

者及び自主申告調査の回答者への対応も課題となる。今回の対象町村では、健診及び自主申告調査を行ったAで、参加者全員に「大変良い」「良い」も含めた判定結果を報告を行っている。健診の受診は機能測定結果も含めて、生活機能低下への関心を高める重要な契機となる。Aでの個人票による結果通知は、健診受診とその結果が啓発の点でも活用された例と考えられる。他方、健診受診者に対する報告会は行ったものの、自主申告調査の結果への対応が一部にとどまっていることを課題としている例もあった。ポピュレーション・ストラテジーに基づく介護予防のあり方につながる課題と考えられる。

E. 結論

今回訪問調査を行った町村において、健診及び自主申告調査は、ハイリスク戦略による介護予防事業の対象者選定と事業目標を再検討する契機となっていた。しかし、毎年の実施を前提とした事業としての意義、及び実施方式のあり方については、町村によって異なる所見が得られた。事後措置としての介護予防事業との連携では、事業対象者の選定における健診等の結果利用に町村間の差がみられたが、健診方式による診査項目の導入が筋力トレーニング（運動教室）などの新たな取組みに進展した例があった。観察事例数を増やした考察が、次年度の課題である。

F. 健康危険情報

該当なし

G. 研究発表

なし

H. 知的財産権の出願・登録状況

該当なし

本分担研究での参照資料

- 1) 厚生省老人保健福祉局長. 宅介護支援センター運営事業等の実施について (H12.9.27 老発 654、改正.H13 老発 213)
- 2) 安田誠史. 平成 15 年度厚生労働研究費補助金長寿総合研究事業「介護予防事業の有効性の評価とガイドラインの作成」研究報告書. 2004
- 3) 高知県健康福祉部. 高齢者健診・平成 15 年度改訂版. H16
- 4) 福島県大玉村健康福祉課、福島県立医科大学公衆衛生学講座、福島県北保健福祉事務所. 平成 16 年度高齢者健診及び介護予防・健康づくりアンケート調査結果報告書. H16
- 5) 高知県土佐町. 平成 16 年度介護予防に関する活動事例. (高知県健康福祉部. 介護予防市町村情報交換会資料に所収)、H17
- 6) 芳賀博. 全国市区町村の介護予防事業の実態と課題. 平成 15 年度厚生労働研究費補助金長寿総合研究事業「介護予防事業の有効性の評価とガイドラインの作成」研究報告書. 2004
- 7) 高知県香北町、高知県中央東保健所、高知医科大学老年病科. 「香北町健康長寿計画」報告書. 199-2001 年. 2002

表1 対象町村の健診・自主申告調査及び事後措置の実施状況

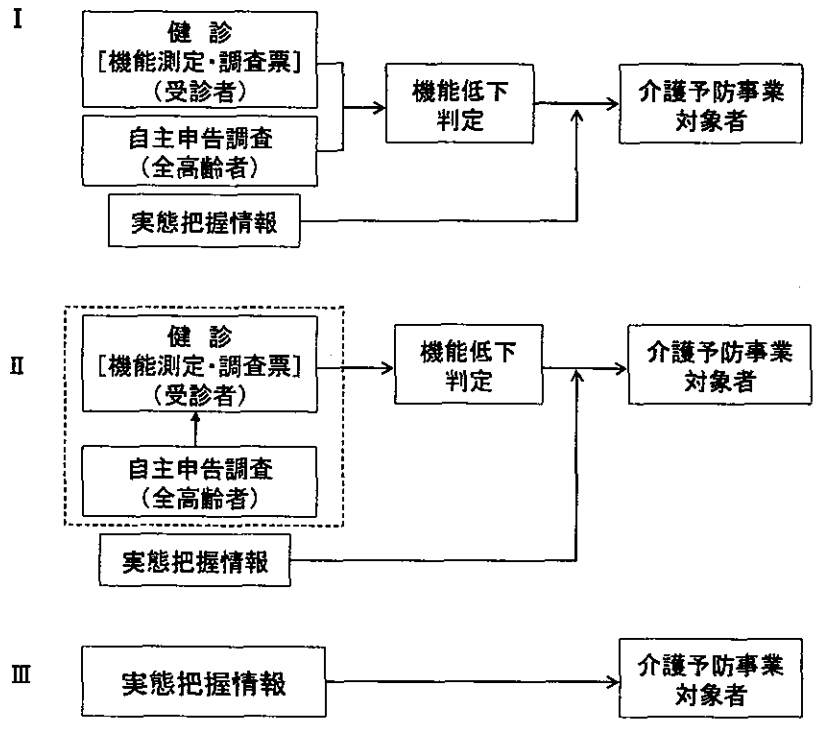
(B 以外は、2004 年度)

