


Impact of Interprofessional Primary Care Practice on Patient Outcomes: A Scoping Review

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Abstract

Systematic reviews have provided some insight into the impact of interprofessional collaborative practice on patient outcomes. Despite strong interest in interprofessional collaborative practice, relatively little is known about its impact in primary care settings. This scoping literature review describes the essential elements of an interprofessional primary care practice and explores what is known about its impact on patient care including clinical, humanistic, and economic outcomes. We completed a review of the literature examining the breadth of knowledge related to interprofessional collaborative practice in primary care settings. A search was conducted to identify studies based on predefined criteria. A total of 51 studies met the criteria. A total of 27 studies reported a significantly positive clinical outcome with the interprofessional collaborative practice model, 27 studies reported no difference, and one study reported negative outcome in mortality. A total of 15 studies reported a significantly positive humanistic outcome. There was little to no difference in economic outcomes. This study provides new insights for future research that examines the impact of interprofessional primary care practice.

Keywords

interprofessional practice, interprofessional team, patient outcomes, primary care, primary health care

Introduction

With growing demand for health care services and an aging population, management of chronic illness in primary care settings is an increasingly important aspect of health care delivery. Many models of primary care delivery have been proposed and most industrialized nations have adopted one or more of these models (Spenceley et al., 2015). The patient-centered medical home (PCMH) model has been proposed as one of the featured models in a reformed United States health care system. This model is patient-centered and physician-directed but also encourages a team approach to care for patients. Patient-centered care is defined as shared responsibility of patient care between the physician and the patient. However, physician-directed care is defined as a physician who coordinates the care for the patient and leads the medical team. The authors reported the patient-centered and physician-directed care to be more accessible, higher quality, more satisfying, and less costly than other models of care. The main feature of this system includes getting patients to the correct care location to be seen by the appropriate specialists in a timely manner. PCMH model has shown to decrease mortality, morbidity, emergency room utilization, hospitalization, and cost per patient (Epperly, 2011). In

addition, the PCMH model using interprofessional team care has shown to increase patient and physician satisfaction with care as well as improve patient access and quality of care (Epperly, 2011).

The World Health Organization (WHO, 2010) defines interprofessional collaborative practice (ICP) as “when multiple health workers from different professional backgrounds work together with patients, families, carers, and communities to deliver the highest quality of care.” This model of care differs

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from other practices because it requires teamwork and patient involvement compared with other models where usually one provider takes leadership working solo (e.g., primary care physician, nurse practitioner, physician assistant) to care for the patient and makes most medical decisions without involving the patient. Since the 1970s, ICP has been shown to play a very important role in improving access to health care services (Brandt et al., 2014). In 2010, the WHO reinforced its support to ICP by creating the Framework for Action on Interprofessional Education and Collaborative Practice (Brandt et al., 2014). WHO's report described the connection between interprofessional health care teams and patient outcomes (Brandt et al., 2014). Similarly, the "Triple Aim" of improving quality, enhancing the patient's experience, and lowering costs might be achieved by ICP and has been the focus of health care delivery reform in the United States (Brandt et al., 2014).

Activities performed within the traditional scope of primary care practice include health promotion, disease prevention, and management of common chronic and acute conditions (Hogg et al., 2008). It is reasonable to conclude that it is important to formally research the connection between primary care delivery and the ICP model.

Some reviews have been conducted (Brandt et al., 2014; Reeves et al., 2017; Zwarenstein et al., 2009) to assess the effect of ICP on the triple aim and health care outcomes in a hospital setting; however, to our knowledge, no review has described comprehensively the impact of ICP on patient outcomes in the primary care setting. The objective of this scoping review was to identify and summarize the available literature regarding the composition and functions of interprofessional care teams in primary care settings as well as to determine the known impact of this model of care on patient outcomes (e.g., clinical, humanistic, and economic) when implemented in primary care settings.

Method

This scoping review followed a structured framework for conducting scoping reviews (Arksey & O'Malley, 2005; Levac et al., 2010), composed of six steps: (a) identify the research question; (b) identify relevant studies; (c) select studies; (d) chart the data; (e) collate, summarize, and report results; and (f) seek consultation. The research team was interprofessional (e.g., medical librarian, pharmacists, primary care physician, and a researcher with background in health services and nursing) from various countries (e.g., the United States, Canada, and Australia) and held diverse health system perspectives.

Definitions and Search Strategies

For the purposes of this scoping review, an interprofessional team was defined as a group composed of at least three health workers from different professional backgrounds who communicate and collaborate to provide services to patients, families, caregivers, and communities. At least one team member

must have been a primary care provider (e.g., a physician, physician assistant, or nurse practitioner) with the authority to diagnose and initiate treatment based on the scope of practice governing health professional practice in the state or country in which the study was conducted (Canadian Interprofessional Health Collaborative, 2010; Department of Health, 2007; The Interprofessional Curriculum Renewal Consortium, Australia, 2013; WHO, 2010). The Starfield definition of primary care was used, which defines key features of primary care as being the first point of entry to a health care system, person-focused (not disease oriented), and integrates care from outside providers (Starfield, 1998; Valaitis et al., 2012). Four unique features of primary care service delivery include access, continuity, integration, and comprehensiveness. The description of each of these features are explained in Supplemental Appendix A (Hogg et al., 2008).

Literature Search

A comprehensive literature search was conducted by a medical research librarian (A.A.S.). Database searches were conducted in July 2013. Search results were limited to articles published between 2000 and 2013. We selected this time frame because more studies in the area of ICP started to emerge in 2000. The following databases and research registries were searched: Ovid MEDLINE, Ovid MEDLINE In-Process and Other Non-Indexed Citations, Ovid MEDLINE Daily, and Ovid OLDMEDLINE; Embase.com Embase; Wiley Cochrane Library: Cochrane Central Register of Controlled Trials (Issue 6 of 12, June 2013), Cochrane Database of Systematic Reviews (Issue 7 of 12, July 2013), NHS Economic Evaluation Database (Issue 2 of 4, April 2013), Health Technology Assessment Database (Issue 2 of 4, April 2013), Database of Abstracts of Reviews of Effect (Issue 2 of 4, April 2013); Thomson Reuters Web of Science: Science Citation Index, Social Sciences Citation Index, Conference Proceedings Citation Index Science, Conference Proceedings Citation Index-Social Sciences & Humanities, EBSCOhost CINAHL, OvidSP IPA, ClinicalTrials.gov, and HSRProj. A copy of the search strategy is included in Supplemental Appendix B. In addition, we wanted to ensure we searched articles from most journals related to ICP; therefore, we handsearched for articles from journals our team recommended or found via Google search related to the field of ICP. Handsearching was conducted in the following journals: *Journal of Interprofessional Care* (2000–2013), *Journal of Research in Interprofessional Practice and Education* (2009–2013), and the *Collaborating Across Borders IV Conference Resource Booklet* (2013). Targeted searches were also conducted using Google and the Canadian Interprofessional Health Collaborative website.

Study Selection

Following the removal of duplicates, the title and abstract of each record was screened by one investigator (Figure 1).

