

The evaluation of nurse navigators in chronic and complex care

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ABSTRACT

Aim

With increasing age and chronicity in populations, the need to reduce the costs of care whilst enhancing quality and hospital avoidance, is important. Nurse-led co-ordination is one such model of care that supports this approach. The aim of this research is to assess the impact that newly appointed Navigators have on service provision; social and economic impact; nurses' professional quality of life and compassion fatigue; and analysis of the change that has occurred to models of care and service delivery.

Design

A concurrent mixed-method approach was selected to address the research aims.

Methods

The research project was funded in July 2018 and will conclude in December 2020. Several cohorts will be studied including; patients assigned to a navigator, patients not assigned to a navigator, family members of patients assigned a navigator; and a sample sized estimated at 140 navigators.

Discussion

This study provides a comprehensive international longitudinal and mixed method framework for evaluating the impact of nurse navigators on quality of care outcomes for patients with chronic conditions.

Impact - What problem will the study address?

Even with specialty focused co-ordinated care, patients get lost in the system, increasing the incidence of non-compliance and exacerbation of condition. Navigators work with patients across service boundaries allowing for care that is patient responsive, and permitting variables in clinical, social and practical elements of care to be addressed in a timely manner. This novel nurse-led approach, supports hospital avoidance and patient self-management, whilst encouraging expansion and opportunity for the nursing and midwifery workforce.

KEY WORDS: nurse navigators, nurse-led care, chronic care, co-ordinated care, integrated care

INTRODUCTION

This project evaluates the effectiveness and sustainability of the navigator model being introduced by two regional health services. These nurses and midwives work with multidisciplinary health teams and are tasked with co-ordinating/navigating the care of people with complex health problems. The objectives of the navigator project include the enhancement of patient education and supporting comprehensive care, thus improving self-management thereby reducing avoidable hospital admissions. The project has adopted theory of change/action research methodologies underpinned by a patient-centred philosophy to map the development of care modelling evolving from this new nursing role. Data collection and analysis include concurrent mixed methods to capture trends in the social impact and overall cost benefits; nurses' professional quality of life and compassion fatigue; and analysis of the change that has occurred to models of care and service delivery.

BACKGROUND

The challenge with complex and/or long term conditions (LTC) is that acute hospital services measure outcomes in episodes of care that have a beginning and an end (Hasle, Nielsen, & Edwards, 2016). For people living with LTCs, care is a life-time journey in which individual care episodes fail to capture continuity of care and the impact on the patient journey across time. Influences on the lack of continuity of care include increased pressure on staffing related to reduced human resource allocations and skills mix, and generalised cost constraints (Bergh et al., 2015; Chadban et al., 2010; Phelan & McCarthy, 2016). Additionally, in the work intensified environment, integrating care has been hampered by inadequate communication between departments/providers, poor or ineffective handover between services, and poor or absent discharge planning and patient education (Finlayson, Sheridan, Cumming, & Fowler, 2012; Harvey et al., 2016; Henderson, Willis, Toffoli, Hamilton, & Blackman, 2016; Willis et al., 2015). Often care gets missed, or misunderstood, and there are unnecessary duplications between services (Finlayson et al., 2012). Additionally, there is a focus on the physical illness with little attention to the psychosocial impact on the patient and their family or carer. As LTCs continue to increase in prevalence and complexity, so too does the cost to the health care system, thus it is imperative that new ways of care delivery should be investigated (Hunt, Kreiner, & Brody, 2012; World Health Organization, 2010).

Alternative service delivery options are being explored in many countries, particularly nurse-led co-ordination. Results of these programs include increased patient self-management and reduced service costs (Chow & Wong, 2014; Parker & Fuller, 2016). For example, Iles and colleagues (2014) demonstrated an economic benefit sustainable through the Medicare Benefits Schedule of the care provided by practice nurse-led care. Few longitudinal studies have examined the effectiveness of nurse-led programs in the management of LTCs, and this study of the newly introduced Navigator (nurse-led) program aims to address this effectiveness gap.

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Navigators were recently introduced into two regional health services, providing navigation and support for patients who have LTCs. The key principles of the navigator service are to co-ordinate patient centred care that will support health partnerships, thus improving patient outcomes and facilitating systems improvement. Navigators work with multidisciplinary teams, providing a central point of communication and co-ordination for the patient, facilitating a seamless journey through the hospital system, whilst providing patient education to encourage self-management.

The research framework for this evaluation is based on a successful pilot study of a nurse-led chronic respiratory program conducted in one region now employing navigators (Harvey, Buckley, & Scott-Chapman, 2015; Harvey et al., 2017). The pilot study demonstrated individualised care managed in the community could be achieved within existing budgets. Increased patient self-management resulted in improved hospital avoidance. Additionally, the number of unattended outpatient appointments were reduced, while surveillance of at-risk patients increased. This result was achieved in a socially and economically deprived community demonstrating success within a disadvantaged population.

