Complete Summary

GUIDELINE TITLE

Prevention of hip fracture amongst people aged 65 years and over.

BIBLIOGRAPHIC SOURCE(S)

New Zealand Guidelines Group (NZGG). Prevention of hip fracture amongst people aged 65 years and over. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2003 Jun. 31 p. [54 references]

GUIDELINE STATUS

This is the current release of the guideline.

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SCOPE

DISEASE/CONDITION(S)

Hip fractures

GUIDELINE CATEGORY

Prevention

CLINICAL SPECIALTY

Family Practice
Geriatrics
Internal Medicine
Orthopedic Surgery

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Health Care Providers
Nurses
Occupational Therapists
Patients
Physical Therapists
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To provide an evidence-based summary of the clinical aspects of hip fracture prevention and advice that can effectively reduce the risks of hip fracture amongst people aged 65 years and over

TARGET POPULATION

People in New Zealand aged 65 years and over seen in primary care settings

INTERVENTIONS AND PRACTICES CONSIDERED

1. Risk Assessment through:
    - Detailed medical history
2. Bone mineral density (BMD) measurement
3. Fall prevention strategies:
    - Muscle strengthening and balance training
    - Multidisciplinary, multifactorial health/environmental screening/intervention programmes
    - Home environment modification
4. Medication to prevent or reduce progressive bone loss, including vitamin D, bisphosphonates, and calcium supplements
    - Hormone replacement therapy is considered but not recommended.
5. Hip protectors

MAJOR OUTCOMES CONSIDERED

For risk assessment, the guideline developer sought studies which validated the ability of risk assessment tools to correctly predict high-risk groups or individuals. For prevention, the primary outcome of interest was the incidence of hip fractures. Secondary outcomes of interest were other non-vertebral fractures and incidence of falls causing significant injury.

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The scope of the guideline and the topics to be researched were established by consensus within the group, and a search for evidence conducted. Guidelines developed by other countries and other organisations and relevant medical literature were reviewed. These were identified by searching the Internet, and the electronic databases, The Cochrane Library, MEDLINE, EMBASE, and CINAHL, Healthstar, and Current Contents, and by reviewing references cited in other guidelines and identified papers. Identified references were screened for eligibility according to pre-determined criteria shown below, and the studies considered eligible were retrieved and underwent critical appraisal using pre-determined templates.

Eligibility and Inclusion Criteria

Types of Studies

Systematic reviews and meta-analyses. Descriptive reviews where no systematic reviews were found, randomised controlled trials (RCTs), non-randomised controlled clinical trials (CCTs), cohort studies, case-control studies, and cross-sectional studies.

Types of Study Participants

Older people aged 65 years and over

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

1++

High quality meta-analyses/systematic reviews of randomised controlled clinical trials (RCTs), or RCTs with a very low risk of bias

1+

Well-conducted meta-analyses/systematic reviews, or RCTs with a low risk of bias

1-

Meta-analyses/systematic reviews, or RCTs with a high risk of bias

2++

High quality systematic reviews of case-control or cohort studies

High quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

2+

Well-conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2-

Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3

Non-analytic studies (e.g., case reports, case series)

4

Expert opinion

Qualitative material was systematically appraised for quality, but was not ascribed a level of evidence.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Retrieved studies were obtained and their content reviewed for relevance to the various topics of the review. Each topic was assigned to two members of the group who read the retrieved reports, agreed on what would be included in the guideline, and appraised the included material using the pathway in the original guideline to filter the included material (see original guideline supporting material).

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grades of Recommendation

A

At least one meta-analysis, systematic review, or randomised, controlled clinical trial (RCT) rated 1++, and directly applicable to the target population

or

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

B

A body of evidence consisting principally of studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results

or

Extrapolated evidence from studies rated as 1++, or 1+

C

A body of evidence consisting principally of studies rated as 2+, directly applicable to the target population, and demonstrating overall consistency of results

or

Extrapolated evidence from studies rated as 2++

D

Evidence level 3 or 4

or

Extrapolated evidence from studies rated as 2+

COST ANALYSIS

Cost-Effectiveness of Hip Fracture Prevention Strategies

The cost-effectiveness of hip fracture prevention is the subject of a recent systematic review, and of modelling.

Considerable uncertainty exists around the cost-effectiveness of fracture prevention. Estimates are sensitive to individual's age at fracture; age at onset,

duration, and other benefits of the prophylactic regimen; costs of adverse effects; and the costs of the intervention that vary considerably from country to country.

