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Title

Protocol: a systematic review and meta-analysis of the effectiveness of community-based health services by nurse practitioners

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Abstract

Introduction: In order to realize universal health coverage in an ageing society, adequate provision of appropriately trained human resources is essential. The nurse practitioner (NP) is a type of advanced practice nurse who is capable of providing treatment and care including assessment, inspection, prescription and consultation. Previous systematic reviews that examined NPs effectiveness in all settings identified higher levels of patient satisfaction with services provided by NPs than by medical doctors (MDs). As non-communicable diseases become a major health burden requiring long-term health care in community settings, this systematic review aims to assess the effectiveness of NP services and to determine whether their practice is an effective alternative to that of MDs in community settings.

Methods and analysis: Relevant randomized controlled trials (RCTs) and cluster RCTs will be searched in the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, CINAHL and the British Nursing Index. We will assess interventions comparing treatment and care provided by NPs in community settings with that provided by MDs. Outcomes will include hospitalization, mortality, and biological data including blood pressure and blood sugar level. Two authors will independently screen studies for inclusion and will resolve differences by discussion and if required through consultation with a third author. The risk of bias of included studies will be assessed using the Cochrane Collaboration *risk of bias* tool. Meta-analysis of included studies will be conducted using a fixed-effect model or a

random-effects model depending on the degree of between-study heterogeneity. Results will be presented using risk ratios with 95% confidence interval for dichotomous outcomes and standardized mean differences with 95% confidence interval for continuous outcomes.

Ethics and dissemination: This systematic review and meta-analysis protocol does not require ethical approval. We will disseminate the findings of this systematic review and meta-analysis via publications in peer-reviewed journals.

Review registration: PROSPEROCRD42014009627.

Introduction

The percentage of the world's population over 60 years of age is estimated to double from approximately 11% to 20% by 2050.[1] In order to realize and sustain universal health coverage (UHC) in an ageing society, adequate provision of well-prepared human resources for health (HRH) is essential.[2] Nurses constitute the largest profession in the world,[3] and are the front-line – often the only – healthcare personnel available to the population, especially in a community setting. It is therefore important to secure a practical environment that enables nurses to optimize their expertise to provide high quality of services.

A nurse practitioner (NP) is a type of advanced practice nurse (APN) defined by the International Council of Nurses as "a registered nurse who has acquired an expert knowledge base, complex decision-making skills and clinical competencies. A master's degree is recommended for entry-level positions".[4] Although many countries have introduced an NP system, the status of education, regulations, code of practice and competencies vary substantially across countries and regions.[5] Many countries with limited HRH are seeking ways to improve the efficiency of healthcare delivery, and utilizing NP is one solution that may enable the provision of primary health care with advanced scope of practice. For instance, in a community setting where NPs are the first point of contact, such as at a nursing home, geriatric health care facility, home-visit nursing agency, in the home or at the clinic,

the NP provides treatment and care including assessment, inspection, prescription and consultation.[6]

With non-communicable diseases (NCDs) becoming a major burden on population health globally,[7] the credentials and competencies of NPs may be beneficial in the management of NCDs, which requires long-term care in primary-care settings, especially in countries with an increasing ageing population. Moreover, NPs are in charge of managing community health in countries with few medical doctors (MD).[8] It is essential to assure that NP practice is sufficiently effective to make up the shortage of MDs, and/or can be equivalent to care provided by MDs in a community setting.

Two comprehensive systematic reviews have previously assessed NP practice.[9, 10] One review conducted in 2002 examined the equivalence of services provided by NPs and by MDs in primary care.[9] This systematic review and meta-analysis of 11 trials and 23 observational studies identified higher levels of patient satisfaction with services provided by NPs than by MDs, and no significant difference in patient health status, prescriptions and return consultations. The other review quantified APN outcomes, including NPs, from articles published in the US between 1990 and 2008.[10] This study identified 14 trials including 12 high quality scaled studies and 23 observational studies. From these trials, NP practice

outcomes were summarized in dimensions of patient satisfaction, self-rated health, physical function, and biological data such as blood sugar control, lipid control and blood pressure. These outcomes were compared with the same outcomes in patients whose care was managed exclusively by MDs. However, no systematic review and meta-analysis has focused on NP practice specifically in a community setting. As services provided by NPs vary depending on the setting, we will conduct a systematic review and meta-analysis focusing on NP practice in the community settings.