THE STUDY

Aims

This study evaluates the clinical, professional and service effectiveness of navigators. This will be done by examining the trends in social impact and self-management of patients; navigator resilience in co-ordinating LTCs over extended periods; the cost benefit of the evolving models of care; and, the social return on investment.

This evaluation is multifaceted and summarised as:

- Social impact;
- Economic outcomes;
- Models of care variances; and
- Professional capacity and capability

Research Questions

1. How does the implementation of a navigator model impact on self-management of patients living with LTCs or complex health needs in the community?
2. Are there differences in co-ordination between levels of nursing and midwifery practice, contexts of practice and specialty areas of care (e.g. mental health, midwifery, nurse practitioner, general, disease specific, age specific, geographic, levels of care), and can a generic model to navigation services be applied?
3. What are the specific patient characteristics (e.g., demographic variables, wellness) and treatment variables (e.g., discharge events, failure to attend outpatient appointments) that can

identify 'at risk' patients who would benefit most from navigator care?

4. What variables may predict a patient's wellness?
5. What is the impact, on the well-being and resilience of the navigator over time?
6. Can the cost benefit of acute-based care and community-based care using social return on investment methods, quality of life scales, and acute service utilisation be effectively measured, and if so, what is the cost-benefit?
7. Is the new model of care a cost-effective approach from a health system perspective?

Table 1 provides the expected primary and secondary outcomes for the project.

Table 1 Expected outcomes of the navigator evaluation

A hub and spoke approach has been adopted. The hub is the core research team; each spoke is a health service which has its own team of navigators, one of whom is a team leader. Each team leader in the spoke is a partner investigator. The hub and spoke approach is intended to engender continuity of communication across all participating health services and to provide individual health service evaluations as well as an overall evaluation. The dual approach allows health services to meet the unique needs of their population as well as providing an avenue to examine differences and similarities across care delivery, professional practice, and patient need.

Underpinning Philosophy

The study draws on the South Alaskan NUKA model of engagement. This model was selected because of its focus on respect, dignity, shared responsibility and partnership, and advocates health ownership through engagement and building relationships between the person, their family and the community (Gottlieb, 2013). The NUKA model actively engages in relationships between the patient as owner of the healthcare, and services that are the supporters of this health care, with the emphasis being on wellness. Additionally, an inequity-responsive, contextually-tailored, culturally-competent care approach (Browne et al., 2012), provides a guideline for ensuring that the care delivered is tailored to the patient. The model aligns with culturally tailored care, for example, Kaupapa Māori theory where self-determination and culturally acceptable care is important (Forrest et al., 2016; Jackson, 2015) and Aboriginal and Torres Strait Islander peoples as consumers of chronic care services focusing on relationships and cultural sensitivity (Coombe, Haswell-Elkins, & Hill, 2008; Davy et al., 2016).

DESIGN/METHODOLOGY

The evaluation adopts a theory of change (Imas & Rist, 2009), defined as "a systematic and cumulative study of the links between activities, outcomes and context of the initiative" (Fullbright-Anderson, Kubisch, & Connell, 1998, p. 16). It is both a "process and a product", involving a cross section of stakeholders through a "facilitated process of analysis and reflection" (Allen, Cruz, &

Warburton, 2017, p. 957). It follows the same evaluation trajectory as Participatory Action Research (PAR), employing a cyclical approach that reviews the plan, the implementation and the progress of the project, so that changes can be made on a regular basis during evaluation, with progressive improvement being measured at predestined points over time (Sullivan, Francis, & Hegney, 2008). Importantly, PAR identifies specific and planned outcomes which are culturally appropriate (Munns et al., 2017). Theory of Change incorporates the principles of PAR but also “articulates explicitly how a project or initiative is intended to achieve outcomes through actions, while taking into account its context” (Laing & Todd, 2015, p. 3) and is frequently used where political, social and economic factors influence projects, and where development requires evidence of sustainability (Archibald, Sharrock, Buckley, & Cook, 2016). It is particularly useful where there are varying levels of complexity (Allen et al., 2017), as is the case with the navigators.

A mixed methods approach is supported by theory of change as quantitative and qualitative data can be combined to form concurrent or sequential analysis drawn from texts, narratives and statistics (Aarons, Fettes, Sommerfeld, & Palinkas, 2012; Johnson & Onwuegbuzie, 2004). This data collection supports an understanding of the social setting, particularly as individual experiences are an integral part of the evaluation process (Johnson & Onwuegbuzie, 2004). Data can be combined, integrated and triangulated to identify variance, concurrence and convergence and is useful in cases where individual reality adds a layer of complexity, and where information is embedded in local environments (Johnson & Onwuegbuzie, 2004).

