [28, 32]. For example, NPs in the United States deliver competent, safe, and economical primary care services while exhibiting high levels of adherence to clinical standards in a variety of practice settings [33]. Likewise, high levels of regard and satisfaction with the treatment given by NPs have been recorded in Jamaica, where both physicians and nurse practitioners received similar reports of respect and satisfaction with care from clients [17,27]. Therefore, policy makers should consider expanding the role of the NP in CARICOM Countries. The call for strengthening the nursing workforce and allowing nurses to function at their maximum potential [23] is aligned with suggestions made by the WHO (2016; 2020) [26,1] and the Institute of Medicine (2010) [31] and will bolster the well needed multidisciplinary approach to addressing the chronic illness pandemic in the region. If allowed to perform at their optimal level of functioning, nurses in the region trained at the baccalaureate level and above could have a significant positive impact on NCD mitigation.

Limitations

The cross-sectional study design and limited sample size were noted limitations of this study. In addition, the asserted lack of information systems in the healthcare organizations affected overall ACIC scores. These results should be interpreted accordingly, for example when comparing with other studies. Future research should account for this situational context.

Implication for nursing and health policies

Efforts to move the outcomes of chronic illness in a positive direction must include increased engagement of nurses and an assessment of the role of nurses in implementing and participating in strategic initiatives of member countries [34]. In addition, further engagement of AP nurses may help to propel the implementation of the CCM in CARICOM countries. This has been shown to be successful in North America [27].

Recommendations

It is imperative that the region more actively adopts a proactive model to effectively address nursing human resources training requirement to respond to the challenge of NCD prevention and control. The Caribbean Cooperation in Health IV Report-2021 indicated partial provision for an auditing system for the surveillance of NCDs. These activities must be strengthened. The full adoption of the CCM in the region will require careful consideration with respect to the general absence of information technology systems reported by the nurses studied.

The CARPHA (2021) report also recommends regional training modules, and tools for the implementation of the Chronic Care Model of Care for the Caribbean Community and its integration in the curricula across health disciplines. It appears greater regional and national support is necessary as over the last two years there has sub-optimal uptake of this recommendation across the CARICOM countries. For example, the regional plan for the training and implementation has not materialized (CARPHA 2021). Moreover, plans to improve compliance with interventions for prevention and treatment of NCD's have regressed and are described in the 2021 report as not being in place (although listed as in progress in 2020).

The shifting of funds and focus to infectious diseases post COVID 19 has also hampered the progress of the CND agenda in the region. Further research into the healthcare practitioner's perception of the CCM and current policies may be insightful and could assist in the identification of strategies to improve the management of NCD in the local setting.

Conclusion

Nurses in Jamaica and Trinidad and Tobago felt there was basic to intermediate support for chronic illness care in their practice settings. The need for additional resources to assist nurses to make decisions to support patients based on evidence and patients' preference is critical to improving client support. This paper presents an opportunity for greater stakeholder engagement to strengthen the care of clients diagnosed with hypertension or diabetes. Gaining insight into the perspectives of practicing physicians and nurses regarding this partnering and how they perceive each other's professional role, may be instructive. This approach could strengthen chronic illness care in the region as nurses, medical doctors, and other allied health professionals must contribute to the full operationalization of national strategic plans/ multi-sectorial action plans for CNCDs.

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