Telemedicine & Tele-rehabilitation in Elderly Care

HA Convention

5 May 2008

Elsie Hui, FRCP

Community Geriatric Assessment Team

Shatin Hospital

Telemedicine (telegeriatrics) – what is it and why?

Telephone/ Fax	Traditional consultation
E-mail	Photos & X-rays, video clips
Internet	Health web sites, on-line assessment / education
Video-conference	Real-time, audio-video link

Patient	Isolation Frailty
Health care provider	Limited resources Traveling time
Hardware	I.T. hardware Broadband 3 G

The application of telemedicine to geriatric medicine

MICHAEL BRIGNELL[1], RICHARD WOOTTON[2], LEN GRAY[3]

[1] Western Health, Gordon St, Footscray, Victoria, Australia 3011, Australia
[2] Centre for On-Line Health, The University of Queensland, Level 3, Centre Building, Royal Children's Hospital, Herston, Brisbane, Australia 4029, Australia
[3] Academic Unit in Geriatric Medicine, The University of Queensland, Princess Alexandra Hospital, Ipswich Rd., Woolloongabba, Brisbane, Queensland, Australia 4102, Australia

Address correspondence to: Len Gray. Tel: 61 7 32405327; Fax: 61 7 32405399. Email: len.gray@uq.edu.au

Abstract

Background: telemedicine has the potential to improve access to the specialty of geriatric medicine, particularly in rural and remote settings. While telemedicine is widely used in some specialities, this is not yet the case in geriatric medicine.
Objective: to review the current literature to identify proven and potential strategies for application of telemedicine in geriatric medical practice.
Method: a comprehensive review of literature pertaining to the application of telemedicine in geriatric medicine and relevant related sub-specialties was undertaken.
Results: a large number of small studies of limited quality, and a small number of robust studies including randomised trials, were identified.
Conclusions: there is evidence to suggest that a variety of telemedicine techniques can be applied effectively and safely in geriatric medicine across a variety of clinical settings. Patient satisfaction is generally reported as high. Howeve, caution is advised due to the paucity of robust studies in the literature.

Keywords: *telemedicine, geriatrics, elderly, remote consultation*

Age and Ageing 2007;36:369-374.

Tele-geriatrics in residential care home setting

- Direct care
  - Physician (geriatrician, primary care)
  - Geriatric nursing
  - physiotherapy & occupational therapy
  - podiatry
- Specialist consultation
  - Dermatology
  - Psychiatry
  - Others (neurology, radiology ….)

Our History

- 1998 – 99
  Pilot study
  - SAGE Kwan Fong Nim Chee Care & Attention Home in Shatin
  - Medical, nursing, psychiatry, PT, OT, podiatry, dermatology