Theory of Change models use a Results Based Logic Model (RBLM) to track change over time (Imas & Rist, 2009), allowing lean thinking strategies such as the Social Impact Measurement for Local Economies (SIMPLE) to be employed (McLoughlin et al., 2009). This combination brings a strategic perspective to analysis for the purposes of improving performance ensuring that specific, socially determined activities are effective and sustainable. SIMPLE is made up of four phases - Scope it – Strategic intent; Map it (short, medium and long term effects of activities); Track it (tracking of trends and outcomes); Tell it (providing reports); Embed it (integrating results into organisational practice). This multi-faceted approach allows for a statement of activities to be monitored and measured, based on defined, progressive stages. Figure 1 outlines the integration of these theories and the research design for the navigator project.

Figure 1 – Project Design

DATA COLLECTION

There are five participant groups for this study. Participants will be recruited during the first six months of commencement of a health service in the evaluation, and they will be followed up every six months for a period of two years. Potential participants will be provided with an information sheet and consent form. Participation is voluntary.

All data collection will occur over two years, at six monthly intervals, these being baseline on consent; 6; 12; 18 and 24 months. Interim reporting of trends and findings will be provided at these times, in keeping with this participatory action research approach to evaluation.

Data collection is divided into patient and family, professional and service. Table 4 outlines the data collection points and the research question they relate to.

Table 2 - Data Collection Points

Patient cohorts. Participants will be asked to complete two surveys at six month intervals; The Meke Wellness Meter (Forrest et al., 2016) that measures social, mental and physical wellness across a range of activities using a scale of 1 (very poor) to 10 (very well); and, the Flanagan's Quality of life Scale (Burckhardt & Anderson, 2003). The EQ-5D-5L quality of life survey will also be completed on admission to, and discharge from, navigator services.

Cohort 1 – This patient evaluation group consists of between 7 and 20 LTC patients per navigator, who are registered and receiving care with navigation services. Patients will be provided with written information on the evaluation and a consent form. This cohort will also be asked to relate one event that they managed at home effectively. A guide for this activity is provided.

Cohort 2 – The comparative patient group consists of 15 LTC patients per health service, who are not registered with navigation services but are under the care of acute specialist services and attending nurse-led clinics. Recruitment will occur through the hospital database and patients will be invited to join the evaluation.

Patients may sign consents with the navigators, or send/email consents directly to the lead researcher. A member of the research team will then make contact with the patients, confirming their consent and establishing best mode of contact for follow-up activity. Navigators will perform baseline measures of the Meke Wellness Meter, the Flanagan's and the EQ-5D-5L questionnaires on their patients, uploaded to the hospital data system. Thereafter all six monthly patient follow-up will be undertaken by research assistants especially contracted to undertake this work. There will be no further involvement from the navigators.

Cohort 3 are family member/carers of cohort 1 participants. Potential participants will be offered the opportunity to participate in the evaluation, and will be provided with an information sheet and consent form, give to the patient for discussion. Patients decide on whether they want to invite a family member to participate in the evaluation. The research team will follow-up all family members on receipt of their signed consent. Family members will be asked to complete a Meke Wellness Meter and Flanagan's Quality of life at 18 months into the evaluation.

Parents of children who are too young to sign their own consent will participate on behalf of their children, completing the Meke Wellness Meter and Flanagan's Quality of life every six months.

Cohort 4 (+/- 120 navigators) working in health services participating in the evaluation. Navigators will be provided with an information sheet and consent form. Navigators will be asked to provide a code of three letters and three numbers which they will use for all activity related to their participation. In signing the consent form the nurse navigator agrees for the research team to recruit patients, and to complete at six month intervals a questionnaire addressing wellbeing and resilience. They will be asked to provide a vignette at least once every 12 months describing how they have supported patient self-management and hospital avoidance (template provided), and, at least one detailed case study in two years (template provided).

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Navigators will be provided with a link to the online resilience and wellbeing survey, the results from which are download directly to a database specific to this activity (Table 3). Two members of the research team (registered nurse and psychologist) will be in control of data. Any issues emerging will be discussed directly with the navigator. If necessary, they will be advised to make an appointment with their medical provider, or provided with employee assisted support through existing employment channels. No individual information will be shared with their health service or managers.

Table 3: The Resilience and Wellbeing Survey for Navigators

Cohort 5 are health services. Although considerable collaboration has occurred with industry partners, participating health services will be asked to sign a consent for access to hospital data and service evaluation. This will include monthly meetings included in routine navigator monthly service meetings, and a six-monthly review. The six-monthly reviews follow inequity-responsive guidelines advocated by Browne et al., (2011) and services will be provided with data trends to review and identify areas of need and/or improvement.

Inclusion and Exclusion Criteria

Inclusion criteria are the health services participating in the study; navigators working in the participating health services; and patients and their carers who are receiving care from participating navigators.

Table 4: Inclusion and Exclusion Criteria

ETHICAL CONSIDERATIONS

Multi-site ethics were approved by the region's Health Research Ethics Committee and the lead university's ethics committee (numbers inserted on acceptance). The evaluation runs over two years from June 2018 in the first region, and September 2018 in the second region. Each participating health service requires site specific approval before commencing data collection ensuring adherence with industry, academic and research protocols; and reporting and management of research by industry and university policy.