At present, the differences in cost of different hip fracture prevention strategies appear to be higher than the apparent differences in efficacy. Thus, cost-effectiveness ratios will be mainly influenced by the cost, rather than by the effectiveness.

Primary Prevention

Amongst frail older people in residential or nursing home care, economic modelling based on the results of randomized controlled trials (RCTs) indicates that the use of calcium and vitamin D supplementation appears more cost-effective than the use of hip pads.

For primary prevention using hormone replacement therapy (HRT), potential savings would only exceed costs if used in women aged 70 years and over (refer to Appendix C in the original guideline document for caution on HRT use). It is therefore unlikely to be cost-effective in older women, since acceptance and continuing compliance, even when scanning has demonstrated low bone mineral density (BMD), may be low.

Secondary Prevention

Bisphosphonates used in secondary prevention appear to be less cost-effective than HRT. However, this conclusion is sensitive to compliance and other possible positive and adverse effects of HRT (refer to Appendix C in original guideline document for current advice). Bisphosphonates may currently be a preferred option.

No studies appear to have measured or modelled the overall cost-effectiveness of fall-prevention programmes compared with other fracture prevention strategies.

In community-dwelling older women, the number needed to treat (NNT) to prevent one hip fracture is estimated at 90 for bisphosphonates, compared with 300 to 1,000 for fall prevention programmes. However, this is a crude comparison as the aim and impact of fall prevention programmes extend beyond hip fracture prevention.

Tertiary Prevention

In older people who have already sustained a hip-fracture, modelling suggests that potential savings from the use of either hip protectors or bisphosphonates would exceed costs over time, but savings would be less with bisphosphonates.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

A draft of the guideline was widely circulated to over 30 individuals/organisations for peer review.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions for the Levels of Evidence (1++ to 4) and Grades of Recommendation (A to D) are given at the end of the "Major Recommendations" field.

Risk Assessment for Hip Fracture in Older People

B Women aged 80 years and over and men aged 85 years and over are, as a group, at high risk of hip fracture.

B Women aged 70 years and over and men aged 75 years and over are, as a group, at high risk of hip fracture:

- living in institutional care, OR
- with significant cognitive impairment

C Women aged 70 years and over and men aged 75 years and over are at high risk of hip fracture:

- with one or more of the following conditions:
    - visual acuity 0.2 (6/30)
    - history of a fall with fracture in the previous year
    - history of frequent falling
    - type 2 diabetes (evidence available for women only)
- if currently using any of the following medications;
    - anticonvulsant therapy
    - opioids (including propoxyphene containing pain medication)
    - corticosteroids (doses greater than prednisone 5 mg per day or equivalent)
    - any psychotropic drug
    - type Ia antiarrhythmics

C Women aged 70 years and over with three or all of the following personal history/lifestyle factors are at high risk of hip fracture:

- smoking history
- personal history of any previous fracture
- history of maternal hip fracture
- low body mass index

C Men aged 75 years and over with any of the following personal history/lifestyle factors are at high risk of hip fracture:

- low body mass index
- smoking history

- history of fracture of spine, hip or wrist
- history of stroke should be considered at high risk of hip fracture

C Women aged 65 years and over are at high risk if their bone mineral density (BMD) is 2 SD below normal for age (Z-score >-2.0), and 75 years and over if BMD is 1 SD below normal for age (Z-score >-1.0). The decision on prevention/treatment should take into account Z-score AND other risk factors.

Men aged 70 years and over are at high risk if their BMD is 2 SD below normal for age, and 80 years and over if BMD is 1 SD below normal for age. The decision on prevention/treatment should take into account Z-score AND other risk factors.

A The available evidence does not support the use of BMD measurement for screening of asymptomatic individuals.

At present, there is only limited evidence that the use of BMD measurement in selected individuals is effective in reducing the risk of future fractures.

Fall Prevention

A A programme of muscle strengthening and balance training, individually prescribed by a trained health professional in a New Zealand primary health care setting, reduces the frequency of falls in high risk community-dwelling older people.

A Multidisciplinary, multifactorial health/environmental screening/intervention programmes reduce the frequency of falls in high risk community-dwelling older people.

A Assessment, advice, and facilitation of home environment modification, when conducted in an experimental situation by a trained occupational therapist, reduces the frequency of falls in high risk community-dwelling older people.

Medication for Bone Protection

A Daily supplementation with vitamin D_3 and calcium reduces the hip fracture rates amongst high-risk older people in institutional care or who have already sustained a hip fracture.