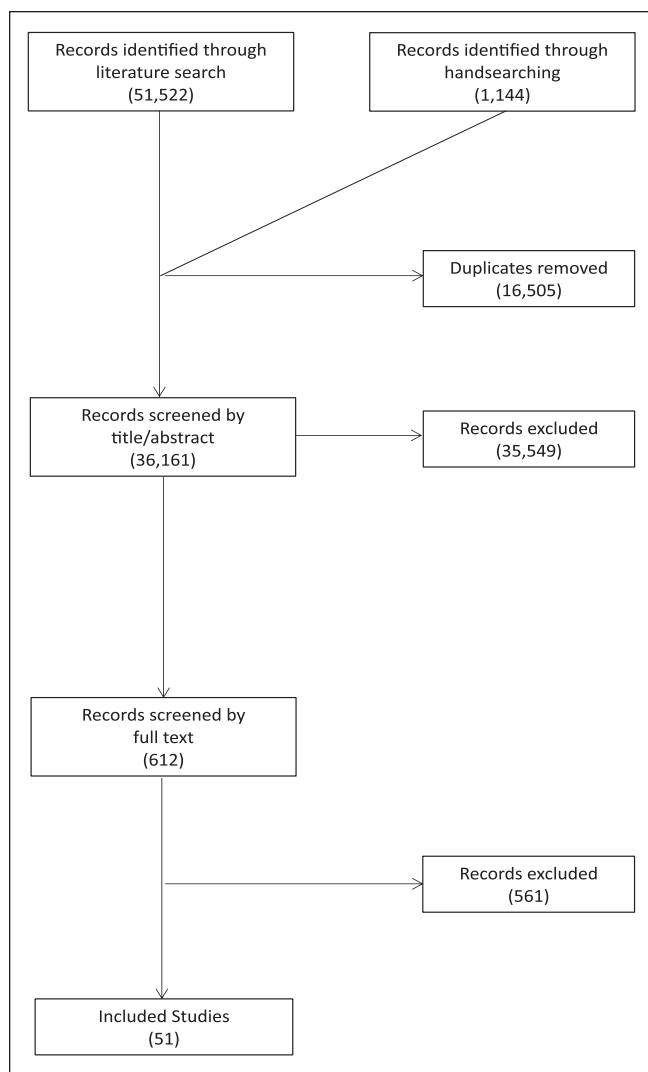


Figure 1. Article selection flowchart.

During this initial screening phase, citations were excluded if they did not appear to be relevant or related to the topic of ICP. If the abstract had a topic totally unrelated to ICP such as it did not mention keywords “interprofessional, multidisciplinary, interdisciplinary, and team,” it was excluded.

Following title/abstract screening, two investigators independently screened the full text of the first 60 studies using an inclusion criteria screening form (Supplemental Appendix C), developed and pilot-tested by the investigators. They compared the results to determine whether the approach to screening was consistent with the research question and purpose (Arksey & O’Malley, 2005; Levac et al., 2010). Disagreements were resolved by consensus or by arbitration by one of the other investigators when no consensus was reached. All remaining articles were screened by one investigator. Studies included in the analysis were conducted in a primary care setting, had an interprofessional team with a team member who provided a range of primary care services,

reported patient-related outcomes, and had a comparison group. Studies that did not meet the inclusion criteria from Supplemental Appendix C were excluded. Only studies published in English after 2000 were included. Commentaries, editorials, literature reviews, theoretical models, and descriptive reports were excluded.

Charting the Data

Data from the included studies were extracted using a detailed charting form (form available on request from the corresponding author) (Levac et al., 2010). This form was created using Google forms and piloted with the first 30 studies extracted independently by two investigators (Arksey & O’Malley, 2005; Levac et al., 2010). Once consistency of data extraction was established, the form was refined and finalized. All remaining articles were extracted independently by one investigator.

Data extracted included the study design; team composition, activities, structures, and features; study setting; and patient population. In addition, specific patient-related outcomes were extracted.

Collating, Summarizing, and Reporting Results

Extracted data obtained from the charting process were coded and categorized into common themes in QSR International’s NVivo 10 software for data analysis. Results focusing on the most relevant themes are reported.

Results

A total of 36,161 articles were included after removal of duplicates (Figure 1). After screening the titles and abstracts for relevance, 612 articles were identified for full-text review from which 51 articles were ultimately selected for inclusion based on the inclusion and exclusion criteria.

Study Design, Characteristics, and Outcomes Assessed by Included Articles

Table 1 describes relevant information on the included articles. The majority of the studies included were conducted in the United States ($n = 21$), Canada ($n = 7$), or other countries ($n = 23$). Most studies were either a randomized controlled trial (RCT) ($n = 37$) or a cohort study ($n = 14$). Only four out of 51 studies were retrospective comparisons. The control groups were most often patients receiving “usual care.” Primary care services were offered most frequently in the following settings: community outpatient clinics ($n = 10$), home care ($n = 6$), veterans affairs medical centers ($n = 5$), ambulatory primary care centers ($n = 4$), community health centers ($n = 4$), group health cooperative ($n = 1$), a long-term care facility ($n = 1$), among others ($n = 20$).

Table 1. Characteristics, Study Design, and Outcomes of Included Studies.

Study	Study design	ICP team members	Practice features	Study duration	Outcome(s)
Cohen et al. (2011)	RCT (Patient-level)	Dietitian, Nurse, Pharmacist, Physical therapist	Face-to-face communication, shared decision making	6 months	A1c, SBP, LDL, smoking, foot care, compliance with diet and exercise
Deen et al. (2011)	RCT (Patient-level)	Pharmacist, Physician, Depression care managers (RN), Telepsychiatrists	Face-to-face meetings	1 year	Intervention status, patient satisfaction
Hughes et al. (2000)	RCT (Patient-level)	Dietitian, Pharmacist, Physician, Social worker, Therapists, Support staff	Not specified	1 year	Barthel Index rating, VA hospital readmissions, HRQoL, satisfaction with care, caregiver HRQoL, caregiver satisfaction with care, caregiver burden; VA cost of care, non-VA use costs
Hultberg et al. (2005)	Cohort (Prospective)	Occupational therapist, Physician, Physical therapist, Social worker, Social insurance officer	Weekly meetings, co-financed	1 year	Perceived pain, HRQoL
Arean (2005)	RCT (Patient-level)	Nurse, Physician, Psychologist	Coordination of patient care, gathering patient data at baseline and used a defined stepped care protocol	1 year	Depressive symptoms, general health functioning, satisfaction in care
Seal et al. (2011)	Cohort (Retrospective)	Nurse, Physician, Social worker, Mental health provider (post-development stress specialist)	Co-location	30 days	Mental health and social service evaluation
Bayliss et al. (2011)	Cohort (Retrospective)	Renal dietitian, Diabetes nurse educator, Nephrology nurse, Renal clinical pharmacist, Physician (nephrologist), Social worker, CDE	Joint or group educational sessions, shared-medical appointments or group visits, weekly team meetings, shared care plan	4 years	Rate of decline to GFR, LDL, A1c, BP
Rosenberg (2012)	Cohort (Prospective)	Nurse, Physician, Physical therapist	Virtual meetings, shared electronic health record, telemedicine, email	1 year	Hospital admission, hospital days, ED contacts, cost to patients
Boorsma et al. (2011)	RCT (Patient-level)	Nurse, Physician, Psychologist, Certified nursing assistant, Home manager	Multidisciplinary in home meetings, face-to-face communication	6 months	Sum score of quality-of-care risk indicators, short-form Rand Health Insurance Study questionnaire, Groningen activity restriction scale, quality of care through resident's eyes, hospital admissions, mortality, QOL
Bucci et al. (2003)	RCT (Patient-level)	Dietitian, Nurse, Pharmacist, Cardiologist, Psychologist, Therapist	Co-location in a clinic setting, face-to-face communication	4 months	Medication Appropriateness Index, directive guidance patient survey