Objectives

To investigate whether monitoring, assessment, counseling, education and prescription provided by NPs results in statistically significantly different patient outcomes from those provided by MDs in a community setting.

Methods

Type of Studies

Randomized controlled trials (RCTs) and cluster RCTs of interventions comparing NPs and MDs will be included. We will not include quasi-RCTs and cross-over trials.

This review protocol has been registered with the International Prospective Register of Systematic Reviews (PROSPERO) at the National Institute for Health Research and Center

for Reviews and Dissemination (CRD) at the University of York (registration number: CRD42014009627).

Type of participants

The participants will be adults receiving treatment and care from NPs in a community setting. Community settings include nursing homes, geriatric health care facilities, home-visit nursing agencies, patient homes, and clinics that cover all areas except hospital inpatients.

Type of intervention

The types of interventions included will be as follows: first contact and assessment of patient at clinics, follow-up and monitoring of patient health and medical plan adherence, counselling and education for preventing non-communicable disease (NCDs), continuity of care and hospital re-admission, disease symptom management, and medication prescription for management of NCDs and disease symptoms. All interventions are provided by NPs in a community setting.

Type of outcome measures

Primary outcomes

1. Hospitalization [times/year]

2. Patient mortality
3. Biological data: cholesterol level [g], blood pressure [mmHg], blood sugar [mg/dl], and Hemoglobin A1c [%]

Secondary outcomes

1. Cost [International Dollars or US dollars]
2. Patient satisfaction
3. Self-reported perceived health
4. Pressure ulcers
5. Functional status (ADL/IADL)
6. Emergency department visits [times/year]
7. Length of hospital stay [days]

Search strategy and sources

We will report data following the PRISMA statement.[11] A comprehensive literature review using the databases MEDLINE, EMBASE, CINAHL, British Nursing Index, and Cochrane Central Register of Controlled Trials (CENTRAL) will be performed. Search strategies will be tailored to each database so as to employ the correct MeSH terms. Where possible both MeSH and free text terms with synonyms will be used so as to increase identification of

potentially relevant studies. Where MeSH terms are not used, free text only will be used. A separate search of Web of Science will be undertaken in order to capture any grey literature. Reference list reviews of included papers will be carried out. No language restrictions will be applied to the searches.

Data collection and analysis

Inclusion criteria

1. Participants: Adult patients who received treatment and care by NPs or by MDs in the community setting.
2. Study design: RCTs including cluster RCTs
3. Intervention site: Community setting including nursing homes, geriatric medical care facilities, geriatric health care facilities, home-visit nursing agencies, patient homes, and clinics.
4. Intervention: monitoring, assessment, counseling, education and medication prescription to elderly people, patients with chronic diseases, and patients discharged from hospitals. All interventions are provided by NPs in a community setting.
5. High-income countries based on World Bank criteria in 2013 or countries that require NP to hold a master's degree.
6. Published original articles (full-text available including theses) published from 1990 to

2014. The time period was chosen because the scientific and organizational basis of clinical practice and intervention changed in1990.[10]

Exclusion criteria

1. Excluded studies: Observational studies, quasi- randomized and cross-over trials.
2. Excluded intervention sites: Inpatient care at hospitals
3. Excluded participants: Children
4. Excluded publications: Non-academic articles and articles published before 1990

Data extraction and management

The study title and abstract will be screened by two authors in the review group independently to identify eligible studies. Two authors in the study group will manually enter data into a standard data extraction form based on the Cochrane Handbook for Systematic Reviews of Interventions,[12] to determine the eligibility of each study. Any disagreements will be solved by discussion. If there is any discrepancy between the two authors, we will consult with other authors (EO, SaM and KS) for expert opinion. When there is unclear information in the process of data extraction, we will contact authors of the original studies to provide further information.