Data will be coded and de-identified before analysis. No identifiable information will be used in any report or publication. No navigator or patient will be put at risk in their employment or treatment in any way. Participation is voluntary, and participants may discontinue their involvement in the project at any time.

ANALYSIS

In keeping with the theory of change process, health services will be provided with a review of the data every six months. This will coincide with the six monthly review meetings to provide health services with discussion points to review practice and make changes to service delivery. A final report will be provided on completion of the project to participating health services and the funder. The following discussion outlines how data will be used in analysis.

Table 5 matches the analysis against the research questions. Refer also to Table 2, data collection points that outline exact data collection and which questions they address.

Table 5 – Analysis in accordance with research questions

- 1) *Mapping all data* will be used to generate discussion with the health service at the 6 monthly reviews. It will also be used for verifying results and themes emerging across the data, and within the individual health services. It allows for construction of a conceptual picture of elements making up the evaluation, allowing for a greater understanding of phenomena (Imas & Rist, 2009). Given the hub and spoke concept, each participating health service contributes to the overall evaluation, and evaluates the service at each six-month review. This allows for differences between health services to be examined, whilst also analysing the similarities between them. This is important when looking for generic models of care, economic effectiveness, social variance, and professional difference.
- 2) *Descriptive statistics* will be used to detail patient demographic characteristics. Inferential statistics based on correlations such as Chi-squares will be conducted to examine binomial relationships between participant variables. Specific associations between presumed predictors and outcomes will be examined via regression analyses. The associations between the demographic and condition variables will be explored. We are particularly interested in seeing any correlations related to age and condition; geographical location and quality of life; geographical location and failure to attend outpatient appointments; location and access to navigator services. For each of the latter relationships, we will examine the potential conditional effect of navigation intensity on the relationship between the variables.
- 3) *Multilevel Longitudinal Models (MLM)* will be applied in instances predicting change over time in our outcome variables of interest (e.g. Flanagan QoL scale scores). Multi-level modelling is a technique that accounts for the random variation in starting points per participant on the variables of interest, while also accounting for the likelihood of similarities in participants within nested conditions (e.g., being treated by the same nurse), thereby providing a better likelihood of enhanced model validity in comparison to traditional ANOVA or similar methods. Furthermore, multi-level modelling is robust to missing data.
- 4) *Social Return on Investment (SROI)* is defined as “a systematic analysis of the effects of an organisation on its communities of interest or stakeholders, with stakeholder input as part of the data that are analysed for the accounting statement (Moodey, Littlepage & Paydar, 2015, p. 21). The Flanagan’s QoL and the Meke Meter will be graded (Flanagan’s, \$1.00 per point graduation; Meke Meter, 10c per increment over all scales). The social impact value is the total score that a patient assigns to the scales, whilst the initial investment amount is the total initial investment score. By using the Flanagan’s QoL and the Meke Meter, we can review total scores as quality of life scores, and we can also examine correlations and variances against each question and parameter based on the indicative economic value.
- 5) *A cost-benefit analysis (CBA)* encompassing acute service and community indicators. CBA allows the assessment of all options that are available to achieve a desired outcome, and is considered a key tool for the development of evidence-based policy (Moody et al, 2015). Indicative cost values will include acute service savings through a reduction in patient beddays, admissions and re-admissions, reduction in patients failing to attend appointments, and in the community through the increasing financial value assigned in the Flanagan’s QoL scale and the Meke Meter.