(continued)

Table 1. (continued)

Study	Study design	ICP team members	Practice features	Study duration	Outcome(s)
Cezaretto et al. (2011)	RCT (Patient-level)	Dietitian, Nutritionist, Physician (endocrinologist), Psychologist, Physical educator	Co-location, face-to-face communication	9 months	BMI, waist circumference, SBP, DBP, LDL, HDL, TG, FBG, depression frequency, BED, QOL, SF-36 domain physical functioning, role emotional
Chan (2009)	RCT (Patient-level)	Dietitian, Nurse, Occupational therapist, Physiotherapist, Psychologist, Physician (MD), Social worker, Public health nurse, Psychiatric nurse	Weekly team meetings, Open consultation	1 year	HADS, health status, QOL
Jiwa et al. (2013)	Cohort (Prospective)	Dietitian, Nurse, Occupational therapist, Physician, Physical therapist, Psychologist, Sexologist	> 2 hour meetings	3 months	HADS, health status, QOL
Lambeek et al. (2010)	RCT (Patient-level)	Occupational therapist, Clinical occupational physician, Physical therapist	Telephone calls, letters, email, conference calls, treatment plan, monitoring	1 year	Duration of sick leave, pain intensity (visual scale), functional status (Roland Disability Questionnaire), prognostic factors for sick leave
Orenius et al. (2013)	Cohort (Prospective)	Occupational therapist, Physician, Physical therapist, Psychologist, Social worker	Joint or group educational sessions, team meetings	1 year	Anxiety, Depression
Callahan et al. (2006)	RCT (Service-level)	Nurse, Physician, Psychologist, Psychiatrist	Co-location, face-to-face communication	18 months	Pharmacological drug use, Neuropsychiatric Inventory Score, Cornell Scale for Depression in Dementia, Telephone Interview for Cognition, Alzheimer Disease Cooperative Study Group ADLs, Caregiver PHQ-9, caregiver stress, hospitalization rate, mean hospital days, nursing home placement, physician/nurse visits
Counsell et al. (2007)	RCT (Patient-level)	Nurse, Pharmacist, Physical therapist, Physician (MD), Social worker	Face-to-face communication	2 years	General health, vitality, social functioning, mental health, mental component summary
Ferris et al. (2005)	RCT (Patient-level)	Pharmacist, Gastroenterologist, Physician	Regularly scheduled medical management meetings	6 months	GERD scale, dyspepsia scale, medication use, QOL
Gupta et al. (2005)	Cohort (Retrospective)	Nurse, Psychologist, Physician, Social worker, Physiotherapist	Home-based care visits	Not specified	Adherence to ARV treatment, approval rating of ADT services
Taveira et al. (2010)	RCT (Patient-level)	Nurse, Nutritionist, Pharmacist, Physical therapist, Physician	Co-location, shared medical records, shared educational sessions	3 months	SBP, DBP, non-HDL cholesterol, LDL, A1c

(continued)

Table 1. (continued)

Study	Study design	ICP team members	Practice features	Study duration	Outcome(s)
Hunkeler et al. (2006)	RCT (Patient-level)	Managers, Physician, Primary care nurse, Consulting psychiatrist, Liaison primary care doctor	Weekly reviews, monthly telephone appointments	2 years	Depression scores, physical functioning, QOL, depression treatment, satisfaction with care
Charrois et al. (2006)	RCT (Patient-level)	Pharmacist, Respiratory therapist, Physician	Assessment of asthma therapy	6 months	Change in ACQ, inhaled steroids use at 6 months, change in FEV1, ED visits, or hospital admission
El Fakiri et al. (2008)	RCT (Patient-level)	Nurse (NP), Physician	Team meetings	9 months	Change in the 10-year annual risk via Framingham score, changes in the lipids, A1c, FBG, BMI, SBP, DBP
Capoccia et al. (2004)	RCT (Patient-level)	Nurse, Pharmacist, Physician assistant, Physician, Social worker, Behavioral scientist, Mental health intern, Psychiatrist	Telecommunication	1 year	Depression symptoms, provider visits, QOL, medication adherence, patient satisfaction
Clifford et al. (2002)	RCT (Patient-level)	Diabetes physician, Hospital physician, Clinical pharmacist	Not specified	6 months	A1c, QOL, patient satisfaction with (a) Hospital physician, (b) Clinical Pharmacist, (c) Drug information
Dejesus et al. (2013)	Cohort (Prospective)	Care coordinator, Navigator, Physician, Psychiatrist	Patients were followed by care managers under the supervision of a psychiatrist who provided consultative recommendations to the primary care providers	1 year	PHQ-9 score, utilization of psychiatric medications
Burns et al. (2000)	RCT (Patient-level)	Nurse (NP), Physician, Social worker, Psychologist	Appropriate team member served as the main liaison between each intervention group and the geriatric evaluation management team	2 years	Health perception, number of clinic visits, ADL, social activity, CES-D scores, general well-being, life satisfaction, MMSE scores, ADL, number of hospitalizations, mortality
Barcelo et al. (2010)	RCT (Service-level)	Nutritionist, Physician, Psychologist	Joint or group educational sessions, cross-consultation	18 months	A1c, blood glucose, total cholesterol, TG, weight, BMI, SBP, DBP
Bonarek-Hessamfar et al. (2009)	Cohort (Prospective)	Dietitian, Nurse, Physical therapist, Physician	Once or twice yearly phone conference	2 years	Readmissions for CHF, follow-up time/mortality, survival time, role of network on survival, QOL
Phelan et al. (2007)	RCT (Service-level)	Nurse (RN), Pharmacist, Geriatrician	Weekly team meetings	2 years	AIMS2-SF, ADL, mortality, SF-36 mental health
Richards et al. (2008)	RCT (Patient-level)	Care Coordinator/Navigator, Physician, Specialist mental health clinicians	Shared-electronic medical records, weekly team meetings, weekly telephone supervision, written feedback via electronic records and personal contact	3 months	PHQ-9 depression symptoms, CORE-OM, adverse events, mental component score, physical component score

(continued)

Table 1. (continued)