町村	健診・自主申告調査及び事後措置の概要
A	<p><高齢者健診></p> <ul style="list-style-type: none"> ・対象者：70歳以上の在住者（要介護2以上の認定者、入院中を除く）1,419人 ・受診者：446人（31.4%） <p>*研究への協力事業として行われ、健診実施に研究スタッフなどが参加</p> <p><介護予防・健康づくりアンケート調査></p> <ul style="list-style-type: none"> ・対象者：健診未受診974人中1/2抽出した490人（88.0%） <p><事後指導・介護予防事業等との連携></p> <ul style="list-style-type: none"> ・健診及びアンケートの結果について、各受診者に結果表による報告。 ・結果表には、7項目（生活機能、栄養バランス、かむ力、外出、転倒発生の危険性、こころ、もの忘れ）の評価項目ごとに、「大変良い」「良い」「がんばりましょう」の3段階で提示。 ・受診者が、評価の結果、村が実施している介護予防支援プログラム（11項目：高齢者出前講座、男の料理教室、転ばぬ先の予防事業、生きがいディサービス、寿大学、訪問指導、訪問栄養相談、家族介護交流事業、配食サービス事業、一人暮らし老人など巡回訪問事業、住宅改造サービス事業）中に該当する場合は、「おすすめ項目」をチェックし、報告と同時に配布。 <p><次年度以降の実施計画></p> <ul style="list-style-type: none"> ・健診は特定の年齢に対する節目健診とし、2005年度は2004年度の残りの1/2に対する自主申告調査の実施予定。
B	<p>【2003年度】</p> <p><一次スクリーニング（自記式質問紙）></p> <ul style="list-style-type: none"> ・対象者：65歳以上在住者（要介護3-5認定者を除く）1,650人 ・回答者：1,276人(77.3%) ・身体機能低下判定者：296人(23.2%) <p>*機能低下判定が健診所見と不一致との印象があり（データは分析中）、個別対応の結果では、医療機関受診勧奨、介護保険適用、家族問題などが多かった。</p> <p><二次スクリーニング（客観的機能測定）></p> <ul style="list-style-type: none"> ・受診者：75歳以上の身体機能低下者79人 ・機能低下判定者：29人 <p>*健診スタッフとして地元大学の学生等が参加</p> <p><事後指導・介護予防事業等との連携></p> <ul style="list-style-type: none"> ・健診受診者への報告会：参加は約60%、要個別指導以外の不参加者には結果表

	<p>を郵送。個別指導該当者は訪問。</p> <ul style="list-style-type: none"> ・客観的機能測定から、33 人に対して個別指導 ・事業への勧奨：運動教室 24、痴呆予防教室 11、ほかに医療機関受診の勧奨 9 ・運動教室：重複を除く対象者 18、教室への参加同意 9（実施前辞退 1） <p>【2004 年度】</p> <p>*2003 年度の実績により、一次スクリーニングは省略</p> <ul style="list-style-type: none"> ・受診者：202 人（地域支え合い型集い開催日にあわせた実施で受診者増） ・介護予防事業対象者：身体機能（虚弱）18 人、痴呆 43 人 <p><事後指導・介護予防事業等との連携></p> <ul style="list-style-type: none"> ・報告会、不参加者への通知票送付、個別対応者への訪問は前年度と同様 ・運動教室：健診での判定による参加者 10 人、他に実態把握情報により数人、要支援・要介護 1 から 8 人が参加 <p><次年度以降の実施計画など></p> <ul style="list-style-type: none"> ・次年度は診査項目をさらに絞り、定例的に実施されている地域支え合い型事業に合わせて健診を実施することで受診率の向上を図る。 <p><感想など></p> <ul style="list-style-type: none"> ・2 年間の健診及び自主申告調査の実施で、町内の高齢者の全体像が見えた。身体機能低下については、運動教室終了後のフォローも含めてほぼ対応指針が確立。痴呆への対応が課題。 ・継続受診者の中では健診による新たな介護予防事業対象者把握は減少が予測される。実態把握情報及び介護保険認定情報からの対象選定を積極的に考える。
C	<p><自記式質問紙></p> <ul style="list-style-type: none"> ・対象者：65 歳以上 1,692 人 ・回収者：1,607 人(95.0%)、うち機能評価が可能な回答約 1,300 <p><健診（機能測定など）></p> <ul style="list-style-type: none"> ・対象者：75 歳以上 ・受診者：324 人 <p>*研究への協力事業として行われ、健診実施に研究スタッフなどが参加</p> <p><事後指導・介護予防事業との連携></p> <ul style="list-style-type: none"> ・報告会：参加 259 人（79.9%） ・転倒予防教室：健診における身体機能測定＋質問紙で転倒歴 45 →スタッフ評価による除外 15、不参加表明 10 →参加者 18 ・痴呆予防教室（予定）：健診における機能判定＋スタッフ情報による勧奨 20 <p><感想等></p> <ul style="list-style-type: none"> ・転倒予防教室は送迎を行ったため、従来の交流型事業に参加できなかった対象者の参加を可能にした。

D	<p><高齢者健診></p> <ul style="list-style-type: none"> ・対象者：実施地区の65歳以上402人（村全数の34.9%） ・受診者：81人（うち、要支援認定者2） ・有所見者32（うち、要支援2） <p>（注：判定項目：身体機能低下、軽度痴呆、うつ症状、閉じこもりのいずれか）</p> <p><事後指導・介護予防事業との連携></p> <ul style="list-style-type: none"> ・有所見者（要支援を除く）30人中21人は在宅介護支援センターの虚弱者登録把握者で、健診による虚弱者の追加9人 ・身体機能低下におけるスタッフ判断（日常の生活行動等による）では、要介護ハイリスク者は9人中1人 ・虚弱者登録に健診情報を加えて、介護予防ないし虚弱者支援事業（様子見訪問、運動教室、ミニデイ、パワーリハビリテーション、痴呆予防教室、要支援者に対する通所介護）の対象者を選定 <p><次年度以降の実施計画></p> <ul style="list-style-type: none"> ・健診実施地区をモデル地区から全地区に拡大 <p><感想等></p> <ul style="list-style-type: none"> ・実態把握等によるハイリスク者の機能低下状態を客観的に把握できた。 ・機能低下測定方法や評価基準の利用により、事業評価、個々の参加者の効果の評価が進展し、参加者の励みの資料となった。
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図1 高齢者健診・自主申告調査・実態把握情報と
介護予防対象者の選定