Assessment of risk of bias in included studies

The risk of bias in included studies will be assessed using the *Risk of Bias* tool according to the Handbook.[12] We will use the following criteria to assess the risk of bias: random sequence generation, allocation sequence concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective outcome reporting and other bias.[12] Evaluation of whether or not included studies are eligible for meta-analysis will be conducted by four authors (MK, EO, HF and SG), and in the event of disagreement, we will consult with other authors (EO, SaM and KS) for expert opinion.

Measurement of treatment effect

Statistical analysis will be carried out using RevMan 2014.[13] For dichotomous outcomes including hospitalization, patient mortality and emergency department use, risk ratios with 95% confidence intervals will be used to assess differences in the outcomes of treatment and care provided by NPs compared to MDs. For continuous outcomes including biological data, cost, patient satisfaction, self-reported perceived health, and functional status (ADL/IADL), standardized mean differences with 95% confidence interval will be calculated.

Missing data

We will assess levels of attrition for included studies, and conduct sensitivity analysis of the impact of including studies with 20% or more of missing data. For all outcomes, we will conduct intention-to-treat analysis wherever possible.

Assessment of publication bias

If a sufficient number (10 or more) of studies are eligible for meta-analysis, funnel plots will be used to in order to assess reporting bias by checking funnel plot asymmetry.

Strategy for data synthesis, assessment/investigation of heterogeneity

We will use a fixed-effect model for combining data if the interventions examined in the studies are judged to be the same based on the heterogeneity between studies, and methods are fairly similar. We will use a random-effects model when the interventions in the studies are considered to have clinical heterogeneity or there is substantial heterogeneity between studies. The results of the random-effects model will be used as the average range of possible intervention effects with 95% confidence intervals, and the estimates of Tau-squared and I-squared and difference of clinical implication between interventions will be discussed.

Analysis of subgroups or subsets

If any substantial heterogeneity is identified through analysis of Tau-squared and I-squared statistics, subgroup analysis will be conducted for primary outcomes in the following characteristic groups.

1. Type of facility: Geriatric health care facilities, home-visit nursing agencies, clinics and hospitals
2. Gender: Males versus females
3. Age group: Less than 40 years versus 40 years and over
4. Type of intervention: Prevention, inspection, treatment including prescription, follow-up of patients and training of other health care providers

Subgroup differences will be assessed by interaction tests. The results of subgroup analyses will be reported quoting the I-squared statistic and p-value, and the interaction test I-squared value.

Discussion

This review and meta-analysis will play an important role in consolidating evidence on the effectiveness of health services provided by NPs, especially where they play a role in managing non-communicable disease, supporting continuity of care between hospital and community, and monitoring and supporting the health of elderly people. Information on which NP activities are effective in improving health outcomes will further drive efforts to

develop an effective NP utilization strategy to support and sustain UHC through provision of high quality care at low cost in community settings.

Acknowledgements

We would like to thank Ms. Miwako Segawa for devising a search strategy for this review.

Contributorship statement

MK conceived and designed the review, completed PROSPERO registration and wrote primary draft. EO and HF conceived and designed the review, provided content expertise and revised the manuscript. SG provided content expertise in the part of statistical analysis and revised the manuscript. ShM, YK and EN were involved in the design of the review setting the outcomes of review, inclusion and exclusion criteria. SaM and KS contributed to content expertise and feedback and to provide important intellectual contents. All authors read and approved the final version of the protocol for submission.

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Abstract

Introduction: To realize universal health coverage in an ageing society, adequate provision of appropriately trained human resources is essential. The nurse practitioner (NP) is an autonomous and independent, advanced practice nurse capable of providing treatment and care that can be substituted for some aspects of a medical doctor's (MD) role, especially in a community setting. Previous systematic reviews found higher levels of patient satisfaction with services provided by NPs than MDs. As non-communicable diseases become a major health burden requiring long-term health care in community settings, this systematic review aims to assess the equivalence of NP services to standard care provided by MDs and to determine whether their practice is an effective alternative to that of MDs in community settings.