Study	Study design	ICP team members	Practice features	Study duration	Outcome(s)
Shiriqui et al. (2013)	Cohort (Prospective)	Dietitian, Nurse, Occupational therapist, Pharmacist, Psychologist, Psychiatrist, Physical educator, Special needs educator, Consulting kinesiologist, Community public health physician consultant	Joint or group educational sessions, weekly team meetings, co-location, face-to-face communication	3 months	Weight, BMI, waist circumference, SBP, TC, LDL, 10-Year CV risk, DBP, depression, conceptual disorganization, blunted affect, motor hyperactivity, CGI-S, WHOQOL-Bref domains: Physical health, Psychological, Environment
Sledge et al. (2006)	RCT (Patient-level)	Geriatrician, Social worker, Psychiatrist, Internist, Psychiatric nurse	Daily Rounds, monthly telephone call to assess needs, offers of assistance with referrals and appointments, phone/pager availability to patients 5 days per week	1 year	Inpatient admissions, ED visits, primary care center visits, overall patient satisfaction, total cost
Sommers et al. (2000)	RCT (Service-level), Cohort (Prospective)	Nurse, Physician, Social worker	Monthly meetings, face-to-face communication	1 year	Hospitalization rate, readmissions, mean office visits, change in social activities, per-patient savings, hospital admissions
Taylor et al. (2005)	RCT (Patient-level)	Dietitian, Nurse (RN), Physician, Exercise specialist	Shared-medical appointments or group visits	4 months	FBG, A1c, SBP, DBP, total cholesterol, HDL, LDL, TG, functional outcomes, diabetic QOL, improvement in role functioning, energy and health distress, deterioration in diabetes impact, improvement in social stigma
Westman et al. (2009)	RCT (Service-level)	Psychologist, Physician, Social worker, Physiotherapist	Weekly team meetings	5 years	Health care utilization, analgesic consumption, work capacity, Coping Strategies Questionnaire, the Pain Catastrophizing Scale, the Tampa Scale for Kinesiophobia, negative life events, job strain and pain
Davey et al. (2005)	RCT (Service-level)	Pharmacist, Physician, Social worker	Co-location, face-to-face meetings, telephone communication	6 months	Quality and effectiveness of communication with patients
Otero-Sabogal et al. (2010)	Cohort (Prospective)	Physician, Social worker, CDE	Joint or group educational sessions, patient-centered medical home, shared-medical appointments or group visits	1 year	A1c, LDL, total cholesterol, BMI, SBP, DBP, PAM
Vest et al. (2011)	Cohort (Prospective)	Nurse, Physician, Physiotherapist	Co-location	7 weeks	Change in work capacity/endurance shuttle walking time, time that the patient could walk without stopping at constant speed at 85% of predicted maximal oxygen uptake, St. George's Respiratory Questionnaire, Clinical COPD Questionnaire

(continued)

Table 1. (continued)

Study	Study design	ICP team members	Practice features	Study duration	Outcome(s)
Maislos & Weisman (2004)	RCT (Service-level)	Dietitian, Nurse, Physician	Joint or group educational sessions	6 months	Response to treatment, A1c, plasma glucose, compliance to study protocol, adherence to follow-up
Majumdar et al. (2003)	RCT (Service-level)	Dietitian, Nurse, Pharmacist, Physician	Shared-medical appointments or group visits, the team traveled in groups to provide service and education to patients	6 months	SBP, DBP, A1c, lipids, patient satisfaction
Pimazoni-Netto et al. (2011)	RCT (Patient-level)	Nurse, Nutritionist, Physician, Physical Therapist, Psychologist	Weekly team meetings, face-to-face communication	3 months	Glycemia, glycemic variability, A1c, changes in frequency of hypoglycemia or weight
Schouten et al. (2010)	RCT (Patient-level)	Dietitian, Internist, Family practitioners, Diabetes nurse	Meetings	1 year	A1c, SBP, DBP, HDL, cholesterol, life expectancy in years, total discounted quality adjusted life year
Unützer et al. (2008)	RCT (Patient-level)	Nurse, Physician, Psychologist	Collaborative practice agreement, weekly team meetings, co-location	1 year	Improving Mood Promoting Access to Collaborative Treatment (IMPACT) cost compared to usual care, medical mental health, substance abuse
Didier & Guimarães (2007)	Cohort (Prospective)	Nurse, Nutritionist, Cardiologist	Joint or group educational sessions	1 year	SBP, DBP, total cholesterol, blood glucose, creatinine, self-reported compliance
Angeles et al. (2013)	RCT (Patient-level)	Dietitian, Nurse (NP), Pharmacist, Physician, Social worker, Physiotherapists	Joint or group educational sessions, face-to-face communication, co-location	6 months	Mean number of clinic visits, SF36v2 scores for bodily pain, medication use
Katon et al. (2004)	RCT (Patient-level)	Nurse (RN), Physician, Psychologist	Weekly team meetings	1 year	Depression scores, patient global improvement from baseline, A1c, adherence to antidepressant, satisfaction with depression treatment, mental health visits
Williams et al. (2004)	RCT (Patient-level)	Nurse, Pharmacist, Physician	Written communication, group meetings	6 weeks	Change scores for medication costs and usage, total number of medications
Wood et al. (2008)	RCT (Service-level)	Dietitian, Nurse, Physician, Physiotherapist	Team report sent to physician	1 year	BP, consumption of fat and vegetables, total cholesterol
Zwar et al. (2007)	Cohort (Retrospective)	Dietitian, Optometrist, Podiatrist, Diabetes educator	Enhanced Primary Care plan	1 year	A1c, weight, SBP, DBP, total cholesterol, adherence to outcome guidelines, change in number of providers, change in numbers of visits to providers
Markle-Reid et al. (2011)	RCT (Patient-level)	Care Coordinator/Navigator, Dietitian, Nurse, Occupational therapist, Physical therapist, Social worker, Speech pathologist	Joint or group educational sessions, shared-medical appointments or group visits, shared-electronic medical records, monthly meetings, co-location	1 year	Physical functioning, number of strokes, community reintegration, perceived social support, depression, anxiety and depressive symptoms, cognitive function, costs of health services

Note. ICP = interprofessional collaborative practice; RCT = randomized controlled trial; A1c = glycated hemoglobin; SBP = systolic blood pressure; LDL = low-density lipoprotein; RN = registered nurse; HRQoL = health-related quality of life; CDE = certified diabetes educator; GFR = glomerular filtration rate; BP = blood pressure; ED = emergency department; QOL = quality of life; BMI = body mass index; DBP = diastolic blood pressure; HDL = high-density lipoprotein; TG = triglycerides; FBG = fasting blood glucose; BED = binge eating disorder; SF-36 = Short Form 36; HADS = Hospital Anxiety and Depression Scale; ADL = activities of daily living; PHQ = patient health questionnaire; GERD = gastroesophageal reflux disease; ARV = antiretroviral; ADT = domiciliary therapeutic assistance; ACQ = asthma control questionnaire; FEV = forced expiratory volume; NP = nurse practitioner; CES-D = Center for Epidemiologic Studies-Depression; MMSE = Mini-Mental State Exam; CHF = congestive heart failure; AIMS2-SF = Arthritis Impact Measurement Scales 2-Short Form; CORE-OM = clinical outcomes in routine evaluation-outcome measure; CV = cardiovascular; CGI-S = clinical global impression scale; WHOQOL-Bref = World Health Organization quality of life instrument; PAM = patient activation measure; COPD = chronic obstructive pulmonary disease.

Table 2. Health care Professionals Represented, *N* = 51 Studies.

Health care professionals	Number of studies (%)
Physicians	48 (94)
Nurses	31 (61)
Therapists	22 (43)
Dietician-nutritionists	21 (41)
Mental health professionals	19 (37)
Pharmacists	17 (33)
Social workers	17 (33)
Nurse practitioners	5 (10)
Physician assistants	1 (2)

Table 3. Interprofessional Team Features and Strategies, *N* = 51 Studies.