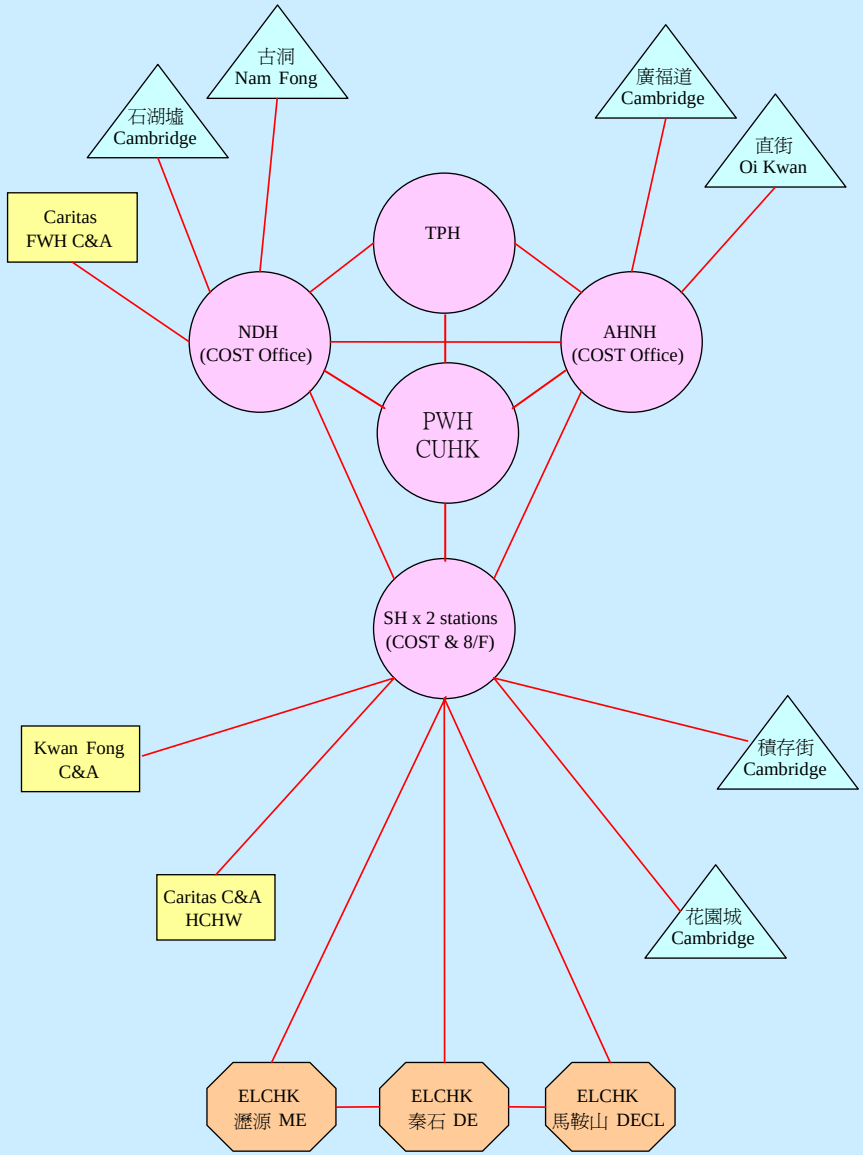
- Extension of telemedicine network
  - To other local residential care homes for elderly (RCHEs)
  - To other hospitals in New Territories and their local RCHEs
  - To a Home Care service provider

- 2003 - 04
  Community rehabilitation programmes
  - DM, OA, CVA, dementia, incontinence

NTE Geriatric Telemedicine Network

- 4 hospitals
- 9 RCHEs
- 5 elderly centres
- Broadband or ISDN (remote areas)
- Multi-point Videoconferencing machines

Also capable of connecting to anywhere in the world with an IP address and VC machine (386kbs)



Videoconferencing Hardware

Tandberg 880

(HKD 110 000)

- Shatin Hospital
- Norway
- 768kbps (IP/ ISDN)
- Multi-point (max 4)
- max 4 video outputs
- 72^{o} wide field of view

Polycom ViewStation FX

(HKD 75 000)

- Hospital and remote sites
- USA
- 512kbps (IP/ISDN)
- Multi-point (max 4)
- max 4 video outputs
- 48^{o} field of view

Pilot study: Intervention

- Shatin CGAT and a local Care & Attention home were linked via teleconferencing.
- Services provided via telemedicine wherever possible.
- Face-to-face visits were conducted if telemedicine inadequate for patient management.

Results

- Feasibility
- Costs
- Services provided & limitations
- User satisfaction

Table 1. Summary of activities and feasibility of Telemedicine

Discipline	Patient-episodes	% adequate with telemed
Geriatrician	356	97.2
Psychogeriatrician	149	99.3
Dermatologist	74	74
Nurse	101	88.7
PT	105	87.1
OT	117	59.8
Podiatrist	99	84.9

Telemedicine is Cheaper

Table 2. Cost comparison between Telemedicine and outreach service or outpatients

Discipline	Telemedicine	Outreach	Outpatients
Geriatrician	$40.3	$153	$455
Psychogeriatrician	$91.6	$105.9	$455
Dermatologist	$117.9	N/A	$455
Nurse	$22.7	$67	N/A
PT	$63.6	$330.4	N/A
OT	$54.6	$290.8	N/A
Podiatrist	$29.2		$160.8

N/A = not applicable

Geriatrician

- Follow-up of old cases
- Triaging urgent medical problems
- Saves time and increases productivity
- Reduced unnecessary A&E visits by 10%
- Reduced acute hospital admissions by 11% over 1 year
- Limitations - new patients, chest auscultation