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- 6) *A cost-effectiveness analysis* is also proposed, where the effectiveness of the new model of care is compared to the usual model of care, relative to their costs. This analysis will allow decision-makers to assess whether investment in the new intervention provides good value for money, from a health system perspective. Given the current budgetary climate, this information is vital for decision-makers who are tasked with gaining maximum health gain from a non-increasing budget.
 - 7) *Quality of Life of patients and family members/carers* will be analysed as a trend across scores from the Flanagan's QoL and Meke Wellness Meter, looking for evidence of self-management and social impact trends (Burckhardt & Anderson, 2003; Forrest et al., 2016).
 - 8) *Patient narratives* will be used to document critical health events and how the patients managed at home (Collins & Jones, 2006). A question list will be provided to each patient as a guide to responses. This will support the analysis of emerging trends.
 - 9) *Thematic analysis* will be undertaken on all qualitative data, looking for themes and patterns related to wellness and self-management (Patton, 1990). Case studies, vignettes, and patient health related narratives will be interrogated and themes coded. The analysis of this section will involve discussion with nominated managers of the service and researchers. All themes will be categorised, looking for significance/variance/similarities based upon the picture emerging in both the themes and the statistical data.
 - 10) *Hospital Document/policy analysis* will be included because of the cyclical nature of the research. These will be reviewed concerning matters that arise in the regular meetings held with the navigators and the six-monthly review of the data. Analysis will include documenting the changes that have occurred in policy/procedure related to clinical practice or patient related events in the project, where organisational policy that has not been changed as a direct result of navigator input but impacts on the navigators manage their work will be identified.
 - 11) *Navigator Co-ordination* will be evaluated using the Equity Responsive Checklist based on work undertaken by Browne et al. (2012), which will be completed at team meetings every six months. Documented progress, issues and strategies for improvement will be categorised as a quality improvement cycle of 'do and review' so that progressive improvement can be mapped, as well as identifying those enduring issues that influence co-ordination process and outcomes. This will be compared with themes from the case studies and vignettes to form an overall picture of the change that has taken place over the study period.
 - 12) *Level of Navigation* provided will be recorded every six months by the Nurse Navigator Patient Continuum (Office of the Chief Nurse and Midwife): RED (Intensive; Managing); AMBER (Maintaining); GREEN (Transitioning; Discharged). It is important to measure this to examine trends in intensity of care provision against demographics, condition and location. We hope to be able to identify an average length of stay for navigation services, and what sort of issues affect what would then be called the 'outliers' in accordance with economic measures. This will be mapped against the patient data. We also intend to examine differences in length of stay between conditions, specialties and level of nursing practice (e.g. registered nurse, nurse practitioner). This is important to understand, because it may allow navigation services to tailor the nursing positions by clinical need and skills require.
 - 13) *Navigator wellbeing and resilience* - Mean scores and standard deviations for each measure will be calculated. Second, bivariate or point-biserial correlations will be conducted to examine relationships among the study variables. Finally, to test for the relative importance of demographic variables (age, length of experience, type of navigators) and individual variables

(resilience, burnout, secondary traumatic stress, compassion satisfaction) a hierarchical regression will be conducted. Analysis within one month of each data collection time point will allow for early intervention and support for nurses in the health services. It should be noted that none of these data are a diagnosis of any condition. However, they may point to the need for further investigations. Nurses will be advised to contact a provider such as their general practitioner, or the employee assistance program or other programs if their results indicate that they need follow up (i.e. higher on the burnout scale than the normal population). We have used this process in previous studies with excellent outcomes.

- 14) *Final analysis* will map and compare statistical analysis and trends alongside all qualitative data to form a complete picture of co-ordination and the impact it is having on patient outcomes.

Validity and reliability/rigour

Regarding the numbers of patients in cohort 1, Spybrook et al.'s (2011) Optimal Design Plus V 3.0 software is used to estimate the required sample size for clustered repeated measures trials for a person-level outcome aiming to achieve Power = 0.80. Working on a possibility of between 80 to 100 navigators, seven participants per navigator is suggestive of meeting this requirement, assuming a change of approximately 0.4 standard deviations in magnitude (i.e., effect size) or greater. More participants per navigator cluster would understandably enhance the likelihood of avoiding type I errors however, and would permit detection of smaller effects should they exist. Therefore the goal of 20 participants per navigator should remain worthwhile. In terms of participant attrition, Heo (2014) notes typical attrition rates between 20% to 30% over the span of longitudinal investigations, and suggests that multiplication of an intended sample size by a factor to account for attrition (i.e., 1.25 and 1.43 for 20% and 30% attrition expectancies, respectively) is an approach that provides a safeguard against anticipated falloff in participant numbers. Applying this to the minimum per-navigator sample sizes outlined prior, this would suggest a minimum of 10 participants per cluster would provide adequate protection against attrition and retain adequate statistical power in the multilevel modelling analyses when assuming the conservative 30% rate of attrition.

Cross referencing of data occurs throughout the data collection, which along with the six-monthly review process, allows for interrogation of data and analysis across a range of activity.

In regards to the use or not, of a control group we need to be concerned about propensity and thus we chose the comparison group (cohort 2). The patients the navigators take on tend to be the sickest in their cohort. Getting a useful homogeneous comparison has proven to be difficult because measuring "how sick" someone is with chronic disease is very difficult, particularly when administrative datasets are used. Therefore, although this is not a control group, a comparative analysis will be undertaken, which is important in terms of evaluating models of care and the different levels of nursing practice that is applied to such care. Change over time will be measured on the variables of interest after accounting for the nested nature of the data (i.e., the participants treated by the same nurse are likely to be more similar in outcomes to one-another), and see which variables relevant to patients might be influencing this change over time.

The choice of the Theory of Change alongside the Results Based Logic Model, SIMPLE approach and models focusing on patient-centred care, were carefully considered. The use of three levels of data and multi-level analysis mapping allows for analyses to address social, financial, professional and service perspectives. The results are aimed at identifying sustainability of nurse-led models of care and cost savings from an economic and social perspective.

The research team on this project were chosen for their expertise. In addition early career researchers appropriate to the study, were included. Doctoral students will work with the team in accordance with ethical guidelines. Lead authorship on publications will be follow expertise and input. Industry partners will be invited to participate in publications and conference presentations where ethically appropriate. These inclusions support industry-academic partnerships in research and translation to practice and ensures clear support and development essential for workforce succession planning.