A Bisphosphonates (alendronate, risedronate) reduce hip and other fracture rates in community-dwelling older women under 80 years of age.

A Evidence for the effectiveness of hormone replacement therapy (HRT) in reducing hip fracture rates in women aged 65 years and over is conflicting. In view of more recent evidence on the risks of HRT, it is not recommended for first line prevention of hip fracture. Refer to Appendix C in the original guideline.

Hip Protectors

A Hip protectors appear to reduce the incidence of hip fractures in older people in institutional care provided that compliance/adherence is achieved.

Cost-Effectiveness of Hip Fracture Prevention Strategies

B In frail older people in residential or nursing home care, calcium and vitamin D supplementation appears more cost-effective than the use of hip pads, although both approaches have similar efficacy.

B The cost-effectiveness of bisphosphonates compared with HRT is sensitive to compliance and the incidence of adverse events and is unclear (refer to Appendix C in the original guideline for current advice on HRT).

B The overall cost-effectiveness of fall prevention programmes, compared with other strategies used for hip fracture prevention, is not known.

Definitions:

Levels of Evidence

1++

High quality meta-analyses/systematic reviews of randomised controlled clinical trials (RCTs), or RCTs with a very low risk of bias

1+

Well-conducted meta-analyses/systematic reviews, or RCTs with a low risk of bias

1-

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2++

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3

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Grades of Recommendations

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or

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B

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or

Extrapolated evidence from studies rated as 1++, or 1+

C

A body of evidence consisting principally of studies rated as 2+, directly applicable to the target population, and demonstrating overall consistency of results

or

Extrapolated evidence from studies rated as 2++

D

Evidence level 3 or 4

or

Extrapolated evidence from studies rated as 2+

CLINICAL ALGORITHM(S)

The original guideline document provides a summary algorithm for risk assessment and selection of preventive strategies.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The advice on the prevention of hip fracture amongst people aged 65 years and over given in this guideline is based on epidemiological and other research evidence, supplemented where necessary by the consensus opinion of the expert development team based on their own experience.

The evidence supporting the recommendations includes systematic reviews and meta-analyses, descriptive reviews where no systematic reviews were found, randomised controlled trials (RCTs), non-randomised controlled clinical trials (CCTs), cohort studies, case-control studies, and cross-sectional studies.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

By following the evidence-based recommendations in this guideline, older people at high risk of hip fracture can adopt effective preventive strategies to help maintain an independent lifestyle.

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

While the guidelines represent a statement of best practice based on the latest available evidence (at the time of publishing), they are not intended to replace the health professional's judgment in each individual case.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Implementation

Adoption and implementation of the recommendations will be a matter for Accident Compensation Corporation (ACC), District Health Boards (DHBs), Independent Practitioners´ Associations (IPAs), Primary Healthcare Organisations (PHOs), and local provider units to consider.

The guideline should provide a basis at local level for protocols, continuing health professional education, audit, and quality assurance activities. Suggestions for audit are described below.

Dissemination

The guideline will be sent to:

- ACC
- colleges and associations representing relevant health professional vocational groups
- members of IPAs
- PHOs
- chief executives and chief medical officers of DHBs
- tertiary education institutions offering health professional programmes
- providers of Aged Care services in the community
- selected others.

Summary guidelines will also be prepared. The guidelines and summaries will be posted on the NZGG website www.nzgg.org.nz and on the ACC website http://www.acc.co.nz/.

Audit and Performance Indicators

Quality

People aged 65 years and over at risk for hip fracture, service providers and funders of services to people at risk of hip fracture all have an interest in the preventive strategies for people at high risk of hip fracture. This places a responsibility on service providers to collect information relevant to different perspectives. Suggestions include:

- a minimum data set for collection relating to each individual at risk for hip fracture aged 65 years and over
- additional data for periodic audit (by an internal or external agency)

Suggested data for routine collection

- Basic demographics of people at risk for hip fracture (age, gender, ethnicity, height, weight, and body mass index [BMI])
- Current living status (own home – alone, residential, whanau/family support)
- Maternal history of hip fracture
- Smoker status. Number of attempts at quitting
- Diabetes diagnosed. Using insulin?
- Number of strokes
- Number of falls in the previous 12 months
- Previous fractures (hip, wrist, humerus, spine)
- Current medications and dose levels (anticonvulsants, bisphosphonates, corticosteroids, opioids, hormone replacement therapy [HRT], psychotropic drugs, and type Ia antiarrhythmic)
- Use of vitamin D supplements and calcium
- Side effects of medication.