Characteristic	Number of studies (%)
Team practice features	
Meetings	32 (63)
One-on-one, face-to-face interaction	18 (35)
Electronic communication	12 (24)
Telemedicine	8 (16)
Standard Medical Care	2 (4)
Stepped care protocol	2 (4)
Letters	1 (2)
Team-based care activities	
Patient education and counseling	38 (75)
Chronic disease management	34 (67)
Assure appropriateness of therapy	28 (55)
Identification and discussion of patient's care options	21 (41)
Health promotion or disease prevention	21 (41)
Adherence support	18 (35)

Interprofessional team composition varied widely. The professionals most often included on interprofessional primary care teams were physicians, nurses, therapists (occupational and physical therapist), mental health professionals, dietitian/nutritionists, pharmacists, and social workers (Table 2). The professionals included on interprofessional teams showing significantly positive impact were physicians (*n* = 31), nurses (*n* = 24), dietician-nutritionists (*n* = 18), therapists (*n* = 15), pharmacists (*n* = 14), mental health professionals (*n* = 13), social workers (*n* = 11), and nurse practitioners (*n* = 2) (e.g., Angeles et al., 2013; Barcelo et al., 2010). Teams in those studies were most likely to communicate through: face-to-face one-on-one interactions (*n* = 12), meetings (*n* = 11), an electronic method (*n* = 1), telemedicine (*n* = 1), letter (*n* = 1) (e.g., Angeles et al., 2013; Barcelo et al., 2010). Table 3 shows the features of the interprofessional primary practice teams reported in all of the included articles.

Team collaboration most commonly focused on patient education and counseling, and chronic disease management (Table 3).

Effect of Intervention on Clinical Outcomes

Out of 51 studies included, a total of 41 studies reported clinical outcomes including cardiovascular, psychiatric, mortality, pain, renal function, smoking, functional status, health perception, median survival time, patient global improvement, social activity, among others (Table 1).

Twenty-seven studies out of those 41 studies reported a significantly positive clinical outcome when interprofessional primary care teams' collaborative interventions were implemented, when compared with the control group (e.g., Angeles et al., 2013; Barcelo et al., 2010). Cardiovascular and psychiatric outcomes were the most frequently reported. Specifically, 15 out of 27 studies reported clinical outcomes related to cardiovascular disease with 10 showing significant positive difference in blood pressure (BP), eight in glycated hemoglobin (A1c) and blood glucose, and seven in serum cholesterol (low-density lipoprotein [LDL], high-density lipoprotein [HDL], and total cholesterol [TC]) (Table 4). In addition, 10 out of 27 studies were related to psychiatric illnesses with six showing significant positive difference in depression (frequency of depression, depression scores, caregivers' Patient Health Questionnaire-9, Center for Epidemiologic Studies–Depression [CES-D], Hopkins Symptom Checklist-90 (SCL-90) mean depression scores, symptom checklist depression scale (SCL-20), remission of depression) (Table 5). Some studies reported multiple clinical outcomes. For example, there were 35 outcomes reported in the 15 studies related to cardiovascular disease and 22 outcomes reported in the 10 studies related to psychiatric illness. See Tables 4 and 5 for further details on cardiovascular and psychiatric outcomes, respectively.

Thirteen studies reported different types of clinical outcomes that were significantly positive and other outcomes that showed no difference (Bayliss et al., 2011; Burns et al., 2000; Callahan et al., 2006; Charrois et al., 2006; Cohen et al., 2011; Didier & Guimarães, 2007; Katon et al., 2004; Majumdar et al., 2003; Otero-Sabogal et al., 2010; Pimazoni-Netto et al., 2011; Shriqui et al., 2013; Taveira et al., 2010; Taylor et al., 2005). Twenty-seven studies reported no difference in clinical outcomes when comparing intervention and control groups. Specifically, 15 out of 27 studies assessing clinical outcomes were for cardiovascular disease with eight showing no difference in serum cholesterol (LDL, HDL, TC, triglyceride [TG]) (Bayliss et al., 2011; Cohen et al., 2011; El Fakiri et al., 2008; Majumdar et al., 2003; Shriqui et al., 2013; Taveira et al., 2010; Taylor et al., 2005), six in A1c and blood glucose (Bayliss et al., 2011; Clifford et al., 2002; Didier & Guimarães, 2007; Katon et al., 2004; Majumdar et al., 2003; Taylor et al., 2005), and three in blood pressure (Otero-Sabogal et al., 2010; Shriqui et al., 2013; Taylor et al.,

Table 4. Significant Positive Cardiovascular Clinical Outcomes With ICP Intervention Versus Control (No. of Studies = 15).

Cardiovascular clinical outcomes	Study	Intervention	Findings (35)	
BP, N = 10	Taveira et al. (2010)	VA-MEDIC vs. usual care	SBP 65.5% ($p < .05$ VA-MEDIC vs. usual care) patients attained target goals in VA-MEDIC group with mean -7.3 ± 20.3 ($p < .05$ VA-MEDIC vs. baseline) vs. 39.9% in usual care (-1.7 ± 19.6); DBP (mm Hg) 87.9% ($p < .05$ VA-MEDIC vs. usual care) patients attained target goals in VA-MEDIC group with mean $-6.5 \pm SD 10$ ($p < .05$ VA-MEDIC vs. usual care and vs. baseline) vs. 68.6% in usual care (1 ± 10.8)	
	Taylor et al. (2005)	Interprofessional collaboration (pre/post intervention)	DBP decreased significantly with intervention vs. control ($p = .04$)	
	Didier & Guimarães (2007)	Interdisciplinary team (pre-/post intervention)	Median BP decreased from 166/96 to 134/80 ($p < .000$)	
	Zwar et al. (2007)	Interprofessional collaboration (pre/post intervention)	BP decreased significantly with intervention (baseline 59.6% vs. 75.2% met BP goal of $< 140/90$, $p < .01$)	
	Cezaretto et al. (2011)	Intensive interdisciplinary intervention vs. traditional intervention	SBP intensive intervention, -5.4 mean $\pm SD 15.3$ ($p < .001$) vs. traditional intervention 0.6 ± 18.3 , $p = .85$ ($p < .05$ for difference in intensive intervention); DBP intensive intervention, -6 ± 9.2 , $p < .001$ vs. traditional intervention, -0.7 ± 8.5 , $p = .63$, ($p < .05$ for difference in intensive intervention)	
	Majumdar et al. (2003)	Multidisciplinary intervention vs. control	BP, 42% intervention vs. 25% control ($p = .004$)	
	Cohen et al. (2011)	VA MEDIC-E vs. standard primary care	The intervention group achieved SBP < 130 (58% cases vs. 32.7% in usual care, $p = .015$) at rates significantly greater than the usual care group	
	Schouten et al. (2010)	Interprofessional intervention vs. usual care	The mean SBP decreased significantly by 4.0 mm Hg (from 143.3 to 139.3) in the intervention group, and 1.6 mm Hg (from 143.3 to 141.8) in the control group	
	Wood et al. (2008)	Multidisciplinary, cardiology program vs. usual care	BP goal was achieved by both coronary (615 [65%] vs 547 [55%]); 10.4%, 0.6 to 20.2, $p = .04$) and high risk (586 [58%] vs 407 [41%]; 16.9%, 2 to 31.8, $p = .03$) patients in the intervention group	
	Shriqui et al. (2013)	Multidisciplinary cognitive behavior lifestyle (pre-/post-intervention)	SBP 123.32 at baseline vs. 120.63 at 3-month follow-up ($p = .01$)	
	A1c, N = 7	Cohen et al. (2011)	VA MEDIC-E vs. standard primary care	The intervention group achieved target goals in A1C values (40.8% cases vs. 20.4% in usual care, $p = .028$) at rates significantly greater than the usual care group
		Taveira et al. (2010)	VA-MEDIC vs. usual care	A1C(%) 40.4% ($p < .05$ VA-MEDIC vs. usual care) patients attained target goals in VA-MEDIC group with mean $-0.9 \pm SD 1.6$ ($p < .05$ VA-MEDIC vs. usual care and vs. baseline) vs. 21.6% in usual care (0.0 ± 1.5)
		Otero-Sabogal et al. (2010)	Multidisciplinary clinical team	A1C significantly improved with intervention from baseline in high-risk diabetic patients with A1C ≥ 9 (10.55 at baseline vs. 8.72 at 1-year follow-up), $p < .001$
Maislos & Weisman (2004)		Interdisciplinary intervention vs. usual care	A1C significantly improved (-1.8% , $p = .000001$) in the intervention group but not in the control group	
Pimazoni-Netto et al. (2011)		Interdisciplinary intervention vs. usual care	A1C (%) significantly improved in the interdisciplinary intervention group vs. usual care (-60.96 ± 10.55 vs. -34.11 ± 10.25 , $p = .038$)	
Zwar et al. (2007)		Interprofessional collaboration (pre/post intervention)	A1C decreased significantly with intervention at 1 year (baseline 27.9% vs. 39.7% patients met A1C $\leq 7\%$, $p < .01$)	
Barcelo et al. (2010)	Interprofessional intervention vs. usual care	A1C decreased significantly in intervention group (from 8.4% to 7.9%, $p < .01$) vs. usual care group (from 8.7% to 8.6%, $p = .80$)		