Limitations

As indicated previously, it is not possible to have a patient control group for ethical and clinical reasons. It is hoped that the participants in the comparative group will be able to provide useful differences in care for the final analysis. Using the comparison group may provide insights into the different nursing models of care that may be useful in the final analysis.

DISCUSSION

This study is essential in the face of increasing care costs and multimorbidity. The need to find ways to effectively manage care in the home with nurses supporting that approach is key to cost effective, socially appropriate care. Co-ordination of such a large and complex project is a challenge, however, industry partnerships have been welcomed, with many of the health services realising that this project will support care into the future. Logistical expediency and open communication is key to completion.

The benefits of this evaluation to patients and their families lies in the fact that such models of care may demonstrate positive support to self-management, and reduced hospital stays, as well as providing a central point of contact through navigator co-ordination between multiple services. For patients with LTCs this is important in normalising life as much as possible.

For nurses, it offers the opportunity of an alternate clinical career pathway if the model of care proves to be effective. It may also improve communication between the members of the multidisciplinary team thus enhancing continuity of care of patients and their families/carers. The well-being and resilience results will also provide an indication of the need, or otherwise, for resilience building in this nursing population.

For health services, a positive outcome will potentially streamline care in accordance with Australian and New Zealand national health strategies, realise cost savings and achieve a reduction in avoidable hospital admissions.

CONCLUSION

This evaluation is multi-level longitudinal model that examines economic benefit, social impact, models of care and professional capacity. Few studies focus on all these elements. The findings from this study are important in that it will add to existing research on co-ordination, and specifically on the capacity and capability to nurse-led co-ordination that addresses all aspects of patient-centred care. The need for such novel models of care are important in the face of escalating care costs and a rapidly increasing chronicity in conditions, and in finding alternative ways to manage care. It is for this reason that other projects may well arise as a result of the findings from this evaluation.

CONFLICT OF INTEREST STATEMENT

There are no known conflicts of interest for any of the researchers involved in this study.

Intellectual Property stays with the lead university. All validated questionnaires used in this study have been awarded permission for their use in accordance with owners' legal requirements.

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Table 1: Expected outcomes of the navigator evaluation

Primary outcomes	Secondary outcomes
<ul style="list-style-type: none">• Reduced avoidable acute service presentations (RQ1)• Improved attendances of out-patient appointments (RQ1)	<ul style="list-style-type: none">• Improved patient and carer satisfaction and quality of life (RQ 1, 2, 3, 4)• The development of a model of care for navigation services (RQ 3, 4)• Provision of a sustainable model of nurse-led co-ordination that works across all services within a multidisciplinary team (RQ 6)• Social impact outcomes measured as social return on investment. (RQ 6)• Measurement of well-being and resilience in the navigator cohort (RQ 5)• Improved health literacy, health promotion and prevention practices (RQ 3, 4)

Table 2: Data Collection Points

Data Collection	Cohort	Type	Time points	How and Where	Research Question
Patient data related to hospital avoidance and service utilisation	All consented patients n= +/- 2400 Comparison group /HHS n = +/-135	Quant Economic	Baseline; 6; 12; 18; 24 months	Hospital information systems Excel Spreadsheet	1, 2, 3, 4, 6, 7
EQ-5D-5L Quality of life	All consented patients	Quant	Baseline & upon leaving the navigator service	RA/Research team – online/phone/postal Survey Monkey™	4, 6
Meke Wellness Meter	All consented patients	Quant	Baseline; 6; 12; 18; 24 months	RA/Research team – online/phone/postal Survey Monkey™	1, 2, 4, 6, 7
Meke Wellness Meter	1 family member per cohort 1 participant	Quant Economic	18 months	RA/Research team – online/postal/phone Survey Monkey™	1, 2, 4, 6
Flanagan's QoL	All consented patients	Quant Economic	Baseline; 6; 12; 18; 24 months	RA/Research team – online/phone/postal Survey Monkey™	1, 2, 4, 6, 7
Flanagan's QoL	1 family member per	Quant	18 months	RA/Research team –	1, 2, 4, 6

Data Collection	Cohort	Type	Time points	How and Where	Research Question
	cohort 1 participant	Economic		online/postal/phone Survey Monkey™	
Client health related narratives	All consented Cohort 1 participants	Qual	One per patient	RA/Research team – online/phone/postal Survey Monkey™	1, 2, 3, 4
Navigators Position (RN; CNS; NP); Specialty (general; R&R; community; MH; Midwifery; acute; rehab) HHS	n= +/- 120	Quant	Baseline; 6; 12; 18; 24	Participant on consent to participate	2, 4, 6
Vignettes	Navigators	Qual	6; 12; 18; 24 months	Online – Survey Monkey™	1, 3
Case studies	Navigators	Qual	12; 24 months	Online – Survey Monkey™	1, 3
Resilience and wellbeing survey	Navigators	Quant	Baseline; 6; 12; 18; 24 months	Online – Survey Monkey™	5, 7
Equity responsive checklist (6 monthly review)	Navigators and team	Qual	6; 12; 18; 24 months	Online – Survey Monkey™	1, 2, 3
Hospital policies (6 monthly review)	Navigators and team	Qual	6; 12; 18; 24 months	Online – Survey Monkey™	4, 6
Action learning groups (Monthly meetings)	Navigator team and manager	Qual	Monthly	Online – Survey Monkey™	2, 3, 4