Methods and analysis: Relevant randomized controlled trials (RCTs) and cluster RCTs will be searched in the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, CINAHL and the British Nursing Index. We will assess patient and health system utilization outcomes of interventions comparing treatment and care provided by NPs in community settings with that provided by MDs. Two authors will independently screen studies for inclusion, consulting with a third author where necessary to resolve discrepancies. The risk of bias of included studies will be assessed using the Cochrane Collaboration *risk of bias* tool, and quality of evidence using the GRADE approach. Meta-analysis of included studies will

be conducted using fixed-effect or random-effects models depending on the degree of between-study heterogeneity. Results will be presented using risk ratios with 95% confidence interval for dichotomous outcomes and standardized mean differences with 95% confidence interval for continuous outcomes.

Ethics and dissemination: This systematic review and meta-analysis protocol does not require ethical approval. We will disseminate the findings of this systematic review and meta-analysis via publications in peer-reviewed journals.

Review registration: PROSPEROCRD42014009627.

Introduction

The percentage of the world's population over 60 years of age is estimated to double from approximately 11% to 20% by 2050.[1] In order to realize and sustain universal health coverage (UHC) in an ageing society, adequate provision of well-prepared human resources for health (HRH) is essential.[2] Nurses constitute the largest profession in the world,[3] and are the front-line – often the only – healthcare personnel available to the population, especially in a community setting. It is therefore important to secure a practical environment that enables nurses to optimize their expertise to provide high quality of services.

A nurse practitioner (NP) is a type of advanced practice nurse (APN) defined by the International Council of Nurses as "a registered nurse who has acquired an expert knowledge base, complex decision-making skills and clinical competencies. A master's degree is recommended for entry-level positions".[4] Although many countries have introduced an NP system, the status of education, regulations, code of practice and competencies vary substantially across countries and regions.[5] Many countries with limited HRH are seeking ways to improve the efficiency of healthcare delivery, and utilizing NP is one solution that may enable the provision of primary health care with advanced scope of practice. For instance, in a community setting where NPs are the first point of contact, such as at a nursing home, geriatric health care facility, home-visit nursing agency, in the home or at the clinic,

the NP performs assessments and diagnoses, orders diagnostic and laboratory tests, prescribes medication and offers treatments with a high level of autonomy and independence. Also taking responsibility for case management, the NP monitors patient health and medical plan adherence, offers counselling and education for non-communicable disease (NCD) prevention, ensures continuity of care and manages hospital re-admission, The NP is also responsible for disease symptom management and is expected to show advanced consultation, collaboration, education, research and leadership skills.[4, 6]

With non-communicable diseases (NCDs) becoming a major burden on population health globally,[7] the credentials and competencies of NPs may be beneficial in the management of NCDs, which requires long-term care in primary-care settings, especially in countries with an increasing ageing population. Moreover, NPs are in charge of managing individual health in communities with few medical doctors (MD).[8] It is essential to assure that NP practice is sufficiently effective to make up the shortage of MDs, and/or can be equivalent to care provided by MDs in a community setting.

Two comprehensive systematic reviews have previously assessed NP practice.[9, 10] One review conducted in 2002 examined the equivalence of services provided by NPs and by MDs in primary care.[9] This systematic review and meta-analysis of 11 trials and 23

observational studies identified higher levels of patient satisfaction with services provided by NPs than by MDs, and no significant difference in patient health status, prescriptions and return consultations. The other review quantified APN outcomes, including NPs, from articles published in the US between 1990 and 2008.[10] This study identified 14 trials including 12 high quality scaled studies and 23 observational studies. From these trials, NP practice outcomes were summarized in dimensions of patient satisfaction, self-rated health, physical function, and biological data such as blood sugar control, lipid control and blood pressure. These outcomes were compared with the same outcomes in patients whose care was managed exclusively by MDs. However, no systematic review and meta-analysis has focused on NP practice specifically in a community setting. As services provided by NPs vary depending on the setting, we will conduct a systematic review and meta-analysis focusing on NP practice in the community settings.