Nurse

- Assessment - swallowing test, wounds, use of inhaler, placement
- Educate patients and carers
- Act as liaison between in-patient service and nursing home
- More frequent review
- Facilitate earlier discharge
- Limitations - complex dressing procedures, clients with communication problems

Physiotherapist

- Screening new cases
- Reduces waiting time and shortens follow-up intervals
- Nursing home staff able to facilitate assessment and supervise rehabilitation
- Limitations - patients with severe communication difficulties, examination e.g. auscultation, neurological or musculoskeletal, specialized treatment modalities e.g. TENS, manual techniques

Occupational Therapist

- Useful for screening - better prepared for site visit, reduces inappropriate referrals
- Reduces waiting time and shortens follow-up intervals
- Closer monitoring
- Limitations - assessing range of movement, activities of daily living in real life situation, environmental barriers, prescription of splints, wheelchairs and pressure garments

Podiatrist

- Foot screening - nails, between toes, heels
- Assessment of wounds, footwear, gait
- Advise staff and patients on dressing techniques and foot protection
- Triaging referrals according to urgency
- Allows earlier discharge from hospital
- Limitations - cannot perform full neurological or vascular assessment

User satisfaction

- Patients - depending on discipline, 82% to 95% were satisfied with telemedicine.

- Nursing home staff - system was user-friendly, boosted confidence, enhanced support from CGAT.

Conclusions

- Telemedicine is an acceptable and useful adjunct to conventional outreach services.
- It enhances the CGAT's efficiency and improves support to nursing home residents.
- Costs can be off-set by linking up with more homes and extending hours of service.

Electronic Stethoscope

(USD 700)

- Directly plugged-in to VC hardware
  - but image is lost
- Quality seems better using broadband
- Heart sounds distorted
- Breath sounds hopeless!
- Not much extra contribution to physician care
- Easier to train nurses (at patient's end) to auscultate!!!

Telemedicine in rehabilitation and maintenance of chronic diseases

Rehabilitation programmes

- Chronic conditions
  - DM
  - dementia
  - OA
  - stroke
  - incontinence
- Content
  - exercise
  - education
  - group discussion
  - peer support
- Outcomes
  - objective
  - subjective
  - qualitative
  - teleconferencing as medium of instruction
- Role of lay personnel
  - staff of elderly centres
  - volunteers
  - patients

Shatin Hospital

Telehealth
headquarters

ELCHK Social Services Network in Shatin

C

A

B

D

E

Day Care

HomeHelp

Community Clinic

Social Centre

Home Help

Social Centre

Day Care

Social Centre

Community Clinic

Social Centre

Why Tele-rehabilitation?

- More cost-effective
  - utilize community resources
  - multiple subjects / sites
- Real-time link allows interaction
  - instructor - subject
  - subject - subject
- ‘Group’ has advantages over 1:1 intervention
  - CDSMP model