Ⅲ. 研究成果の刊行に関する一覧表

研究成果の刊行に関する一覧表

雑誌

発表者	論文タイトル	発表誌	巻号	ページ	出版年
安田誠史	県・保健所・市町村の連携による介護予防推進について	日老医誌	41	640-642	2004
Yasuda N, Zimmerman S, Hawkes WG, Gruber-Baldini AL, Hebel JR, Magaziner J	Concordance of proxy perceived change and measured change in multiple domains of function in older persons	J Am Geriatr Soc	52	1157-1162	2004
Takahashi T, Ishida K, Hirose D, Nagano Y, Okumiya K, Nishinaga M, Matsubayashi K, Doi Y, Tani T, Yamamoto H	Trunk deformity is associated with a reduction in outdoor activities of daily living and life satisfaction in community-dwelling older people	Osteoporosis Int	16	273-279	2004
Takahashi T, Ishida K, Hirose D, Nagano Y, Okumiya K, Nishinaga M, Doi Y, Yamamoto H	Vertical ground reaction force shape is associated with gait parameters, timed up and go, and functional reach in elderly females	J Rehabil Med	36	42-45	2004

IV. 研究成果の刊行物・別刷

第46回日本老年医学会学術集会記録

〈市民公開在宅介護フォーラム：寝たきり・ほけは防止できるか？「介護予防」の手法とその有効性〉

3. 県・保健所・市町村の連携による介護予防推進について

安田 誠史

日本老年医学会雑誌 第41巻 第6号 別刷

第46回日本老年医学会学術集会記録

〈市民公開在宅介護フォーラム：寝たきり・ぼけは防止できるか？「介護予防」の手法とその有効性〉

3. 県・保健所・市町村の連携による介護予防推進について

安田 誠史

〈要約〉 介護予防の方策の一つは、現時点では自立生活を送っている在宅高齢者のうち、身体精神機能のレベルが、早期に、自立生活が困難な水準にまで低下してしまう危険性が高い高齢者を同定すること、そして、これら高危険度群を標的集団として、身体精神機能の維持向上に有効な介入を実施することである。高知県は、2002年度から、県立保健所が管内市町村を支援して、市町村の介護予防事業が、この方策に則って展開されるよう取り組んでいる。この方策を実践した事例を紹介し、県庁が政策立案で、県立保健所が技術支援で役割を担う必要があることを指摘した。

Key words：介護予防，身体精神機能，地域保健，保健所，市町村

(日老医誌 2004；41：640—642)

緒言

高齢者保健活動の目標は、生活習慣病を早期発見して寿命を伸長させることから、要介護状態にならない期間の伸長を目指す段階へと移った。要介護状態は、日常生活動作能力 Activities of Daily Living (ADL) の障害、あるいは痴呆症状を有することと密接に関連している。このうち、ADL 障害については、その発生に関連する要因が明らかにされている¹⁾(表1)。従って、要介護状態にならないことを目指す高齢者保健活動は、ADL 障害の危険因子を有する高齢者、特に、身体精神機能が低下している高齢者を標的集団とするハイリスク・ストラテジー high-risk strategy に則って展開されると、効果的、効率的である。高知県では、県庁高齢者保健担当部局が、この方策に則って活動を展開するための標準方式を策定し、普及させることを目標に調査研究事業を行っている。この標準方式では、以下の手順で、在宅高齢者から身体精神機能低下者が同定され、有効性が期待される介護予防事業の対象者として選定される。

身体精神機能測定の対象になる

在宅高齢者の把握

老人保健法による基本健康診査(基本健診)対象者名

Involvement of public health organizations at prefecture level in services conducted by municipalities for the purpose of preventing the long-term care use of older persons

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簿に掲載される65歳以上高齢者が機能測定の対象者である。このうち、既に要介護認定(おおむね要介護度3度以上)を受けている者は、機能測定の対象から除かれる。市町村介護保険部門が把握する情報を利用して除外する。

対象者の身体精神機能の測定

身体機能の測定には、客観的機能遂行能測定と質問票による自主申告調査がある²⁾。前者に属する測定には、体力(筋力、柔軟性、敏捷性、平衡感覚、持久性)測定とタスク遂行能測定(up & go test, functional reachなど)がある。客観的測定を行う場合は、測定会場が必要であり、基本健診機会が利用される場合と、基本健診とは別に測定が行われる場合がある。自主申告調査では、標準化された質問票によって、ADLより上位の機能である、手段的生活動作、移動能力(中距離以上の歩行、階段昇降)、四肢体幹機能(関節可動域、筋力)が評価される。精神機能測定には、精神症状測定と認知機能測定がある。精神症状測定では、高齢者抑うつスケール Geriatric Depression Scale、一般精神健康調査 General Health Questionnaireなどの調査票が用いられる。認知機能測定には、信頼性、妥当性が確認された面接調査票である Mini-Mental State Examination が用いられる。全員に客観的測定を実施することが困難な場合は、まず、自主申告質問票調査を実施し、身体精神機能障害が疑われた者に客観的測定を実施する。

高危険度群と判定された症例の点検

機能測定結果が障害域にあった高齢者を対象に、市町

表1 ADL障害の危険因子

【健康状態】	【生活習慣】
<ul style="list-style-type: none"> ・慢性疾患数多 ・薬剤服薬数多 ・聴力障害 ・視力障害 ・抑うつ症状 ・認知機能障害 ・四肢機能障害 ・わるい主観的健康 ・転倒 	<ul style="list-style-type: none"> ・不適切体重：高BMI，低BMI，体重減少 ・不活発な身体活動 ・大量飲酒，非飲酒 ・現在，過去の喫煙 ・社会的きずな（配偶者，親族，交友，グループ活動）疎

文献1)をもとに著者が作成

村の高齢者保健担当部署と介護保険担当部署が合同で症例検討を行う。現在，重度の要介護認定を必要とする状態でないか確認する。また，ADL障害のリスクが高まる医学的因子の管理状況と生活習慣に関する問題点を点検する。そして，現在市町村で提供されている介護予防事業のうち，どの事業に適格性を有する高齢者かを検討する。現在治療中の疾患を持つ高齢者が，運動指導が行われる事業の対象者に選定された場合は，主治医の意見を求める。

表2 参加者の身体生活機能の変化 (N = 8)

