

The Role of Patient Navigators in Ambulatory Care: Overview of Systematic Reviews

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Abstract

Background: Patient navigators have been introduced across various countries to enable timely access to healthcare services and ensure completion of diagnosis and follow-up of care. There is an increasing amount of evidence on the positive effect of patient navigation for patients. The aim of this study was to analyse the evidence on patient navigation interventions in ambulatory care and to evaluate their effects on individuals and health system outcomes.

Methods: An overview of reviews was conducted, based on a prespecified protocol. All patients in ambulatory care or transitional care setting were included in this review as long as it was related to the role of patient navigators. The study analysed all roles of patient navigators covering a wide range of health professionals such as physicians, nurses, pharmacists, social workers as well as lay health workers or community-based workers with no or very limited training. Studies including patient-related measures and health system-related outcomes were eligible for inclusion. A rigorous data collection was performed in multiple data bases. After reaching an inter-rater agreement, title and abstract screening was independently performed. Of an initial 8362 search results a total of 673 articles were eligible for full-text screening. An extraction form was used to analyse the nine included review.

Results: Nine systematic reviews were included covering various patient navigation roles in cancer care, disease screening and transitional care. Seven systematic reviews primarily tailored services to ethnic minorities or other disadvantaged groups. Patient navigators performed tasks such as providing education and counselling, translations, home visits, outreach, scheduling of appointments and follow-up. Six reviews identified positive outcomes in expanding access to care, in particular for vulnerable patient groups. Two reviews on patient navigation in transitional care reported improved patient outcomes and hospital readmission rates and mixed evidence on quality of life and emergency department visits.

Conclusions: Patient navigators have shown to expand access to screenings and health services for vulnerable patients or population groups who tend to underuse health services.

Background

The raising prevalence of chronic diseases is a challenge for health systems worldwide. Almost one in three people have been shown to live with one or more chronic conditions across the OECD countries (1). Strengthening primary care and the coordination of healthcare across inpatient and outpatient services and multiple providers has therefore become essential to deliver high-quality and personalized care to patients (2; 3; 4; 5).

Access to healthcare services is vital to meet patients' needs, decrease health inequalities and prevent diseases or slow disease progression and the development of complications. Yet, throughout their care pathway, many patients see themselves confronted with a fragmented and complex healthcare system and navigating through it poses a challenge (6). To enhance access to health care and strengthen coordination and continuity of care, various countries have introduced new professional roles and tasks, such as patient navigator roles (7). The role of patient navigators was first introduced in the United States (U.S.) in the 1990s. The aim was to improve access to cancer care services for minority groups by improving screening and diagnosis of certain types of cancer and assisting patients in manoeuvring through the healthcare system (8).

Patient navigator have since been introduced across various countries to enable timely access to healthcare services and ensure completion of diagnosis and follow-up of care (9; 10; 11). Originally focused on cancer, the role and function of patient navigators has diversified. People with chronic conditions often require repeated contact with multiple health care providers and may experience barriers in accessing healthcare services (12). In transitional care, earlier discharges from the inpatient to the outpatient and community setting has resulted in expanded and new roles

of healthcare workers in the ambulatory care setting, ensuring greater coordination of care and follow-up (13). Patient navigation may cover various tasks along the care continuum including education, outreach, facilitating communication and end-of-life care (14). Patient navigator roles are usually performed by qualified professionals such as nurses or social workers, but are also undertaken by trained lay persons, peers and former patients such as cancer survivors (15).

Patient navigators are often targeted towards patients from vulnerable or marginalized patient groups that frequently experience the largest barriers to accessing health care, such as ethnic minorities, older people, socioeconomically disadvantaged groups or uninsured persons (16).

There is an increasing amount of evidence on the positive effect of patient navigation for patients; for instance, on disease prevention and health promotion (17; 18), but also various studies with non-significant findings or mixed results (19). The number of systematic reviews has increased over the past decade, requiring an update of the evidence on the role of patient navigators in different countries and health system contexts, population groups and for various outcomes. To the best of our knowledge, there has been no overview of systematic reviews on the impact of patient navigation on patient and health system outcomes.

The overarching aim of this study was to assess the availability of evidence on patient navigation interventions in ambulatory care and to evaluate their effects on patients and healthcare systems. This study seeks to inform researchers and policy-makers about the relevance and effectiveness of patient navigation.