Objectives

To investigate whether services delivered by NPs substitution for MDs result in statistically equivalent patient and health system utilization outcomes to standard care provided by MDs in a community setting.

Methods

Type of Studies

Randomized controlled trials (RCTs) and cluster RCTs of interventions comparing NPs and MDs will be included. We will not include quasi-RCTs and cross-over trials.

This review protocol has been registered with the International Prospective Register of Systematic Reviews (PROSPERO) at the National Institute for Health Research and Center for Reviews and Dissemination (CRD) at the University of York (registration number: CRD42014009627).

Type of participants

The participants will be adults receiving treatment and care from NPs in a community setting. Community settings include nursing homes, geriatric health care facilities, home-visit nursing agencies, patient homes, and clinics that cover all areas except hospital inpatients.

Type of intervention

The types of interventions included will be as follows:

- As a first point of contact for patients or clients, perform assessments, order diagnostic and laboratory tests
- Offer diagnoses, prescribe medications and treatments
- Implement procedures

- Take responsibility for case management
- Follow-up and monitoring of patient health and medical plan adherence
- Counselling and education for preventing non-communicable disease (NCDs)
- Ensuring continuity of care and hospital re-admission
- Disease symptom management

All interventions are provided by NPs in a community setting.

Type of outcome measures

Primary outcomes

1. Hospitalization [times/year]
2. Patient mortality
3. Biological data: cholesterol level [g], blood pressure [mmHg], blood sugar [mg/dl], and Hemoglobin A1c [%]

Secondary outcomes

1. Cost [International Dollars or US dollars]
2. Patient satisfaction
3. Self-reported perceived health
4. Pressure ulcers

5. Functional status (ADL/IADL)

6. Emergency department visits [times/year]

7. Length of hospital stay [days]

Search strategy and sources

We will report data following the PRISMA statement.[11] A comprehensive literature review using the databases MEDLINE, EMBASE, CINAHL, British Nursing Index, and Cochrane Central Register of Controlled Trials (CENTRAL) will be performed and an example of search strategy in MEDLINE is shown in Supplementary File 1. Search strategies will be tailored to each database so as to employ the correct MeSH terms. Where possible both MeSH and free text terms with synonyms will be used so as to increase identification of potentially relevant studies. Where MeSH terms are not used, free text only will be used. A separate search of Web of Science will be undertaken in order to capture any grey literature. Reference list reviews of included papers will be carried out. No language restrictions will be applied to the searches.

Data collection and analysis

Inclusion criteria

1. Participants: Adult patients who received treatment and care by NPs or standard care by MDs in the community setting.
2. Study design: RCTs including cluster RCTs
3. Intervention site: Community setting including nursing homes, geriatric medical care facilities, geriatric health care facilities, home-visit nursing agencies, patient homes, and clinics.
4. Intervention: All types of treatment and care provided by NPs in community settings.
5. High-income countries based on World Bank criteria in 2013
6. Countries that require NP to hold a master's degree at the time of the study period. If education qualifications are not clearly mentioned, detailed information will be obtained by contacting authors of the article or by reference to established qualification standards for the country in question where the study clearly specifies that NPs are defined with reference to national accreditation boards.
7. Published original articles (full-text available including theses) published from 1990 to 2014. The time period was chosen because the scientific and organizational basis of clinical practice and intervention changed in1990.[10]

Exclusion criteria

1. Excluded studies: Observational studies, quasi- randomized and cross-over trials.

2. Excluded intervention sites: Inpatient care at hospitals

3. Excluded participants: Children

4. Excluded publications: Non-academic articles and articles published before 1990

Data extraction and management

The study title and abstract will be screened by two authors in the review group independently to identify eligible studies. Two authors in the study group will manually enter data into a standard data extraction form based on the Cochrane Handbook for Systematic Reviews of Interventions,[12] to determine the eligibility of each study. Any disagreement will be solved by discussion. If there is any discrepancy between the two authors, we will consult with other authors (EO, SaM and KS) for expert opinion. When there is unclear information in the process of data extraction, we will contact authors of the original studies to provide further information.