	介入前平均	介入後平均
握力 (kg)	18.5	19.8
長座体前屈 (cm)	20.5	21.0
開眼片足立ち時間 (秒)	8.0	8.5
Up & Goテスト (秒)	14.6	11.9*
10m 歩行時間 (秒)	12.6	9.1*
自信がない生活動作数	5.5	3.5*

*Wilcoxon 符号付順位和検定による $p < 0.05$

高危険度群への介入

身体機能の維持向上に有効な介入プログラムは，四肢体幹のストレッチング（関節可動域の改善），徐々に負荷を高める四肢体幹の運動（筋力の向上），体操（平衡性の改善），中等度までの全身有酸素運動（持久力の向上）から構成されるべきである⁹⁾。介入の効果を評価するために，介入前と介入後の2回，身体精神機能を測定し，介入前後での変化を測定する。

以下に，標準方式に則って，身体精神機能測定と介護予防事業を連携させる取り組みを進めた町の事例を紹介し，県庁，県立保健所，町が担った役割を考察する。

事例

高知県香我美町（人口約 6,800 人，高齢者人口割合約 27%）が，2003 年度に，身体精神機能測定を行って機能低下者を選定し，筋力向上運動を指導する教室の対象者にした事例を紹介する。

1. 対象者選定

まず，質問紙調査による自主申告情報に基づいて，身体精神機能が評価され，自主申告情報で機能の障害が疑われた者に，客観的機能測定が実施された。すでに要介護度3度以上の認定を受けていた者を除いた65歳以上高齢者1,550名が質問紙調査の対象になり，1,273名(82%)から調査票が回収され，296名が身体機能低下者と判定された。このうち，介護予防事業モデル地区に選定された地区の住民で，専門医での運動指導が必要と

なる疾患がない75歳以上者が客観的機能測定の対象者とみなされた。63名が客観的機能測定を受け，29名が，身体機能または精神機能のいずれかが障害域にあると判定された。町の高齢者保健担当スタッフと介護保険担当スタッフとが，各人の生活機能を評価する検討会を開催し，18名を，介護予防事業として企画された筋力向上運動を指導する教室の対象者に選定した。このうち9名から，主治医の了解と本人の教室参加同意が得られた。

2. 介入

参加者8名を対象に，12週間，週2回，計24回の教室が開催された。教室では，米国 National Institute of Aging が，在宅で実施できる筋力向上運動として提唱している運動¹⁰⁾を基に，町の嘱託を受けた運動指導士が作成した6種類の運動（腕を前・横にあげる運動，膝を伸ばす運動，椅子から立ち上がる運動，腕の二頭筋を縮める運動，脚の後ろ蹴り運動，脚を側方にあげる運動）が指導された。参加者は，手首または足首に，負荷が調整できる重錘バンドを巻き，10回ずつを1セット，左右2セットずつを基本にする運動を行った。

3. 介入効果の評価

介入の効果評価には，教室の初回と最終回に実施された，身体精神機能測定項目での測定値の変化と，初回に参加者が設定した，生活行動に関する目標の達成状況が用いられた。最終回は，初回に比べて，歩行機能が有意に改善し，また，転倒危険が高まる生活動作項目のうち，

その動作を行うことに自信がないと回答した項目数が有意に減少した(表2)。初回に生活行動に関する目標を設定した5名については、全員が、それぞれの目標を達成できたか、改善したと回答した。

考 察

紹介した事例から、自立生活を送っている高齢者の身体精神機能を測定し、その水準が低い高齢者を介護予防事業の対象者にするという方策に則って、高齢者保健活動を展開する場合、県庁、保健所、市町村それぞれが担うべき役割を考察する。

県庁担当部局の役割は、介護予防を目指す地域保健活動の標準方式を策定するために、県独自の調査研究事業を展開することにある。新しい方策の導入時には、調査研究事業として位置づけることによって、市町村の活動に県庁、保健所スタッフが関与することが促される。

保健所の役割は、第一には、町スタッフの技術支援にある。効果的な介入プログラムの作成と実施には、小規模市町村にはスタッフがいない保健医療専門職の関与が必要なことが多い。また、介入効果の評価を可能にする事業実施計画の立案と調査結果の分析に際しても、市町村スタッフは経験が乏しく、保健所の支援が欠かせない。第二の役割は、モデル自治体での取り組みを、管内の他自治体へ普及させることであり、保健所は、管内の他市町村の担当者へ、積極的に情報を提供する役割を担うべきである。

町は、対象者への直接サービス提供を担う。高齢者保健担当部署と介護保険担当部署が合同で活動に関与すると、効果的、効率的なサービス提供が可能になると期待される。

今後の取り組みで重要な課題は、機能測定に参加しない高齢者、および介入適格者だが介入に参加しない高齢者への対応である。ADL障害の発生危険が高い者は、機能測定非参加者、介入非参加者の方に偏在する。対象者の自宅を訪問して行う身体精神機能測定、また、通所型の介入に参加しない高齢者を対象とする、家庭で実施可能な介入プログラムの開発が必要である。

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Concordance of Proxy-Perceived Change and Measured Change in Multiple Domains of Function in Older Persons

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OBJECTIVES: To compare proxy perceptions about change over 6 months in physical, instrumental, affective, and cognitive functioning of older persons with computed change in patient self-report and performance and patient's own perceptions about change.

DESIGN: Prospective study.

SETTING: Recovery from hip fracture that occurred in community-dwelling persons in Baltimore, Maryland, in 1990–91. The recovery from the sixth to the 12th month postfracture was observed.

PARTICIPANTS: One hundred forty-one hip fracture patients aged 65 and older and a self-designated proxy for each.

MEASUREMENTS: For specific tasks of physical and instrumental functioning, proxy perception of change over the previous 6 months asked in the 12th month postfracture was compared with change in criterion measures (subject self-report and observed performance) from the sixth to the 12th month postfracture. For global change over the previous 6 months in each area of functioning, proxy perception was compared with the subject's own perception in the 12th month postfracture.