Methods

This study was part of a larger study consisting of an overview of systematic reviews on skill-mix changes in ambulatory care. It followed a prespecified protocol (registered with International Prospective Register of Systematic Reviews, (20) and is described according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. An overview of review was chosen due to the high number of expected published systematic reviews on the topic and to identify gaps in the existing literature.

Eligibility criteria

Eligible systematic reviews or meta analyses were included if they assessed the effect of patient navigator roles on patients or health systems and were published since 2010. The start date reflects our focus on recent evidence and the increasing interest in patient navigation in the last decade. Only English language publications were included. Protocols of reviews were excluded. Systematic reviews not covering any individual or health-system related outcome measure were also excluded. Detailed eligibility criteria and the search process are outlined in the registered protocol (20).

The overview of reviews followed the Population, Intervention, Comparison and Outcomes (PICO) scheme:

Population

All patients and participants in ambulatory care or transitional care (hospital to ambulatory sector) setting were included in this review as long as it was related to the role of patient navigators. Reviews that covered patient navigators in hospital settings only (with no cross-sectoral coordination function described) or emergency care were excluded. The geographic focus was on high-income countries, hence systematic reviews explicitly excluding high-income countries (e.g. only including low-income countries) were not considered for inclusion.

Intervention

The overview of reviews analysed all roles of patient navigators or similar roles in the country specific contexts. We covered a wide range of persons and health professionals as patient navigators, such as physicians, nurses, pharmacists, social workers and others if performing patient navigator roles; as well as lay health workers or community-based workers with no or very limited training.

Comparison

Standard of care followed the definitions by the individual studies included in the systematic reviews.

Outcome measures

We included a range of primary outcomes in the overview of reviews. Studies including patient-related measures (e.g. clinical outcomes, mortality, patient satisfaction, quality of life) and health system-related outcomes (access, continuity of care, costs, efficiency) were eligible for inclusion.

Search method for identification of reviews

Search strategy

The Search strategy was built and run in Embase first, then adapted to the following databases: Medline in Ovid, Cochrane CENTRAL, Web of Science Core Collection, CINAHL EBSCOhost (Cumulative Index to Nursing and Allied Health Literature), PsychINFO Ovid and Google scholar. A librarian supported the team in developing the search strategy and carried out the literature search in January 2018. Search terms included combined Medical Subject Headings (MeSH) with free text words. For each of the databases, the search strategy was adapted to meet the specific requirements. Filters were used (as applicable, depending on the database) to identify systematic reviews. The search strategy was reviewed internally.

In addition to the electronic search, a snowballing approach was used to detect other systematic reviews. Reference lists of included reviews were screened for other relevant studies and systematic reviews that were identified during the piloting phases were also considered for full-text screening.

Data collection and analysis

Screening of reviews

Three reviewers independently screened titles and abstracts of the first 100 hits, using the software Rayyan QCRI. Interrater agreement was calculated using an extended version of Cohen's kappa coefficient^[1], and a high (0.86) interrater agreement was reached (21; 22). Therefore, the final total of 3983 hits generated by the search were screened for title/abstract by the three reviewers. Overall, a total of 673 articles identified as eligible for full-text screening during the title/abstract screening including articles detected through the snowballing approach. These were accessed as full-text and independently reviewed for final inclusion by the researchers, after interrater agreement of 0.78 was reached (see PRISMA Flow Diagram). Finally, nine reviews were identified as eligible for final inclusion.

Data extraction and analysis

A data extraction form (Microsoft Excel) was used, informed by previous overview of reviews (23; 24). To ensure consistency in data extraction, a piloting phase was performed among the researchers wherein differences were resolved via discussions and one researcher double checked data extraction for all reviews.

The data analysis was performed as narrative synthesis, meta-analysis was not possible due to the heterogeneity of the outcome measures. The data was summarized for navigation roles focusing on health promotion/prevention, transitional care, chronic conditions and access to services for disadvantaged population groups. Moreover, study design, participants, professions, comparator, country, outcomes (by individual patient outcomes and health system outcomes) were extracted.

Quality appraisal

Using the AMSTAR II (A Measurement Tool to Assess systematic Reviews) checklist. The AMSTAR I checklist was specifically developed to assess the quality of systematic reviews (23), further developed and expanded into AMSTAR II covering a total of 16 items (25). The systematic reviews were independently evaluated by two researchers after a pilot phase to ensure consistency in the ratings.