(continued)

Table 4. (continued)

Cardiovascular clinical outcomes	Study	Intervention	Findings (35)
Glucose, N = 4	Maislos & Weisman (2004)	Interdisciplinary intervention vs. usual care	Plasma glucose significantly improved (-1.5 mmol/L, <i>p</i> = .003) in the intervention group but not in the control group
	Pimazoni-Netto et al. (2011)	Interdisciplinary intervention vs. usual care	Weekly mean glycemia (mg/dL) significantly improved in the interdisciplinary intervention group vs. usual care (-2.26 ± 0.23 vs. -1.29 ± 0.24, <i>p</i> = .003)
	Cezaretto et al. (2011)	Intensive interdisciplinary intervention vs. traditional intervention	Fasting plasma glucose (mg/dL) intensive intervention, -3.6 mean ± SD 13.4, <i>p</i> < .001 vs. traditional intervention -2.0 ± 13.8, <i>p</i> = .61; post-load plasma glucose (mg/dL) intensive intervention, -9.2 mean ± SD 27.8, <i>p</i> < .001 vs. traditional intervention -2.4 ± 26.9, <i>p</i> = .52
	Barcelo et al. (2010)	Interprofessional intervention vs. usual care	Blood glucose (mg/dL) decreased significantly in intervention group (from 163.4 to 149.1, <i>p</i> = .01) vs. usual care group (178.4 to 183.1, <i>p</i> = .67)
Foot Care, N = 1	Cohen et al. (2011)	VA MEDIC-E vs. standard primary care	The number of days of the week that patients followed foot care recommendations was significantly higher for intervention group vs. baseline, 1.46 days (95% CI = [0.75, 2.18]), <i>p</i> < .05, but not for usual care vs. baseline, 0.47 days (95% CI = [-0.16, 1.09])
LDL, N = 2	Otero-Sabogal et al. (2010)	Multidisciplinary clinical team	LDL 100.38 mg/dL at baseline vs. 89.92 at 1-year follow-up (<i>p</i> < .005)
	Shriqui et al. (2013)	Multidisciplinary cognitive behavior lifestyle (pre-/post-intervention)	LDL 3.06 mmol/L at baseline vs. 2.96 at 3-month follow-up (<i>p</i> = .04)
TC, N = 6	Otero-Sabogal et al. (2010)	Multidisciplinary clinical team	TC 171.07 mg/dL at baseline vs. 163.09 at 1-year follow-up (<i>p</i> < .055)
	Shriqui et al. (2013)	Multidisciplinary cognitive behavior lifestyle (pre-/post-intervention)	TC 5.28 mmol/L at baseline vs. 5.12 at 3-month follow-up (<i>p</i> = .03)
	Didier & Guimarães (2007)	Interdisciplinary team (pre-/post-intervention)	TC decreased from 217 mg/dL to 194, (<i>p</i> < .0004) between baseline and 12 months
	Barcelo et al. (2010)	Interprofessional intervention vs. usual care	TC (mg/dL) decreased significantly at the beginning and end of the intervention group from 192.3 to 177.2 (<i>p</i> < .01) vs. usual care group (200.7 to 194.4, <i>p</i> = .03)
	Wood et al. (2008)	Multidisciplinary, cardiology program vs. usual care	TC decreased in high-risk patients in intervention group significantly from baseline to 1 year 12.7% (2.4 to 23, <i>p</i> = .02)
	Zwar et al. (2007)	Interprofessional collaboration (pre-/post-intervention)	TC decreased significantly with intervention at 1 year (baseline 72.1% vs. 84.5% met TC goal of ≤5.5 mmol/L, <i>p</i> < .01)
HDL, N = 1	Schouten et al. (2010)	Interprofessional intervention vs. usual care	HDL improved significantly in the intervention group (0.12 vs. 0.03)
Weight loss, N = 1	Shriqui et al. (2013)	Multidisciplinary cognitive behavior lifestyle (pre-/post-intervention)	Weight (kg) 88.44 at baseline vs. 87.70 at 3-month follow-up (<i>p</i> = .00)
BMI, N = 1	Shriqui et al. (2013)	Multidisciplinary cognitive behavior lifestyle (pre-/post-intervention)	BMI (kg/m ²) 31.72 at baseline vs. 31.42 at 3-month follow-up (<i>p</i> = .00)
Waist circumference, N = 1	Shriqui et al. (2013)	Multidisciplinary cognitive behavior lifestyle (pre-/post-intervention)	Waist circumference (cm) 106.10 at baseline vs. 104.67 at 3-month follow-up (<i>p</i> = .00)
10-Year CV risk (%), N = 1	Shriqui et al. (2013)	Multidisciplinary cognitive behavior lifestyle (pre-/post-intervention)	10-Year CV risk 4.03 at baseline vs. 3.48 at 3-month follow-up (<i>p</i> = .02)

Note. ICP = interprofessional collaborative practice; BP = blood pressure; VA-MEDIC = Veterans Affairs Multi-Disciplinary Education and Diabetes Intervention for Cardiac risk reduction; DBP = diastolic blood pressure; SBP = systolic blood pressure; VA MEDIC-E = Veterans Affairs Multidisciplinary Education and Diabetes Intervention for Cardiac risk reduction—Extended for 6 months; CI = confidence interval; LDL = low-density lipoprotein; TC = total cholesterol; HDL = high-density lipoprotein; BMI = body mass index; CV = cardiovascular.

2005). Nine out of 27 studies focused on psychiatric outcomes with five showing no difference in depression symptoms (Cornell Scale for Depression in Dementia, Recovery from depression, Effect Size on PHQ-9 Depression Symptoms, Hospital Anxiety and Depression Scale (HADS); Callahan et al., 2006; Chan, 2009; Jiwa et al., 2013; Katon et al., 2004; Richards et al., 2008).

One RCT reported negative clinical outcomes in mortality and no difference in activities of daily living (ADLs) disability and Arthritis Impact Measurement Scale 2-Short Form (AIMS2-SF) physical and affect subscales (Phelan et al., 2007). Phelan et al. found that an interprofessional team of geriatrics specialists providing care for 433 patients, compared with 441 patients receiving usual care, resulted in

Table 5. Significant Positive Psychiatry Clinical Outcomes With ICP intervention Versus Control (No. of Studies = 10).