RESULTS: Agreement between proxy perceptions of change and change in criterion measures was poor. There was a general pattern for proxies to overstate improvement and understate deterioration in comparison with change observed in criterion measures for specific tasks of physical and instrumental functioning. Proxies' global perceptions reported subjects improving less and deteriorating more than patients' own perceptions.

CONCLUSION: Proxy perceptions about task-specific and global changes in subjects' functional health over a short period of time are systematically different from

patient report and observed performance. *J Am Geriatr Soc* 52:1157–1162, 2004.

Key words: aged; bias; epidemiologic measurements; health status; proxy

When older persons are unable or unwilling to provide information about their medical and functional status, proxy reporting is an important source of information for clinical assessment and research.¹ Recent reviews^{2,3} and cross-sectional studies^{4–16} assessing the concordance of proxy ratings of current functional health status indicate that proxies tend to rate greater degrees of disability in physical,^{4,6,8–13} instrumental,^{4,6,8,9,11,13} and affective,^{7,14–16} functioning and less disability in cognitive functioning^{12,14} than subject self-reports^{4,6–9,11–16} and performance observations^{10,12,17} demonstrate. However, few studies have evaluated the validity of proxy ratings of change in functional health of older subjects, an exception being the concordance of perception of change with regard to cognitive function over a long period of time.¹⁸ To date, no study has examined the concordance of proxy perceptions of change over short periods of time in physical, instrumental, or mental functioning, although information about changes over relatively short periods of time is often needed for diagnoses, treatment planning, and research.

The purpose of the present study was to compare proxy perceptions of change over a 6-month period in physical, instrumental, cognitive, and affective functioning of older subjects with observed and self-reported change during the same period. Two types of proxy perceptions of change were assessed: perception about task-specific changes in physical and instrumental functioning and perception of global changes in the four areas of function.

METHODS

Subjects

Subjects included hip-fracture patients and proxies identified by patients as the person most knowledgeable about their health status. Details of recruiting subjects were

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described in a previous report.¹² In brief, there were 328 hip-fracture patients entering one of eight Baltimore, Maryland, hospitals from January 1990 through June 1991 who were aged 65 and older, living in the community at the time of their fracture, and able to designate a proxy. Of 233 patient-proxy pairs who consented to participate in the study, 155 (66.5%) pairs completed a set of measurements. Fourteen patients who were recognized as mentally confused in the 6th month after fracture were excluded, leaving 141 pairs for use in the present analysis. There was no statistically significant difference between 141 pairs used for the analysis and 92 pairs excluded from the analysis in terms of demographic characteristics of patients or those of proxies.

Design

In the 6th and the 12th months after fracture, patient self-reports and observed performance were obtained for specific tasks of activities of daily living (ADLs) and instrumental activities of daily living (IADLs). Patients also responded to formal tests of affective and cognitive functioning at both time points. Also at 12 months, a proxy rated change over the previous 6 months in the patient's ability to perform specific ADLs and IADLs based on his or her own perception. In addition, the proxy and patient rated global change over that period for physical, instrumental, affective, and cognitive functioning, based on their own perception. Proxies were interviewed by telephone within 1 month of the patient's 12-month assessment. The institutional review boards at the University of Maryland and of the study hospitals approved the protocol.

Measures

Task-Specific Change in Physical and Instrumental Functioning

For ADLs and IADLs, subject self-report and observed performance were chosen as criterion measures, because they were considered distinct concepts of functioning.¹⁹⁻²¹

Criterion Measure Based on Subject Self-Report. In the sixth and the 12th months after hip fracture, patients were asked about the use of assistance and difficulty in performing 15 ADL tasks (10 lower extremity tasks and 5 upper extremity tasks) in the previous week, using a modified version of the Functional Status Index,²² and seven IADL tasks during the previous 2 weeks, using a modified version of the Older Americans Resources and Services instrument.²³ (See Table 1 for a list of tasks of ADLs and IADLs.) For each ADL task, a nine-level composite measure was created by combining responses to assistance use and difficulty and coded as follows: (1) did not perform the task for health reasons; used assistance and experienced (2) extreme, (3) moderate, (4) mild, or (5) no difficulty; or did not use assistance and experienced (5) extreme, (7) moderate, (8) mild, or (9) no difficulty. For each IADL task, assistance use in performing the task was dichotomized as independent versus dependent (used assistance, was unable to perform the task, or did not perform it for health reasons).

Criterion Measure Based on Subject Observed Performance. At both assessments, examiners observed patients' performance for 10 of the 15 ADL tasks and three of the

seven IADL tasks under an explicitly defined protocol. For each ADL task, patient's performance was measured in terms of three elements (assistance use, time to complete the task, and correctness). The performance time for each activity was coded based on quartile points in the sixth-month assessment. By combining performance observations in the three elements, a nine-level composite measure was derived for each ADL task with the following categories: (1) did not perform the task for health reasons or performed it incorrectly; used assistance and completed the task correctly in (2) the lowest, (3) the third, (4) the second, or (5) the top quartile of performance time (i.e., the fastest time); or completed task independently and correctly in (6) the lowest, (7) the third, (8) the second, or (9) the top quartile of performance time. Performance on each IADL task was measured in terms of assistance use and dichotomized as independent versus dependent (used assistance, was unable to perform the task, or did not perform it for health reasons).

Computed Changes in Criterion Measures. A change in each criterion measure for each ADL and IADL task (self-report and performance) was measured using a difference in the composite measure between the two time points. A one-level or more difference was considered to be change (improvement or deterioration).

Proxy Perceptions of Change. At the 12-month assessment, the proxy was asked to rate his or her perception of the change over the previous 6 months in the patient's functional ability for each ADL and IADL. The degree of perceived change was rated using a five-level scale: (1) much better now, (2) somewhat better now, (3) equally as well now, (4) somewhat worse now, or (5) much worse now.