Data Collection	Cohort	Type	Time points	How and Where	Research Question
Policy documents related to co-ordination (6 monthly review)	Navigators and team	Qual	12;24 months	Hospital team with researchers	4, 6

Table 3: The Resilience and Wellbeing Survey for Navigators

Construct Measured	Name of Measure	Description
Resilience	<i>Connor-Davidson Resilience Scale (CD-RISC-25)</i> (Connor & Davidson, 2003)	25-item measure of resilience utilising a 5-point Likert Scale. Example item: 'Even when things look hopeless, I don't give up'.
	<i>State-Trait Assessment of Resilience Scale (STARS)</i> (Rees)	10-item measure using a 7-point Likert scale. It has two sub-scales, one measuring state resilience and the other measuring trait resilience. Example item: 'I feel ready to deal with life's ups and downs'.
Wellbeing	<i>The WHO (Five) Well-being Index [WHO Five]</i> (Topp, et al., 2015)	Five items rated on a 5-point Likert scale. Example item: 'I have felt calm and relaxed'.
Affect	<i>Positive and Negative Affect Scale [PANAS]</i> (Watson et al., 1988)	20-item measure of affective state that uses a 5-point Likert scale. It has two sub-scales; one measuring positive affectivity (PA) and the other negative affectivity (NA).
Burnout	<i>Burnout Measure –Short Version</i> (Malach-Pines, 2005)	10-item version of the original 21-item scale. Example item: 'Difficulties sleeping'.
Job Strain	<i>General Health Questionnaire</i> (Goldberg & Williams, 1988)	A 12-item measure that captures general psychological distress using a 4-point Likert Scale. Example item: 'Felt constantly under strain'.
Professional Quality of Life	<i>The Professional Quality of Life Scale version 5</i> (Stamm, 2016)	30-items, five-point Likert scale, containing three 10-item subscales (compassion satisfaction, compassion fatigue & burnout). Example item: 'My work makes me feel satisfied'.
Coping	<i>Cybernetic Coping Scale</i> (Brough, et al., 2005)	14-item measure of coping with a 6-point response format acknowledging the function of coping as both an independent variable and an outcome. Example item: 'I refused to think about the problem'.
Mindfulness	<i>Cognitive and Affective Mindfulness Scale, Revised (CAMRS-R)</i> (Feldman et al., 2007)	20-item self-report measure of trait-based mindfulness, using a 4-point Likert scale. Example item: 'I am able to focus on the present moment'.
Team climate	Team Work Scale (Kivimaki et al., 2001)	14-item measure using a 5-point Likert scale.

		Example item: 'We have a "we are together" attitude'.
Empowering Leadership	Empowering Leadership Scale (Amundsen & Martinsen, 2014)	18-item measure using a 7-point Likert scale. Example item: 'My leader encourages me to take initiative'.
Job Satisfaction	<i>Abridged Job in General</i> (Russell et al., 2004)	8-item scale, a short version of the previous Job in General Scale.
Attrition	<i>Three-item Turnover Intention Scale</i> (Jaros, 1991)	Three items using a five-point Likert scale measures how often respondents consider leaving their occupation, and likelihood of leaving their occupation in the future. Example item: 'How likely is it that you would leave your organisation in the next year?'

Table 4: Inclusion and Exclusion Criteria

Participant groups	Inclusion Criteria	Exclusion Criteria
Patients	<p>Study group:</p> <ul style="list-style-type: none">• All patients with LTCs who are admitted to the HHS during the study period and are assigned to navigation services• One nominated family member/primary carer of the participating patients. <p>Comparison group:</p> <ul style="list-style-type: none">• Patients with LTCs who are admitted to the HHS during the study period and have not been assigned to navigator services (i.e. being cared for by specialist services through nurse- led clinics)	<ul style="list-style-type: none">• Patients who are not diagnosed with LTCs or complex needs, who are not being provided a service by the navigator or the other nurse-led “usual care” services.• Patients who are, in the opinion of the nurses, not cognitively able to provide informed consent.• Family members/carers who are not nominated by the participating patient.• More than one family member/carers per patient. <ul style="list-style-type: none">• Patients who do not have LTCs• Patients with LTCs but who are not being cared for by specialist services through nurse- led clinics or navigator services
Nurses	<ul style="list-style-type: none">• Nurses and midwives employed as navigators in a participating health service.	<ul style="list-style-type: none">• Nurses and midwives who are not employed by a participating health service as a navigator.• Nurses and midwives from a health service not participating in the evaluation.• Navigators from a health service who are not participating in the evaluation.
Health services	<ul style="list-style-type: none">• Health services who employ navigators and who have consented to participate in the evaluation.	<ul style="list-style-type: none">• Health services who do not employ navigators• Health services who have not consented to participate in the evaluation.