Assessment of risk of bias in included studies

The risk of bias in included studies will be assessed using the *Risk of Bias* tool according to the Handbook.[12] We will use the following criteria to assess the risk of bias: random sequence generation, allocation sequence concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective outcome reporting and

other bias.[12] Studies will be included in meta-analysis if they are of the same type of such as RCTs or cluster RCTs and have the same population, intervention, comparison and outcomes. Evaluation of whether or not included studies are eligible for meta-analysis will be conducted by four authors (MK, EO, HF and SG), and in the event of disagreement, we will consult with other authors (EO, SaM and KS) for expert opinion.

Measurement of treatment effect

Statistical analysis will be carried out using RevMan 2014.[13] For dichotomous outcomes including hospitalization, patient mortality and emergency department use, risk ratios with 95% confidence intervals will be used to assess differences in the outcomes of treatment and care provided by NPs compared to MDs. For continuous outcomes including biological data, cost, patient satisfaction, self-reported perceived health, and functional status (ADL/IADL), standardized mean differences with 95% confidence interval will be calculated.

Missing data

We will assess levels of attrition for included studies, and conduct sensitivity analysis of the impact of including studies with 20% or more of missing data. For all outcomes, we will conduct intention-to-treat analysis wherever possible.

Assessment of publication bias

If a sufficient number (10 or more) of studies are eligible for meta-analysis, funnel plots will be used in order to assess reporting bias by checking funnel plot asymmetry.

Strategy for data synthesis, assessment/investigation of heterogeneity

We will use a fixed-effect model for combining data if the interventions examined in the studies are judged to be the same based on the heterogeneity between studies, and methods are fairly similar. We will use a random-effects model when the interventions in the studies are considered to have clinical heterogeneity or there is substantial heterogeneity between studies. The results of the random-effects model will be used as the average range of possible intervention effects with 95% confidence intervals, and the estimates of Tau-squared and I-squared and difference of clinical implication between interventions will be discussed. Finally we will assess the quality of the following individual outcomes and produce summaries using the GRADE approach

1. Hospitalization
2. Patient mortality
3. Biological data
4. Cost
5. Patient satisfaction

6. Self-reported perceived health

Data will be imported from RevMan 2014 [13] to the GRADE profiler [14] to produce "summary of findings" tables. These tables will include a summary of the intervention effect and a quality of individual outcomes using the GRADE approach. The quality of the body of evidence for each outcome will be assessed based on five factors: study limitations, consistency of effect, imprecision, indirectness and publication bias.

Analysis of subgroups or subsets

If any substantial heterogeneity is identified through analysis of Tau-squared and I-squared statistics, subgroup analysis will be conducted for primary outcomes in the following characteristic groups.

1. Type of facility: Geriatric health care facilities, home-visit nursing agencies, clinics and hospitals
2. Gender: Males versus females
3. Age group: Less than 40 years versus 40 years and over
4. Type of intervention
5. The number of NPs delivering the intervention: less than 10 versus 10 and over
6. The years of NP experience: less than 10 years and 10 and over

Subgroup differences will be assessed by interaction tests. The results of subgroup analyses will be reported quoting the I-squared statistic and p-value, and the interaction test I-squared value.

Discussion

This review and meta-analysis will play an important role in consolidating evidence on the effectiveness of health services provided by NPs, especially where they play a role in managing non-communicable disease, supporting continuity of care between hospital and community, and monitoring and supporting the health of elderly people. Information on which NP activities are effective as a substitute for standard care provided by MDs in terms of patient and health system utilization outcomes will further drive efforts to develop an effective NP utilization strategies. These strategies in turn will strengthen support to and sustain UHC through provision of high quality care at low cost in community settings.