Global Change in All Domains

During the 12-month assessment, the patient and proxy were asked to rate their perception of global change over the previous 6 months for physical, instrumental, affective, and cognitive functioning of the patient. They rated their perceptions with a five-level scale ranging from (1) much better now to (5) much worse now. At 6 and 12 months, patients were administered the Center for Epidemiologic Studies Depression Scale (CES-D)²⁴ and the Mini-Mental State Examination (MMSE)²⁵ as formal tests of affective and cognitive functioning, respectively. Scores on the CES-D (range 0-60) were dichotomized as depressed (≥ 16) versus not depressed. Scores on MMSE (range 0-30) were dichotomized as impaired (≤ 23) versus not impaired.

Analysis

For each ADL and IADL, the five levels of proxy perception of change were collapsed into three categories (i.e., better, equal, or worse) to match the proxy perception to the criterion measures on categories of change. The proxy perception of change was compared with computed change (improvement, no change, or deterioration) in each of two criterion measures. For global change in physical, instrumental, affective, and cognitive functioning, the proxy and patient perceptions for each function were collapsed into three categories and were compared. Proxy perceptions of change in affective and cognitive functioning were

also compared with change in dichotomized scores on formal tests.

To assess agreement between proxy perception of change and change in a criterion measure, a kappa statistic was computed for each three-by-three table. To examine the degree to which a proxy perception systematically overstated or understated change in the criterion measure (bias), a three-by-three table was collapsed into two two-by-two tables of improvement (improved vs did not improve) or deterioration (deteriorated vs did not deteriorate). For each two-by-two table, the percentage of bias was calculated as the ratio of the difference between the proportion of proxy-perceived change and that of change in the criterion measure expressed as a percentage of the proportion of change in the criterion measure. A positive percentage of bias means that the proxy perceived change more often than the criterion measure demonstrated. McNemar chi-square test was used for a test of zero bias. To control the overall significance level, the chi-square statistic was compared with a chi-square value with two degrees of freedom.²⁶ Statistical analyses were performed using SPSS Base 9.0 (SPSS Inc., Chicago, IL).

Numbers of patient-proxy pairs for use differed by ADL and IADL because pairs having effective values for all three measurements (proxy perception of change and two computed changes in criterion measures) varied by task due to missing data.

RESULTS

Of the 141 patients, 76.6% were female, 63.1% were widowed, and 7.1% were nonwhite. Their average age \pm SD was 80.6 ± 7.2 , and 58.1% had completed high school.

The average age of proxies was 60.2 (range 24–93); 76.3% were female, 63.3% were married, and 81.2% had completed high school. Proxies were most frequently children (36.2%), spouses (15.6%), or other relatives (31.2%). Fifty-one proxies (35.3%) lived with the patient at the 12-month assessment; the 90 proxies who did not live with the patient had had an average of 10.3 visits with the patient in the previous month.

Task-Specific Changes in Physical and Instrumental Functioning

Agreement

For all ADLs and IADLs, kappa values were less than 0.2 (i.e., poor agreement) for proxy perception versus subject self-report comparisons and proxy perception versus subject performance observation comparisons. (Details are available upon request.)

Bias

Table 1 presents the distribution of proxy perception of change and computed change in each criterion measure and the percentage of bias associated with proxy perception for individual tasks of physical and instrumental functioning.

Proxy perception versus subject self-report comparisons. Estimates of percentage of bias associated with proxy perception were positive for improvement and negative for deterioration for almost all ADLs, meaning that, when they reported improvement, they overreported it, and when they

reported deterioration, they underreported it. The only exception was for eating, for which bias estimates were positive for both improvement and deterioration. Positive values of percentage of bias for improvement were significant in three lower extremity tasks and three upper extremity tasks. Negative values of percentage of bias for deterioration were significant in four lower extremity tasks. The estimates of percentage of bias for improvement were smaller in lower extremity tasks than in upper extremity tasks; the median value of bias estimates for improvement was lower in lower extremity tasks than in upper extremity tasks (54.4% vs 177.4%). The median values of percentage of bias for deterioration were negative in both lower and upper extremity tasks (–69.8% and –55.3%, respectively).

For IADLs also, proxies perceived patients as improving more and as deteriorating less than patient self-reports demonstrated. Bias estimates for improvement were positive for all seven tasks and were significant for two tasks. Five of seven bias estimates for deterioration were negative, although none was significant.

Proxy perception versus subject performance comparisons. Actual performance was observed for 10 ADLs. There was no consistent pattern in bias estimates for improvement. For deterioration, bias estimates were negative in five tasks and were significant in two of six lower extremity activities; bias estimates were negative and significant in all four upper extremity activities. The median values of percentage of bias for deterioration were negative in both lower and upper extremity activities (–72.1% and –81.1%, respectively). The proxy perception also understated deterioration for specific IADLs. The bias estimates for deterioration were negative on all three IADL tasks, although none was significant.

Global Changes in Functioning

Table 2 presents agreement and bias associated with proxy perception of global change in each of four areas of functioning. Kappa values showing agreement were less than 0.3 in all areas. Contrary to findings for individual ADLs and IADLs, as a group, proxies consistently saw patients to be improving less and deteriorating more than patients perceived themselves; all bias estimates were negative for improvement and positive for deterioration. Bias estimates were significant only for cognitive change. Proxy perceptions of change in affective and cognitive functioning overstated improvement and deterioration in comparison with change in scores on the affective and cognitive tests. Bias estimates were significant for improvement in affective function and deterioration in both areas of function, but when score change greater than half of a standard deviation of the score distribution in the sixth-month assessment was regarded as change in these tests, values of percentage of bias for proxy perception decreased and none was statistically significant (data not shown). Therefore, bias estimates for the proxy perception versus dichotomized test score comparisons seem to be exaggerated.