Results

Characteristics of the reviews included

A total of nine systematic reviews describing 223 individual studies on patient navigation roles met the inclusion criteria and were included (see Tables 1-3). The included reviews covered three areas of care: four systematic reviews analysed patient navigator roles for patients with various types of cancer ('cancer care' including diagnosis and treatment), three reviews focused on screenings for the prevention and early identification of diseases and two reviews covered transitional care interventions for patients with various chronic conditions. The analysis of the results is structured along these three areas of care. Patient navigators performed tasks such as providing education and counselling (addressing the language needs of the target groups), translations, home visits, outreach, scheduling of appointments and follow-ups.

Seven of the nine reviews covered interventions targeted primarily or exclusively at vulnerable population groups such as ethnic minorities, non-native speakers or medically underserved populations (19; 26; 27; 11; 15; 28; 29). Most individual studies were conducted in the U.S. and Canada, followed by studies from European countries (e.g. Austria, Italy, UK) and Asia (e.g. Bangladesh, Korea, Japan). Randomized Controlled Trials (RCTs) made up a majority of studies included in the systematic reviews. Two out of the nine systematic reviews performed meta analyses (15; 30).

All systematic reviews reported on the professional background of the patient navigator (e.g. nurses, physicians, lay health worker). Three systematic reviews provided information on the length or contents of their patient navigation training (28; 29; 19). The reporting of education and training in the three reviews was often limited to individual studies and not consistent. Reporting on the details of the interventions and outcome measures was available for all systematic reviews.

Quality appraisal

The quality of the systematic reviews included in the overview of reviews varied. Two were assessed as moderate quality (30; 19) and seven systematic reviews were of low quality (28; 15; 29; 26; 31; 27; 11).

Patient navigation interventions with a focus on diagnosis and treatment of cancer

Four systematic reviews focused on patient navigation for cancer care covering interventions to improve cancer diagnosis and treatment (Table 1: (19; 26; 27; 11)). Two reviews also included interventions for diagnosis and screening (27; 11). Out of the four reviews, one targeted ethnic minorities (27) and three covered all cancer patients, of which the majority were ethnic minorities in two reviews (19; 11). One review covered medically underserved patients including

uninsured persons and patients from rural and urban areas in the US (26). The main interventions undertaken by patient navigators were education on the disease, its treatment and self-care scheduling appointments and assistance with appointments in the included systematic reviews. Other roles included facilitating communication between providers (11; 19; 27; 26).

Patient navigator roles were undertaken by individuals with diverse backgrounds, ranging from health professionals to lay persons (19; 26; 27; 11) and patients (19) such as breast cancer survivors (11). Among health professionals, nurses were the most common profession to take on the role of patient navigation. The reporting of details of the training and education of the patient navigators was limited among the four reviews. Only Ranaghan et al. (19) reported on patient navigator training. In the review, one out of four studies provided details on education, with patient navigators trained in breast health education, public speaking and observing mammograms undertaken in mobile breast cancer screening units by radiologists, breast surgeons and oncologists.

Patient navigation showed improved outcomes in all four systematic reviews focusing on facilitating access to health services. Two systematic reviews demonstrated improvements in access and timeliness of treatment and care for vulnerable patients or ethnic minority patients, for example by reducing waiting times and improving appointment scheduling with specialists (11; 26). Earlier treatment and treatment initiation were demonstrated by one systematic review (26). One review showed improved adherence to follow-up for medically underserved patients (26). Ranaghan et al. (19) reported a shorter time to diagnosis and appointments and indicated improved patient satisfaction and coordination of care. However, the authors report that the effect was not statistically significant, which was largely attributed to small sample sizes for sub groups analyses in the evaluated studies.

Patient navigation interventions with a focus on screening of diseases

Five systematic reviews analysed patient navigator roles to increase screening uptake (see table 2: (29; 15; 28; 27; 11)). Except for Al-Faisal et al. (15), all other focussed on cancer. Two reviews focused on diagnosis and treatment in addition to screening and have therefore also been covered in the previous sub-section (27; 11). One review focused on vulnerable patients such as medically underserved groups (28), while another provided evidence on patient navigation interventions for non-English proficient persons (29). Interventions covered various components such as education, reminders, assistance in setting up appointments, language support and the identification and removal of barriers.