Psychiatry clinical outcomes	Study	Intervention	Findings (22)
Depression scores, $N = 1$	Orenius et al. (2013)	Multidisciplinary pain management program (pre-/post-intervention)	Significant change was found for the depression score, with a change of -2.1 (95% CI = $[0.6, -3.7]$) ($p = .007$)
Frequency of depression, $N = 1$	Cezaretto et al. (2011)	Intensive interdisciplinary vs. traditional intervention	Frequencies of depression reduced in both interventions but of BED only in the intervention group (28.0%–4.0%, $p < .001$)
Caregiver Patient Health Questionnaire-9, $N = 1$	Callahan et al. (2006)	CCM vs. usual care primary care	Intervention caregiver reported significant improvements in depression as measured by Caregiver Patient Health Questionnaire-9, difference in score -1.6 (95% CI = $[-3, -0.2]$), $p = .02$
PHQ-9 score, $N = 1$	Dejesus et al. (2013)	CCM vs. usual care	Mean PHQ-9 score of those enrolled in the CCM was statistically lower compared with those in usual care (4.44 vs. 7.13; $p = .002$)
Depression (CES-D) scores, $N = 1$	Burns et al. (2000)	Interdisciplinary outpatient primary care evaluation and management vs. usual care	Intervention group compared with usual care, had significantly greater improvement in CES-D scores, $p = .003$
SCL-90 mean depression scores, $N = 1$	Katon et al. (2004)	CCM vs. usual care	SCL-90 mean depression scores had a significantly lower adjusted mean in the intervention group than the usual care group ($p = .03$)
SF-36 domain physical functioning, $N = 1$	Cezaretto et al. (2011)	Intensive interdisciplinary vs. traditional intervention	Domain physical functioning showed marked reductions in the intervention group when compared with the control group ($p = .05$)
SF-36v2 subscale score for bodily pain, $N = 1$	Angeles et al. (2013)	Early intervention vs. control group (who later received delayed intervention)	The SF-36v2 subscale score for bodily pain was significantly improved in the early intervention group compared with the delayed intervention group (mean difference = 13.1 points; $p < .05$)
SF-36 domain General Health, $N = 1$	Counsell et al. (2007)	Geriatric interdisciplinary team vs. usual care	Significant improvements for intervention patients compared with usual care in SF-36 scale: General health (0.2 vs. -2.3 , $p = .045$)
SF-36 scales domain Vitality, $N = 1$	Counsell et al. (2007)	Geriatric interdisciplinary team vs. usual care	Significant improvements for intervention patients compared with usual care in SF-36 scale: Vitality (2.6 vs. -2.6 , $p < .001$)
SF-36 domain Social Functioning, $N = 1$	Counsell et al. (2007)	Geriatric interdisciplinary team vs. usual care	Significant improvements for intervention patients compared with usual care in SF-36 scale: social functioning (3 vs. -2.3 , $p = -.008$)
SF-36 domain role emotional, $N = 1$	Cezaretto et al. (2011)	Intensive interdisciplinary vs. traditional intervention	The domain role emotional showed marked reductions in the intervention group when compared with the control group ($p = .05$)
SF-36 domain Mental Health, $N = 2$	Counsell et al. (2007)	Geriatric interdisciplinary team vs. usual care	Significant improvements for intervention patients compared with usual care in SF-36 scale: Mental health (3.6 vs. -0.3 , $p = .001$)
	Phelan et al. (2007)	Geriatric interdisciplinary team vs. usual care	The intervention group had a significantly higher overall psychological well-being mean score than the control group (77.6 vs. 75.5, $p = .03$)
General well-being, $N = 1$	Burns et al. (2000)	Interdisciplinary outpatient primary care evaluation and management vs. usual care	Intervention group compared with usual care had significantly greater improvement in General well-being ($p = .001$)

(continued)

Table 5. (continued)

Psychiatry clinical outcomes	Study	Intervention	Findings (22)
MMSE scores, N = 1	Burns et al. (2000)	Interdisciplinary outpatient primary care evaluation and management vs. usual care	Intervention group compared with usual care had significantly greater improvement in MMSE scores ($p = .025$)
Mental Component Summary, N = 1	Counsell et al. (2007)	Geriatric interdisciplinary team vs. usual care	Significant improvements for intervention patients compared with usual care in SF-36 scale: Mental Component Summary (2.1 vs -0.3, $p < .001$)
SCL-20, N = 1	Hunkeler et al. (2006)	Collaborative case intervention vs. usual care	One year after resources were withdrawn: significant difference in depression (SCL-20) scores (0.23, $p < .0001$) favoring intervention patients remained
Total Caregiver Neuropsychiatric Inventory, N = 1	Callahan et al. (2006)	CCM vs. usual care primary care	Total Caregiver Neuropsychiatric Inventory (-2.2 difference in score at 12 months, $p = .03$)
Total Patient Neuropsychiatric Inventory Score, N = 1	Callahan et al. (2006)	CCM vs. usual care primary care	Total Patient Neuropsychiatric Inventory Score (-5.5 difference in scores at 12 and 18 months, $p < .01$)
Pharmacological drug use, N = 1	Callahan et al. (2006)	CCM vs. usual care primary care	Intervention patients were more likely to receive cholinesterase inhibitors (79.8% vs. 55.1%, $p = .002$) and antidepressants (45.2% vs. 27.5%, $p = .03$)
Remission of Depression, N = 1	Hunkeler et al. (2006)	CCM vs. usual care	Intervention patients fared slightly better than controls regarding remission of depression ($p < .005$)

Note. ICP = interprofessional collaborative practice; CI = confidence interval; BED = binge eating disorder; CCM = collaborative care model; PHQ-9 = Patient Health Questionnaire-9; CES-D = Center for Epidemiologic Studies–Depression; SCL-20: Symptom Checklist Depression Scale; SF-36 = Short Form 36; MMSE = Mini-Mental State Exam.

increased mortality in the intervention group at 24 months (11.4% vs. 7.1%, $p = .03$) (Phelan et al., 2007). The intervention group consisted of a team composed of a geriatrician, gerontological advanced practice nurse practitioner, and a geriatric pharmacist. In that study, the patients seen were aged 75 years and older, and there was no difference between the intervention and control groups. Approximately 12 months into the study, there were eight deaths in the intervention group and 14 in the control group ($p = .34$). The higher mortality difference was observed at 24 months.

Effect of the Intervention on Humanistic Outcome

Out of 51 studies included, a total of 25 studies reported humanistic outcomes including measures of patient and caregiver satisfaction, quality of life measures, and treatment adherence. Fifteen out of 25 studies reported a significantly positive humanistic outcome with the ICP model (e.g., Orenius et al., 2013; Shriqui et al., 2013). Of note, six studies reported improved satisfaction with medical care (Areal et al., 2005; Deen et al., 2011; Hughes et al., 2000; Hunkeler et al., 2006; Katon et al., 2004; Majumdar et al., 2003), and five studies reported an improvement in quality of life (Angeles et al., 2013; Hughes et al., 2000; Hunkeler et al.,

2006; Lambeek et al., 2010; Orenius et al., 2013). There was also an increase in adherence to medications in two studies (Gupta et al., 2005; Katon et al., 2004). An increase in adherence, specifically with anti-retroviral therapies in the setting of HIV+ patients, was shown in one study by Gupta et al. (2005) when an interprofessional team consisting of a physician, nurse, social worker, physiotherapist, and psychologist provided care to the patient compared with usual care. Another study showed an increase in adherence to antidepressant treatment in the intervention group (Katon et al., 2004).