DISCUSSION

For specific tasks of physical and instrumental functioning, analysis at the individual level demonstrated poor agree-

Table 1. Correspondence Between Proxy Perception of Change, Change Measured with Subject Self-Report, and Performance Observations for Individual Tasks of Physical and Instrumental Functioning over 6 Months

Task	No.*	Proxy Perception		Subject Self-Report		Subject Performance		Proxy Perception vs Subject Self-Report		Proxy Perception vs Subject Performance	
		Better	Worse	% Reporting	% Reporting	Improvement	Deterioration	% Observed	Improvement	Deterioration	Improvement
Lower extremity ADLs											
Walking 10 feet	120	60.0	13.3	28.3	18.3	32.5	10.0	112.0 [§]	-27.3	84.6 [§]	33.0
Getting in/out of bed	83	43.4	4.8	21.7	14.5	42.2	19.3	100.0 [†]	-66.9	2.8	-75.1 [†]
Putting socks/shoes on	79	41.8	6.3	27.8	20.3	48.1	20.3	50.4	-69.0	-13.1	-69.0
Getting on/off toilet	90	34.4	3.3	30.0	16.7	34.4	24.4	14.7	-80.2 [‡]	0.0	-86.5 [§]
Getting in/out of bath/shower	42	54.8	2.4	31.0	14.3	31.0	14.3	76.8	-83.2	76.8	-83.2
Rising from armless chair	87	36.8	6.9	31.0	21.8	29.9	12.6	18.7	-68.3 [‡]	23.1	-45.2
Walking one block	70	58.6	4.3	32.9	17.1	NA [†]	NA	78.1 [†]	-74.9	NA	NA
Climbing five stairs	83	45.8	4.8	28.9	19.3	NA	NA	58.5	-75.1 [†]	NA	NA
Getting into car	97	46.4	8.2	33.0	27.8	NA	NA	40.6	-70.5 [§]	NA	NA
Putting on pants	121	30.6	8.3	22.3	16.5	NA	NA	37.2	-49.7	NA	NA
Upper extremity ADLs											
Eating	134	17.9	3.7	3.7	2.2	37.3	31.3	383.8 [§]	68.2	-52.0 [§]	-88.2 [§]
Putting on shirt/blouse	113	31.9	7.1	11.5	15.9	22.1	27.4	177.4 [§]	-55.3	44.3	-74.1 [§]
Buttoning shirt/blouse	115	25.2	6.1	11.3	9.6	32.2	27.8	123.0	-36.5	-21.7	-78.1 [§]
Grooming	110	20.9	3.6	6.4	9.1	32.7	22.7	226.6 [‡]	-60.4	-36.1	-84.1 [§]
Taking shower/bath/ sponge bath	104	33.7	5.8	24.0	17.3	NA	NA	40.4	-66.5	NA	NA
Instrumental ADLs											
Using telephone	112	15.2	9.8	7.1	8.9	13.4	10.7	114.1	10.1	13.4	-8.4
Handling money	82	12.2	1.2	1.2	11.0	13.4	9.8	916.7	-89.1	-9.0	-87.8
Taking medications	103	8.7	3.9	6.8	6.8	17.5	10.7	27.9	-42.6	-50.3	-63.6
Getting places out of walking distance	110	28.2	8.2	7.3	6.4	NA	NA	286.3 [‡]	28.1	NA	NA
Shopping	89	27.0	6.7	10.1	9.0	NA	NA	167.3 [‡]	-25.6	NA	NA
Preparing meals	97	22.7	3.1	10.3	9.3	NA	NA	120.4	-66.7	NA	NA
House cleaning	97	20.6	3.1	10.3	7.2	NA	NA	100.0	-56.9	NA	NA

* Numbers of patient-proxy pairs for use varied by task because of missing data.
[†] NA = Not applicable because subject performance was not examined.
[‡] P < .05; § P < .01 using McNemar chi-square test.
 ADL = activity of daily living.

Table 2. Correspondence Between Proxy and Subject Perceptions of Global Change in Four Areas of Functioning and Correspondence Between Proxy Perception of Global Change and Change in Scores on a Formal Test of Affective and Cognitive Functioning

Area of Functioning	Proxy Perception				Subject Perception				Formal Test*		Proxy Perception vs Subject Perception			Proxy Perception vs Formal Test			
	No.	% Reporting		Worse	Better	Worse	% Reporting		Worse	Better	% Observed	Improvement	Deterioration	Kappa ± SE	Improvement	Deterioration	Bias, %
		Better	Worse				Better	Worse									
Physical functioning	137	56.9	18.2	63.5	10.2	NA†	NA	NA	0.28 ± 0.07	-10.4	78.4	NA	NA	NA	NA	NA	
Instrumental functioning	134	29.1	7.5	41.0	3.0	NA	NA	NA	0.06 ± 0.07	-29.0	150.0	NA	NA	NA	NA	NA	
Affective functioning	135	28.9	17.0	34.1	15.6	9.6	5.9	5.9	0.08 ± 0.07	-15.2	9.0	-0.01 ± 0.05	201.0 [‡]	188.1 [‡]	188.1 [‡]	188.1 [‡]	
Cognitive functioning	137	17.5	19.7	30.7	9.5	10.2	8.8	8.8	0.13 ± 0.07	-43.0 [‡]	107.4 [‡]	-0.09 ± 0.05	71.6	123.9 [‡]	123.9 [‡]	123.9 [‡]	

* Center for Epidemiological Studies Depression Scale as the test for affective functioning; Mini-Mental State Examination as the test for cognitive functioning.
 † NA = Not applicable because no formal test was available.
 ‡ P < .05; § P < .01 using McNemar chi-square test. SE = standard error; NA = not applicable.