Health professionals (15) or trained lay persons (29; 15; 28) undertook patient navigator roles. In the review by Roland et al. (28), lay patient navigators received general training in information related to cancer and health, cancer screening and guidelines. Moreover, they were trained in providing patient support and care. Skill-based training was provided on topics such as motivational interviewing and communication. In the review by Genoff et al. (29), five out of fifteen studies reported on the length of training of patient navigators, which ranged from six hours training to two days workshops and additional follow-ups one year later.

Patient navigation improved screening rates for population groups in all five systematic reviews, with the majority of patient groups being from ethnic minorities (15; 28; 29; 27; 11).

The results of the meta-analysis by Al-Faisal et al. (15) showed a significant increase in screenings rates with patient navigation (OR: 2.48, 95 % CI, 1.93 to 3.18, $p < 0.001$). Three other systematic reviews also found improved screening rates (28; 29; 27). Glick et al. (27) showed improved adherence to screening for ethnic minority cancer patients. Another systematic review demonstrated improved adherence to breast cancer screening and diagnostic follow up for breast cancer patients, of which the majority were ethnic minority women (11).

Patient navigation also significantly improved the probability of attending recommended care events (OR 2.48, 95% CI, 1.27 to 5.10, $p= 0.008$) (15). Improved completion of diagnostic (28) and screening (27) was also shown. Improved referrals and shorter time to diagnosis for patients with abnormal screening results were reported in one systematic review (28).

Patient navigator interventions in transitional care

Transitional care interventions from hospital to ambulatory care or home involving patient navigator roles were the focus of two systematic reviews. The patient navigation interventions were targeted at older patients with at least one chronic condition (see table 3: (31; 30)).

Although a wide range of different interventions were covered, patient navigator tasks mostly included coordination, discharge planning and follow up in addition to education and multiprofessional collaboration among health professionals. Nurses (e.g. advanced practice nurses), physicians, pharmacists and social workers performed patient navigation interventions, among other professions.

Patient navigation in transitional care focusing on older patients with chronic diseases demonstrated a significant reduction in mortality rates (Risk Difference (RD) -0.02, 95% CI: -0.05-0.00) (30), improvements for depression symptoms and disease management (31) and a positive effect on activities of daily living (ADL), communication with patients, caregivers, education for caregivers, self-management and knowledge of patient medication (31). Mixed results on quality of life were reported in the two reviews, with no difference in quality of life between intervention and non-intervention groups reported in Le Berre et al. (30), but improved quality of life reported for the intervention group in Manderson et al. (31).

Improved referrals were reported by Manderson et al. (31). Le Berre et al (30) showed that introducing patient navigation in transitional care results in significantly fewer Emergency Department visits at 3 months post-discharge (Risk Difference (RD) -0.08, -0.15, -0.01), yet, showed no effect at six or twelve months (30). However, the review reported significantly lower hospital readmissions at 6 months (RD -0.05, -0.09, -0.00), 12 months (RD -0.11, -0.17, -0.05), and at 24 months (MD -1.03, -1.81, -0.24) and no effect one month (30). Mandersen et al. (31) reported lower readmissions, shorter time to readmission and less hospital days. This review reported an inconclusive effect on costs related to the use of emergency departments.

Discussion

This study identified nine systematic reviews that assessed the impact of patient navigators on patient and health system related outcomes. While intervention components varied, the systematic reviews overall show that patient navigation interventions have positive effects on facilitating and improving access to screening and treatment, particularly for medically underserved and ethnic minority patients. Moreover, patient navigator interventions in transitional care showed positive effects for patients with chronic conditions, and may result in lower rates of hospital re-admissions, but the evidence on the latter remains scarce and not consistent over time.

The included reviews particularly demonstrated improvements on health system related measures, namely increased access (29; 15) and reduced waiting times for underserved patients and ethnic minority patients (11). Patient navigators helped improve access by reducing barriers created by language, culture and low health literacy, thereby helping ensure a more effective patient pathway and reducing delays in diagnosis and treatment (29; 26). The findings are consistent with previous studies documenting the positive impact of patient navigators on reducing health disparities (32; 33; 34; 35; 36). Improving access to healthcare services for patients by reducing various barriers ranging from financial and insurance issues, complex paperwork, neighbourhood resources, language, transportation or

childcare can empower and foster trust among underserved patients and communities (32). However, most of the available evidence on patient navigation interventions increasing access to healthcare services comes from the U.S. This limits the generalizability of these findings to other country contexts.