Three studies had different types of humanistic outcomes that were significantly positive and other outcomes that showed no difference. The significantly positive outcomes included patient satisfaction with drug information; patient satisfaction with care; patient and caregiver health-related quality of life (medical outcomes study, short-form, 36 items); and patient and caregiver satisfaction with care. Outcomes that showed no difference included quality of life; intervention status on the patient ratings of patient respect, being informed about self-help or support groups, being involved in care, feeling safe and the protection of confidentiality; patient and caregiver Barthel Index rating (Clifford et al., 2002; Deen et al., 2011; Hughes et al., 2000). Thirteen studies reported no difference in humanistic outcome with

the ICP model compared with the control group. Specifically, six out of 13 studies reported no difference in quality of life (Boorsma et al., 2011; Capoccia et al., 2004; Chan, 2009; Clifford et al., 2002; Ferris et al., 2005; Jiwa et al., 2013). Finally, one study by Angeles et al. reported a negative outcome in quality of life SF-36v2 physical component in the intervention group (15.3 decrease) versus the control group (3.4 increase, $p = .01$) (Angeles et al., 2013). However, this result contradicted the positive qualitative findings where patients reported feeling better with the intervention. In addition, there were improvements in the pain-related quality-of-life score with the intervention (9.2 increase) compared with the control group (3.9 decrease, $p \leq .01$). The authors concluded that SF-36v2 may not have been the ideal tool to measure their patient outcomes (Angeles et al., 2013).

Effect of the Intervention on Economic Outcome

Out of 51 studies included, only six studies evaluated economic outcomes. One study by Williams and colleagues (2004) measured the effect on monthly medication cost when a medication review was conducted by an interprofessional team. This study reported savings in wholesale medication cost of US\$26.92 per month for patients in the intervention group versus US\$6.75 in the control group ($p < .006$). Four out of six studies reported no difference in economic outcomes related to patient's medication costs or total per-person costs of service utilization (e.g., number of hospital admissions, emergency room visits, or clinic visits) when comparing the usual care group to the interprofessional intervention group (Ferris et al., 2005; Markle-Reid et al., 2011; Sledge et al., 2006; Ünützer et al., 2008). Finally, one study reported a significant increase in total cost of care in the Team-Managed Home-Based Primary Care (TM/HBPC) (mean [*SD*] US\$31,401 [US\$32,624]) compared with control group (mean [*SD*] US\$28,008 [US\$30,613]) at 12 months ($p = .05$) (Hughes et al., 2000).

Discussion

We will be discussing the main findings of clinical, humanistic, and economic outcomes from the studies included in this scoping review. Out of 51 studies included, many studies ($n = 27$) reported significantly positive clinical outcomes. Interestingly, they most often reported results favoring the interprofessional primary care teams' interventions on cardiovascular and psychiatric outcomes. Although seven studies reported significant difference in serum cholesterol (LDL, TC, HDL), eight studies reported no difference in serum cholesterol (LDL, HDL, TC, TG), but this could be due to patients previously being controlled and on an appropriate therapy. This finding shows that the interprofessional team strategy may be considered in the setting of hypertension and diabetes management as it is supported by many studies. Patients with mental illness, such as depression, could also

benefit from being cared by an interprofessional team instead of a sole provider. Other patterns recognized in studies having positive impact included team composition and team practice features.

One RCT reported a significantly negative clinical outcome (Phelan et al., 2007). Mortality was increased in the intervention group at 2 years. The study hypothesized that the cause for increased mortality could have been associated with greater disease severity among intervention participants, although the investigators did not collect this data. Another explanation hypothesized was patient confusion as to who (geriatric care team vs. primary care physician) was to make clinical decisions. The authors concluded that ICP is not an appropriate model of care for older adults in primary care. It is uncertain what caused this unnerving result and this outcome should be further analyzed. Although the authors reported mortality being higher in year 2 in the intervention group, life expectancy may have been positively influenced in the intervention group compared with controls. The average age in both groups was the same and mortality was higher in the control group at 12 months. Nevertheless, it is important to point out that open communication is key between health care professionals when caring for patients, to prevent confusion, which was one of the possible causes for the negative outcome reported by the authors.

Overall, a majority of studies reporting humanistic outcomes showed significantly positive results with ICP compared with usual care, specifically for satisfaction with care and adherence to medications. In one study that reported a negative humanistic outcome in quality of life, the authors doubted they had used the most appropriate measurement tool, as their results contradicted the overall positive qualitative comments from patients (Angeles et al., 2013). Therefore, this result should be considered less reliable.

There were only a small number of studies ($n = 6$) reporting economic outcomes and most showed no difference when comparing ICP to usual care. Therefore, one could conclude that if ICP brings better clinical and possible humanistic outcomes with no additional cost, then ICP is a better model to provide patient care. However, more studies analyzing the economic outcomes of ICP in the primary care setting are needed to determine the economic viability of this model. Furthermore, given different financial models internationally, that is, universal access versus insurance-based health systems, it would be important in future studies to differentiate impacts on out-of-pocket costs to patients versus costs to the health care system.

Given that it is not possible to conduct a meta-analysis of these data due to the heterogeneity of the study designs, patient populations, interprofessional team composition, and outcome measures, we chose to use a scoping literature review approach. In addition, we did not perform a risk of bias assessment, because that is generally not conducted in scoping reviews (Munn et al., 2018). Our review differs from other reviews in several ways. Our definition for ICP required

the team to have at least three different health professionals involved in the patient care. Other investigators included studies with two or more health care professionals (Reeves et al., 2017). A major strength of our scoping review is that we searched a broad range of databases and gray literature as part of our literature search, which resulted in the inclusion of a larger number of studies compared with previous reviews (Reeves et al., 2011, 2017).

There are some limitations to this scoping review that are important to note. While we attempted to include all the studies available from 2000 to 2013, it is possible some relevant studies were missed. Our review did not include studies after the year 2013 and some important new work may have been published since then. Therefore, as there is still no other scoping review similar to this one published to date, these data would still help future researchers gain knowledge and perspective of the impact of interprofessional care on patient outcomes during the period of 2000–2013.

In addition, it was not possible to clearly identify which studies used shared decision making as part of their ICP model, which may be an important element of high-quality interprofessional team-based care. Shared decision making was not discussed or defined in a majority of the studies. As this was a scoping review with a focus on reporting the main themes that emerged, the studies that showed no difference in outcomes and the possible reasons for such results were not fully investigated. Finally, another limitation is that we did not separate out the different outcomes based on countries; however, this may be something other researchers may be interested in doing in the future and could find this scoping review helpful to get started.

Despite positive results in the majority of papers, several studies reported no difference when comparing ICP to usual care. These results should be further analyzed to identify the lessons learned and aspects of interventions needed to improve the ICP model. Rarely studies reported significant negative patient outcomes with the ICP model, but these results should be carefully considered.

Conclusion

Our findings reveal that there are studies showing that ICP in primary care settings can positively impact clinical and humanistic outcomes. Future studies should identify unique activities and interventions that were highly successful among ICP teams with positive impact on patient outcomes. In addition, studies should aim to define shared decision making clearly within their study and the process of how it is implemented. Furthermore, more studies are needed to determine the impact of ICP on humanistic and economic outcomes in the primary care setting. Beyond cardiovascular and psychiatric outcomes, other common diseases seen within primary care settings should be further explored to determine the impact of the ICP model.

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Supplemental Material

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