Table 5: Analysis in accordance with research questions

Qu#	Question	Elements for analysis
1.	How does the implementation of a navigator model impact on self-management of patients living with LTCs or complex health needs in the community?	<p>Mapping all the data</p> <p>Descriptive statistics</p> <p>Multilevel longitudinal modelling</p> <p>Social return on investment</p> <p>Cost benefit analysis</p> <p>Cost effectiveness analysis</p> <p>Quality of life of patients family and carers</p> <p>Patient narratives</p> <p>Thematic analysis</p> <p>Navigator co-ordination</p> <p>Level of navigation</p> <p>Final analysis</p>
2.	Are there differences in co-ordination between levels of nursing and midwifery practice, contexts of practice and specialty areas of care (e.g. mental health, midwifery, nurse practitioner, general, disease specific, age specific, geographic, levels of care), and can a generic model to navigation services be applied?	<p>Mapping all the data</p> <p>Descriptive statistics</p> <p>Multilevel longitudinal modelling</p> <p>Quality of life of patients family and carers</p> <p>Patient narratives</p> <p>Thematic analysis</p> <p>Navigator co-ordination</p> <p>Level of navigation</p> <p>Final analysis</p>
3.	What are the specific patient characteristics (e.g., demographic variables, wellness) and treatment variables (e.g., discharge events, failure to attend outpatient appointments) that can identify 'at risk' patients who would benefit most from navigator care?	<p>Mapping all the data</p> <p>Descriptive statistics</p> <p>Multilevel longitudinal modelling</p>

Qu#	Question	Elements for analysis
4.	What variables may predict a patient's wellness?	<p>Mapping all the data</p> <p>Descriptive statistics</p> <p>Multilevel longitudinal modelling</p> <p>Quality of life of patients family and carers</p> <p>Patient narratives</p> <p>Thematic analysis</p>
5.	What is the impact, on the well-being and resilience of the navigator over time?	<p>Navigator co-ordination</p> <p>Level of navigation</p> <p>Navigator wellbeing and resilience</p> <p>Multilevel longitudinal modelling</p>
6.	Can the cost benefit of acute-based care and community-based care using social return on investment methods, quality of life scales, and acute service utilisation be effectively measured, and if so, what is the cost-benefit?	<p>Mapping all the data</p> <p>Descriptive statistics</p> <p>Multilevel longitudinal modelling</p> <p>Social return on investment</p> <p>Cost benefit analysis</p> <p>Cost effectiveness analysis</p>
7.	Is the new model of care a cost-effective approach from a health system perspective?	Final analysis

Figures - Nurse Navigator Project

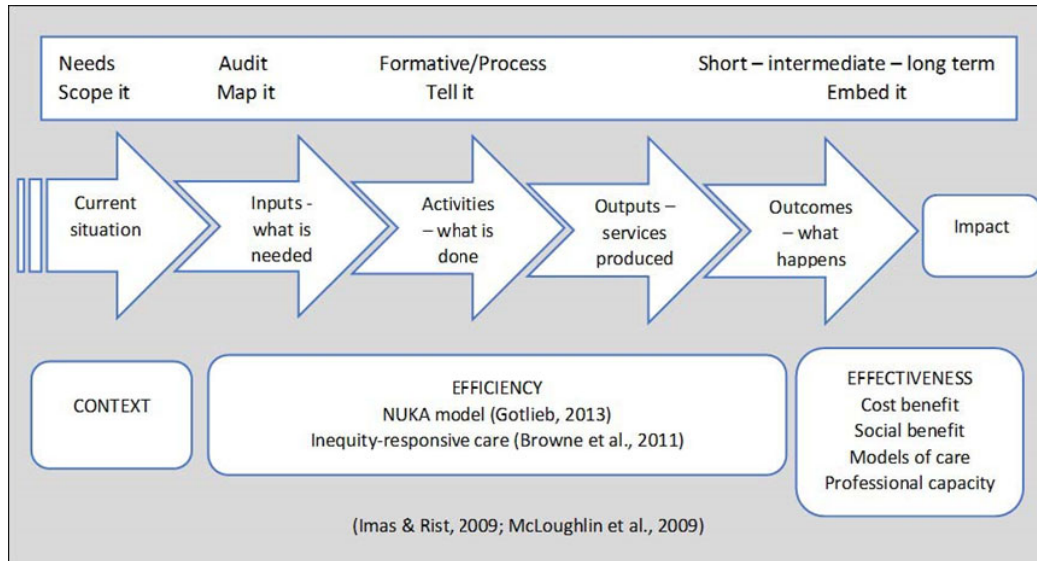


Figure 1 Project design