While the majority of included systematic reviews focused on cancer care, there is less evidence on the effects of patient navigator roles for patients with other conditions. Yet, our findings show that patient navigators in transitional care can improve patients' health outcomes and readmission rates for older people with at least one chronic condition (31; 30). Previous studies reported similar positive effects of patient navigation, particularly for older patient groups (37). Although the results demonstrate an overall positive impact on post-discharge outcomes for older chronically ill patients (31; 30), no effect was shown after one month (30). This is in line with other evidence showing inconsistent effects on readmission rates over time. Considering a threshold of more than 30 days may indicate a positive impact over a prolonged period in time (38; 37).

An important challenge for the evaluation of patient navigation is that patient navigator models are very different in terms of the qualifications of health professionals and services offered (12). The evidence shows that patients are being navigated through the healthcare system by a variety of different people, ranging from professionals within the health systems such as physicians, nurses, social workers to lay people (39). However, a detailed description of the educational background, length of training and knowledge about the minimum level of qualification to undertake patient navigator roles is largely missing in the included studies.

Conclusions

Introducing patient navigator roles can be a strategy to improve access to healthcare services, as shown for cancer patients from ethnic minority or socially disadvantaged population groups. Patient navigator roles can increase access to screening and treatment for various types of cancer. It may also improve health outcomes and lower readmission rates for patients with other chronic conditions. However, there is a lack of knowledge which components of patient navigation are most promising and what is needed to successfully implement the new roles.

The importance of the definition of scope of practice and the effectiveness of supervision, qualification and skills of patient navigators are to be further investigated. Overall, more research is needed on barriers and enabling factors for successful patient navigation, including minimum qualification levels and how the patient navigator role should be tailored for different patient and population groups. Further knowledge is needed on how navigators should be integrated into primary care teams and on the tasks and responsibilities of the patient navigators compared with other providers.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that there is no conflict of interest.

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Authors' contributions

Hannah Budde had the main role in the extraction, analysis and interpretation of the data and was responsible for drafting and structuring the manuscript. Dr. Claudia B. Maier was responsible for the overall design and conduct of the overview of reviews and was involved in the write-up and the revisions of the manuscript. Gemma Williams and Juliane Winkelmann contributed to the study, methodology and reviewed the manuscript. Laura Pfirter was involved in data collection and quality appraisal and reviewed the paper. All authors read, commented upon, and approved the final manuscript.

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Tables

Table 1. Patient navigator interventions with a focus on the diagnosis and treatment of cancer

<i>Intervention</i>					<i>Outcomes</i>	
<i>Source</i>	<i>Details of the intervention</i>	<i>Profession(s)</i>	<i>Population</i>	<i>Countries</i>	<i>Patient-related outcomes</i>	<i>Health-system related outcomes</i>
(19)	Patient navigation included facilitating communication with providers, outreach, assistance with appointments and scheduling, education, follow-up, counselling)	<u>Intervention:</u> Patient, nurse, professional navigator <u>Comparison:</u> Radiologists, physicians, breast surgeons	Cancer patients receiving care in ambulatory setting (incl. ethnic minority and minority women patients)	CA, KR, US	· Improved patient satisfaction in four out of four studies	· Care coordination improved, statistically insignificant · Shorter time to diagnosis, statistically insignificant
(26)	Introduction of patient navigator to overcome obstacles such as language barriers, coordination of appointments, lack of transportation and insurance or difficulties to understand the follow-up process	<u>Intervention:</u> Lay persons, nurses with oncology experience, individual with master in social work - <u>Comparison:</u> Not reported	Cancer patients from medically underserved populations, rural or urban area, uninsured persons, non-English speaking persons	US	· Improved adherence to follow-up	· Earlier treatment and treatment initiation · Significant improvements in diagnostic resolution
(27)	Patient navigator intervention to improve screening, diagnosis and treatment of cancer in ethnic minority patients (e.g. scheduling appointments, outreach, assistance with transportation, telephone support)	<u>Intervention:</u> Nurses, lay health educators, lay health workers, NPs, community health aides, physicians <u>Comparison:</u> Not reported	Ethnic minority cancer patients	US	· Improved adherence to screening	· Increased screening rates · Improved completion of screening
(11)	Patient navigation in breast cancer care involving non-health professionals (e.g. follow-up to screening and clinical breast abnormalities, education, counselling,	<u>Intervention:</u> Breast cancer survivors, lay community health workers, nurse navigator in cooperation with lay navigator and	Breast cancer patients (66% of sample were non-white women)	CA, US	· Improved adherence to breast screening and diagnostic follow-up (e.g. after abnormal radiographic screening,	· Reduced waiting time for biopsy/diagnostic intervals · Decreased time to appointment with genetic counsellor