Audit

Audit is a systematic, independent and documented process for obtaining evidence and evaluating it objectively to determine the extent to which a service, such as a primary health care practice, is meeting best practice standards. In order to assess hip fracture prevention is being provided effectively; a register of individuals with risk factors for hip fracture may be established. In addition, the following performance indicators may be assessed.

Suggested performance indicators

The proportion of people enrolled in the practice who are at high risk who have had:

- visual acuity check
- polypharmacy review
- vitamin D and calcium supplementation
- access to hip protectors
- specific anti-osteoporotic medication (prescribed or prescription offered), with details of the type of medication

Proportion of community-dwelling people aged 80 years and over enrolled in the practice who have had:

- a formal hip fracture risk assessment including falls assessment

IMPLEMENTATION TOOLS

Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

New Zealand Guidelines Group (NZGG). Prevention of hip fracture amongst people aged 65 years and over. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2003 Jun. 31 p. [54 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2003 Jun

GUIDELINE DEVELOPER(S)

New Zealand Guidelines Group - Private Nonprofit Organization

SOURCE(S) OF FUNDING

Ministry of Health

GUIDELINE COMMITTEE

Guideline Development Team

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Research and Writing Group Members: William Gillespie, ChM, FRACS, FRCPEd, Orthopaedic Surgeon, Dean, Hull York Medical School (Convenor); John Campbell, MD, FRACP, Professor of Geriatric Medicine, University of Otago Medical School; Melinda Gardner, Mphty, PhD, Physiotherapist, Fall Prevention Research, Northern DHB Support Agency; Lesley Gillespie, BSc (Soc Sci), MMedSci (Clin Epi), RGN, Trial Search Coordinator for the Cochrane Musculoskeletal Injuries Group, The University of York, Orthopaedic Nursing, Clinical Epidemiology; Jan Jackson, Fractured Neck of Femur Clinical Nurse Specialist, Auckland District Health Board; Clare Robertson, BSc (Hons), BCom, PhD, Senior Research Fellow, Fall Prevention Research, Economic Evaluation, University of Otago Medical School; Jean-Claude Theis, MD, MChOrth, FRCS Ed, FRACS, Associate Professor of Orthopaedic Surgery, Dunedin School of Medicine; Raymond Jones, Project Coordinator, Otago District Health Board

Consultation Group Members: Marion Robinson (Dunedin); Heather Thomson (Opotiki); Jim Reid (Dunedin)

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Declaration of Competing Interest

John Campbell has received research funding from the Accident Compensation Corporation (ACC).

ENDORSER(S)

Age Concern New Zealand, Inc. - Medical Specialty Society
College of Nurses Aotearoa NZ - Academic Institution

Hospitals Association, Inc. (New Zealand) - Professional Association
New Zealand College of Practice Nurses (NZNO) - Professional Association
New Zealand Home and Health Association, Inc. - Professional Association
New Zealand Nurses Organization - Professional Association
New Zealand Orthopaedic Association - Professional Association
New Zealand Society of Physiotherapists - Professional Association
NZ Geriatric Society - Professional Association
Osteoporosis New Zealand - Medical Specialty Society
Residential Care NZ, Inc. - Professional Association
Royal New Zealand College of General Practitioners - Medical Specialty Society
Women's Health Action - Medical Specialty Society

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.

Print copies: Available from the New Zealand Guidelines Group Inc., Level 30, Grand Plimmer Towers, 2-6 Gilmer Terrace, PO Box 10-665, Wellington, New Zealand; Tel: 64 4 471 4188; Fax: 64 4 471 4185; e-mail: info@nzgg.org.nz.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- New Zealand Guidelines Group (NZGG). Guideline summary. Prevention of hip fracture amongst people aged 65 years and over. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2003 Jun. 4 p. Available from in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.
- New Zealand Guidelines Group (NZGG). Search strategy. Prevention of hip fracture amongst people aged 65 years and over. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2003 Jun. 6 p. Available from in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.

Print copies: Available from the New Zealand Guidelines Group Inc., Level 30, Grand Plimmer Towers, 2-6 Gilmer Terrace, PO Box 10-665, Wellington, New Zealand; Tel: 64 4 471 4188; Fax: 64 4 471 4185; e-mail: info@nzgg.org.nz.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on June 16, 2004. The information was verified by the guideline developer on July 19, 2004.

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