ment between proxy perception of change and computed change in self-report and performance-based criterion measures. Group-level analysis indicated that the discordance was systematic; proxies overstated improvement and understated deterioration in those specific tasks. The agreement between proxy and subject perceptions in terms of a global change in each area of physical, instrumental, cognitive, and affective functioning also was poor. Proxy perceptions consistently understated improvement and overstated deterioration in comparison with subject perceptions, regardless of area of function, although this difference was only significant for cognitive function. The tendency for proxies to overstate decline in subjects' global function is understandable in light of evidence that proxies overstate patient reports of disability in current functional health status.^{2,3}

This study had several limitations. Because study subjects were hip-fracture patients, proxies and subjects might have been focusing on aspects of functioning thought to be related to the fracture (lower extremity activities) more than would persons not having such an injury. Less extreme bias for improvement in lower extremity activities than in upper extremity activities may be due to different levels of attention given to these two groups of activities. The activity related to walking (walking 10 feet) was the only item for which proxies overestimated deterioration in comparison with subjects' performance. This exceptional finding may also be due to the proxy's special attention to motor performance. Second, there might be limited variability in change during the period from 6 to 12 months after the fracture. In hip-fracture patients, most recovery in functional health occurs by 6 months, with little additional recovery observed at the group level between 6 and 12 months.²⁷ Had the proxy rated change over a period beginning at the point of the fracture, the level of agreement and the extent of bias might have differed. Third, in the analysis for task-specific change, change measures used for the patient and proxy comparisons were not equivalent in terms of time frame and type of information: change in patients' measurements computed between two occasions and change perceived by a proxy only at the follow-up point. The lack of equivalence might distort the correspondence between proxy and patient information. Fourth, this study did not address patients' functional health before the hip fracture. The extent of change that a proxy regards as meaningful might vary according to the patient's level of functioning before the fracture. Functional health in the sixth-month assessment could be used as a surrogate variable, but because of the limited sample size, analysis stratifying patients by presence or absence of functional impairment at that month did not yield a consistent pattern of results. The limited sample size also hampered further analysis aiming to examine influences of characteristics of the subjects, characteristics of the proxies, and the proxies' relationship to the subjects on agreement and bias for proxy perception. Such influences have been reported with regard to current functional health status.^{6,11,28} Finally, the most severely cognitively impaired patients, often the ones for whom a proxy is most likely to be required, were not studied. Applying results of the present study to the agreement and bias of proxy responses for subjects who cannot provide their own responses must be done cautiously.

When the same proxy is used to rate a subject's functioning and quality of life at two time points, a computed change in the proxy reports may be useful.² To the authors' knowledge, two studies have evaluated this type of change measure, and neither supports the value of using the same proxy at two points.^{29,30} In older patients in mild to moderate stages of dementia, longitudinal change over 2 years computed from proxy and subject ratings on physical and instrumental functioning became increasingly discordant over time.²⁹ For a quality-of-life measure in older patients visiting hospital emergency departments, there was low to moderate agreement between subject and proxy change scores over 4 months.³⁰

Although it is impossible to determine whether a proxy or a patient reports change in the patient's functioning more accurately, the present study casts doubt on utility of proxy perception about change in older subject's functioning over a short period. Medical and healthcare professionals need to recognize poor concordance between proxy reports and patient-derived measures on a short-term change in patient's functioning. Researchers who use proxies also need to consider biases associated with proxy reports of such a change.

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Trunk deformity is associated with a reduction in outdoor activities of daily living and life satisfaction in community-dwelling older people

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Abstract We have evaluated the association between trunk deformities of the sagittal plane and functional impairment of daily living in community-dwelling elderly subjects. The analysis involved a detailed assessment of indoor and outdoor activities of daily living, satisfaction with life, and mental status. The participants in this study were 236 community-dwelling older adults, aged 65 years and older, living in Kahoku district of Kochi in Japan. The participants were classified based on their posture, which was assessed using photographs of the subjects, and interviewed to assess their basic activities of daily living (BADL), instrumental ADL (IADL), and cognitive well-being in the cross-sectional study. The statistical analysis was performed using the Mann-Whitney *U*-test. The lumbar kyphosis group received significantly lower BADL and IADL scores than the normal group. The trunk deformity group which were defined as kyphosis, flat back, and lumbar lordosis groups exhibited decreases in activities that included going out, shopping, depositing and withdrawing money, and visiting friends in the hospital. These activities require going outdoors; thus, this study showed that the trunk deformity group had limitations in outdoor activities. There was no significant difference between the geriatric depression score (GDS) and the pattern of posture. The abnormal trunk deformity groups tended to score lower than the normal group with regard to

subjective healthiness and life satisfaction measures, including subjective health condition, everyday feeling, satisfaction with human relationships, satisfaction with economic condition, and satisfaction with present life.

Keywords Activities of daily living · Kyphosis · Life satisfaction · Trunk deformity

Introduction

Several studies have reported on the relationship between trunk deformity and lumbago [1,2]. It is predictable that patients with abnormal posture would be at increased risk for falling, as their balance is perturbed by the posture abnormality [3,4]. Loss of distal lumbar lordosis is the main cause of sagittal imbalance in individuals who do not maintain sagittal alignment [5]. This abnormal posture could lead to the limitation of daily activities.

There have been several evaluations of posture and functional activities to date [6]; however, very few involve elderly subjects. Ettinger et al. [7] reported that kyphotic women did not have greater back pain, disability caused by back problems, or poorer health than non-kyphotic women. Another study showed a poor correlation between quality of life and abnormal findings on radiography or densitometry [8].

Vertebral body compression fractures have been shown to be associated with the severity of kyphosis [9]. Ryan et al. [10] reported that there was a significant association between scores of osteoporosis severity and limitations in functional activity. Vertebral compression fractures associated with osteoporosis can be self-limiting, causing considerable pain and disability [8].

Vertebral compression fractures are associated with significant impairments in physical, functional, and psychosocial performance in the elderly [11,12,13]. It is crucial to improve the mental status of the elderly. However, there have been few reports regarding the

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