referral, translation
and scheduling)

social worker,
lay workers

attending
genetic
counselling)

Comparison:

Professions
not defined

Country abbreviations: CA=Canada, KR=South Korea, US= United States of America

Table 2. Patient navigator interventions with a focus on screenings of diseases

<i>Skill-mix interventions</i>					<i>Outcomes</i>	
<i>Source</i>	<i>Details of the intervention</i>	<i>Profession(s)</i>	<i>Population</i>	<i>Countries</i>	<i>Patient-related outcomes</i>	<i>Health-system related outcomes</i>
(15)	Patient navigator interventions either as face-to-face, mail or phone interventions (e.g. education or support in identifying barriers, setting up appointments and making reminder calls)	<p><u>Intervention:</u></p> Trained laypersons or health professional (e.g. nurse)	Patients in primary care completing screening for colorectal, cervical and breast cancers and hepatitis B (often vulnerable patients)	BD, CA, US	<ul style="list-style-type: none"> Increased probability to attend recommended care events (OR 2.48, 95% CI, 1.27 to 5.10, p= 0.008) 	<ul style="list-style-type: none"> Increased access to screenings (OR: 2.48, 95 % CI, 1.93 to 3.18, p<0.00001)
		<p><u>Comparison:</u></p> Control group without PN or intervention group before intervention				
(27)*	Patient navigator intervention to improve screening, diagnosis and treatment of cancer in ethnic minority patients (e.g. scheduling appointments, outreach, assistance with transportation, telephone support)	<p><u>Intervention:</u></p> Nurses, lay health educators, lay health workers, NPs, community health aides, physicians	Ethnic minority cancer patients	US	<ul style="list-style-type: none"> Improved adherence to screening 	<ul style="list-style-type: none"> Increased screening rates Improved completion of screening
		<p><u>Comparison:</u></p> Not reported				
(11)*	Patient navigation in breast cancer care involving non-health professionals (e.g. follow-up to screening and clinical breast abnormalities, education, counselling, referral, translation and scheduling)	<p><u>Intervention:</u></p> Breast cancer survivors, lay community health workers, nurse navigator in cooperation with lay navigator and social worker, laypersons	Breast cancer patients (66% of sample were non-white women)	CA, US	<ul style="list-style-type: none"> Improved adherence to breast screening and diagnostic follow-up (e.g. after abnormal radiographic screening, attending genetic counselling) 	<ul style="list-style-type: none"> Reduced waiting time for biopsy/diagnostic intervals Decreased time to appointment with genetic counsellor
		<p><u>Comparison:</u></p>				

		Professions not defined				
		-				
		-				
(28)	Patient navigator interventions targeting screening and diagnosis of cancer (e.g. partnerships with health and non-healthcare services, education, scheduling, outreach, communication, follow-ups)	<p><u>Intervention:</u></p> <p>Lay health advisors, promotora, case manager, community outreach specialist, lay health educator, lay health worker), partners (e.g. academic researchers, community members, community activists, public health officials)</p> <p><u>Comparison:</u></p> <p>Not reported</p>	Medically underserved population (incl. urban cities, rural counties, suburban neighbourhoods, border regions), screenings for breast, cervical and colorectal cancer	US	<ul style="list-style-type: none"> · Improved completion of diagnostics, especially for patients who missed a follow-up diagnostic appointment · Improved referral and follow up 	<ul style="list-style-type: none"> · Improved breast, cervical, or colorectal cancer screening rates for mammography, pap tests, screening with colonoscopy · Shorter time to diagnosis for abnormal screening results
(29)	Patient navigation included assisting patients in navigating through cancer screening (e.g. setting up appointments and making reminder calls along with providing language services such as interpreting and one-to one educational sessions)	<p><u>Intervention:</u></p> <p>Patient navigators, bilingual staff, health educators, family members, professional interpreters</p> <p><u>Comparison:</u></p> <p>Not reported</p>	Non-proficient English-speaking population groups in need for cancer care	US	<ul style="list-style-type: none"> · Significant increased screenings rates for breast, cervical, or colorectal cancer (14/15 studies) · Breast cancer screening rates increased by 17-25% · Colorectal screening rates increased by 13-40% · Cervical cancer screening showed a nearly 60% increase 	