Acknowledgements

We would like to thank Ms. Miwako Segawa for devising a search strategy for this review.

Contributorship statement

MK conceived and designed the review, completed PROSPERO registration and wrote primary draft. EO and HF conceived and designed the review, provided content expertise and revised the manuscript. SG provided content expertise in the part of statistical analysis and revised the manuscript. ShM, YK and EN were involved in the design of the review setting the outcomes of review, inclusion and exclusion criteria. SaM and KS contributed to content expertise and feedback and to provide important intellectual contents. All authors read and approved the final version of the protocol for submission.

Competing interests: None

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Supplementary file 1 – Search strategy for MEDLINE (OVID)

#1	exp Nurse Practitioners/
#2	nurse practitioner*.tw.
#3	Advanced Practice Nursing/
#4	(advanced practice adj3 nurs*).tw.
#5	Nurse Clinicians/
#6	nurse clinician*.tw.
#7	nurse specialist*.tw.
#8	specialist nurse*.tw.
#9	Home Health Nursing/
#10	Nurses, Community Health/
#11	community health nurs*.tw.
#12	community nurse*.tw.
#13	community matron*.tw.
#14	district nurse*.tw.
#15	Nurses, Public Health/
#16	Public Health Nursing/
#17	public health nurs*.tw.
#18	or/1-17
#19	communit*.tw.
#20	Nursing Homes/
#21	nursing home*.tw.
#22	assisted living.tw.
#23	residential care.tw.
#24	Homes for the Aged/
#25	(geriatric adj7 care).tw.
#26	(care adj7 facilit*).tw.
#27	((long-term or longterm) adj7 facilit*).tw.
#28	((long-term or longterm) adj7 care).tw.
#29	(nursing adj7 facilit*).tw.
#30	home.tw.
#31	House Calls/
#32	exp Home Care Services/
#33	Outpatients/
#34	(outpatient* or out-patient*).tw.
#35	(clinic or clinics).tw.
#36	or/19-35

#37	18 and 36
#38	randomized controlled trial.pt. (378560)
#39	controlled clinical trial.pt. (88833)
#40	randomized.ab. (298871)
#41	randomised.ab. (59924)
#42	placebo.ab. (155925)
#43	randomly.ab. (215923)
#44	trial.ab. (310452)
#45	groups.ab. (1372175)
#46	or/38-45 (2009609)
#47	37 and 46 (1691)
#48	exp animals/ not humans.sh. (3966435)
#49	47 not 48 (1691)

Supplementary file 2: PRISMA-P checklist of items for a systematic review or meta-analysis protocol

Section and topic	Item No	Checklist item	Reported on page #
Administrative information			
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	Title: page 1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	N/A
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	Abstract: page 4 Methods: page 8
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	Authors, affiliations, and corresponding author: page 1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	Contributorship statement: page 15
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	N/A
Support:			
Sources	5a	Indicate sources of financial or other support for the review	Funding: page 17
Sponsor	5b	Provide name for the review funder and/or sponsor	Funding: page 17
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	Funding: page 17
Introduction			
Rationale	6	Describe the rationale for the review in the context of what is already known	Introduction: page 6

Section and topic	Item No	Checklist item	Reported on page #
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	Objectives: page 7
Methods			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	Methods: page 7
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	Methods: page 10
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	Supplementary file 1
Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	Methods: page 11
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	Methods: page 11
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	Methods: page 11
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	Methods: page 10
Outcomes and	13	List and define all outcomes for which data will be sought, including prioritization	Methods: page 10

Section and topic	Item No	Checklist item	Reported on page #
prioritization		of main and additional outcomes, with rationale	
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	Methods: page 12
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	Methods: page 13
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	Methods: page 13
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	Methods: page 14
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	Methods: page
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	Methods: page 13
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	Methods: page 14