Notes: CI= Confidence Interval, OR=Odds Rati, p=p-value, *= systematic reviews covering screening, diagnostic and treatment and therefore listed twice; Country abbreviations: CA=Canada, BD=Bangladesh, US= United States of America, promotora= lay health workers of a community (mostly female) providing a range of services as liaison between Hispanic communities and healthcare services

Table 3. Patient navigator interventions with a focus on transitional care

<i>Skill-mix interventions</i>					<i>Outcomes</i>	
<i>Source</i>	<i>Details of the intervention</i>	<i>Profession(s)</i>	<i>Population</i>	<i>Countries</i>	<i>Patient-related outcomes</i>	<i>Health-system related outcomes</i>
(31)	Patient navigation in transitional care (e.g. discharge planning, coordination of care, phone support, home visits, liaison with medical and community services, patient/caregiver education)	<p><u>Intervention:</u></p> Registered nurse with advanced practice expertise, gerontological advanced practice nurse, social worker; physicians and physician mentors (supporter in a multidisciplinary team) <p>-</p> <p><u>Comparison:</u></p> Not reported	Older patients with chronic diseases	AU, CA, US	<ul style="list-style-type: none"> · Improved depression symptoms · Improvement for disease self-management · Improved quality of life · Improved activities of daily living, communication with patients, caregivers, education for caregivers, self-management, knowledge of patient medication 	<ul style="list-style-type: none"> · Lower readmissions · Shorter time to readmission and less hospital days · Improved community referrals · Inconclusive effect on costs related to use of emergency rooms
(30)	Transitional care interventions from hospital to home (majority of interventions focused on contacts, home visits and educational components; others included multidisciplinary coordination and collaborations)	<p><u>Intervention:</u></p> Nurses, primary care physicians, cardiologists, pharmacist <p>-</p> <p><u>Comparison:</u></p> Family physician, not consistently reported	Older patients with at least one chronic disease	AT, AU, CA, BE, CH, CN, DE, DK, ES, FI, HK, IR, IT, JP, NL, NZ, SE, SI, UK	<ul style="list-style-type: none"> · Mortality: Significantly lower for intervention (RD -0.02, -0.05-0.00, NNT 50) and maintained at 6, 12 and 18 months post-discharge · No significant effect on quality of life 	<ul style="list-style-type: none"> · Significantly fewer ED visits at 3 months post-discharge (Risk Difference (RD) -0.08, -0.15, -0.01); no effect at 1, 6, 12 months · Total readmission days: Significant difference at 3 months (MD -1.33, -2.15, -0.52), 6 months (MD -1.42, -2.33, -0.50), 12 months (MD -3.37, -5.21, -1.53), 18 months (MD -3.16, -5.68, -0.64);

no difference
at 1 month

· Risk
hospital
admission:
Significantly
lower at 6
months (RD
-0.05, -0.09,
-0.00), 12
months (RD
-0.11, -0.17,
-0.05), and at
24 months
(MD -1.03,
-1.81, -0.24)

Notes: CI= Confidence Interval, ED= Emergency Department, MD=Mean Difference, OR=Odds Ratio; p=p-value; RD=Risk Difference; Country abbreviations: AU= Australia, AT= Austria, BE= Belgium, CH= Switzerland, CN= China, DE=Germany, DK= Denmark, ES= Spain, FI= Finland, HK= Hoch Kong, IT= Italy, JP= Japan, NL= The Netherlands, NZ= New Zealand, SE= Sweden,

SI=Slovenia, UK= United Kingdom, US= United States of America

Supplementary Files

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