Video conferencing link

1.5Mbps
Telemed Fibre IP Link

Broadband Network

1.5Mbps
Telemed Fibre IP Link

Shatin Hospital

Community centre

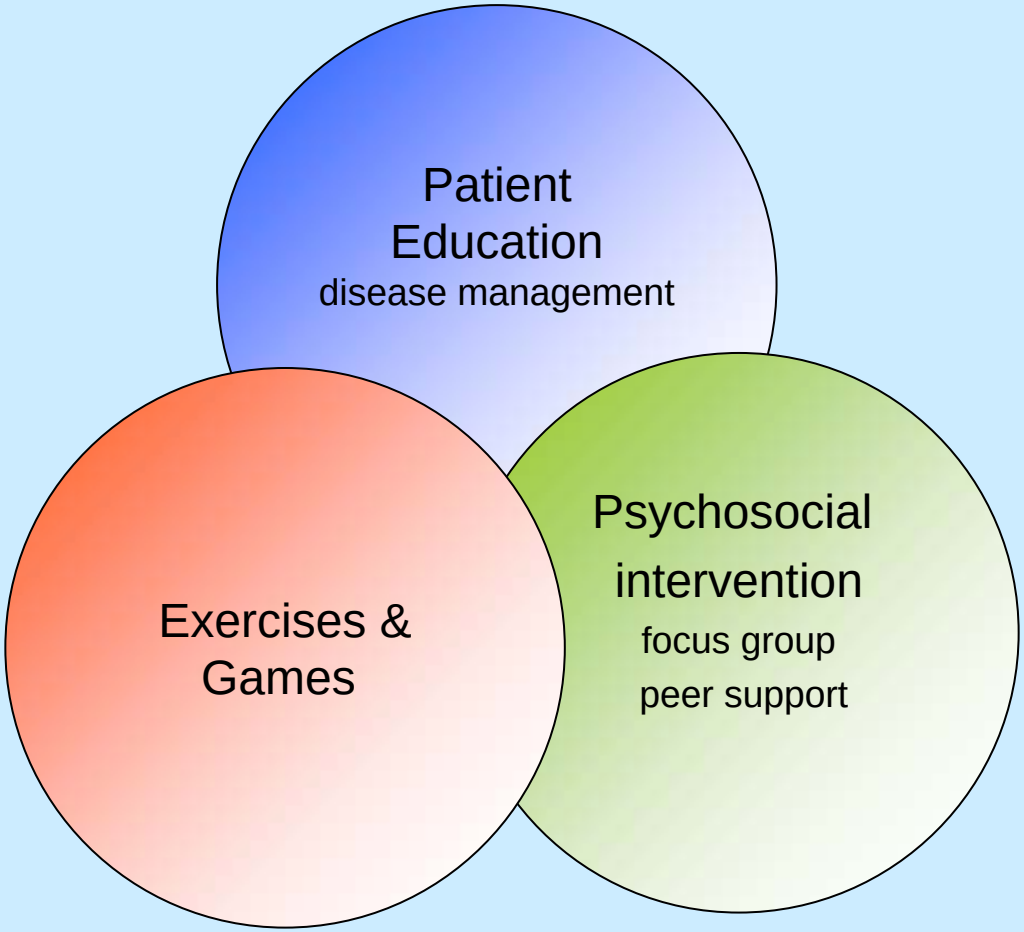
An example: Diabetes

Aim: to examine the effect of a self-management program in elderly DM patients via teleconference

- Features:
  - 8 sessions
  - 1 one-hour session/ week
  - Groups of 8 – 12 patients
- Outcome measures:
  - Diabetes quality of life questionnaire (DQOL-revised)
  - SF-36
  - DM knowledge test
  - 24-hours dietary recall

Dietary advice

Program Content



Exercise training

- The whole exercise session lasted for 30 minutes.
- It started with a 5-minute warm up




- 10-minute resistance training with the use of elastic tubing (Theraband®)


- Followed by a 10-minute aerobic dance

- And ended with a 5-minute cool down or progressive muscle relaxation training.

Foot examination & blood sugar monitoring

Key Findings

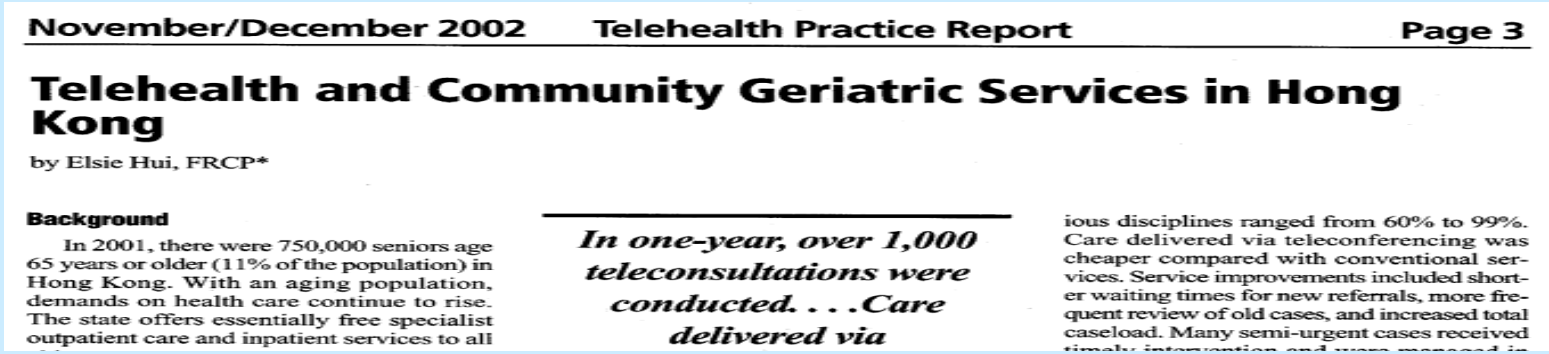
Significant changes were observed in the following outcomes:

- Diabetes Knowledge Test
- Mean post-prandial blood glucose (12 $\rightarrow$ 8 mmmol/l)
- Nutritional status
  - Dietary intake (carbohydrates, protein, fat)
  - Body Mass Index (25.4 $\rightarrow$ 24.9)
  - Sig weight reduction in 36% of subjects
- QOL
  - Diabetes QOL questionnaire (*all* domains)
  - SF-36 (6 out of 8 domains)

Conclusions

- Community-based group rehabilitation programs incorporating exercise prescription, education and peer support can improve patients' physical and psychological outcomes in various common chronic diseases.
- The programs should be part of a comprehensive care package offered to patients with chronic diseases.
- Community centres for older persons are the ideal location for running these programs.
- Teleconferencing is a feasible and acceptable means to deliver such programs, and allows health care professionals to reach out to more patients in the community.

Telegeriatrics publications



November/December 2002 Telehealth Practice Report Page 3

Telehealth and Community Geriatric Services in Hong Kong

by Elsie Hui, FRCP*

Background

In 2001, there were 750,000 seniors age 65 years or older (11% of the population) in Hong Kong. With an aging population, demands on health care continue to rise. The state offers essentially free specialist outpatient care and inpatient services to all

In one-year, over 1,000 teleconsultations were conducted. . . .Care delivered via

ious disciplines ranged from 60% to 99%. Care delivered via teleconferencing was cheaper compared with conventional services. Service improvements included shorter waiting times for new referrals, more frequent review of old cases, and increased total caseload. Many semi-urgent cases received

Hui E et al. Telemedicine: A pilot study in nursing home residents. Gerontology 2001;47:82-87.

Chan WM et al. The role of telenursing in the provision of geriatric outreach services to residential homes in Hong Kong. J Telemed Telecare 2001;7:38-46.

Hui E, Woo J. Telehealth for older patients: the Hong Kong experience. J Telemed Telecare 2002;8(suppl.3):S3:39-41.

Tang WK et al. Telepsychiatry in psychogeriatric service: a pilot study. Int J Geriatr Psychiatry 2001;16:88-93.

Corcoran H et al. The acceptability of telemedicine for podiatric intervention in a residential home for the elderly. J Telemed Telecare. 2003;9(3):146-9.

Tele-rehabilitation publications

Telemedicine in rehabilitation

Elsie Hui. In *Teleneurology*, 2005; Royal Society of Medicine Press Ltd. Eds.Richard Wootton & Victor Patterson

DM

Chan WM, Woo J, Hui E et al. A Community model for care of elderly people with diabetes via telemedicine. *Applied Nursing Research* 2005;18:77-81

OA

Wong YK, Hui E, Woo J. A community-based exercise programme for older persons with knee pain using telemedicine. *J Telemed telecare* 2005;11:310-315

Stroke

JCK Lai, J Woo, E Hui, W M Chan. Telerehabilitation – a new model for community based stroke rehabilitation. *J Telemed Telecare* 2004;10:199-205

Dementia

Poon P, Hui E, Dai D, et al. Cognitive intervention for community-dwelling older persons with memory problems: telemedicine versus face-to-face treatment. *Int J Geriatr Psychiatry* 2005;20:285-286.

Urinary incontinence

Hui E, Lee PSC, Woo J. Management of urinary incontinence in older women using videoconferencing versus conventional management: a randomised controlled trial. *J Telemed Telecare* 2006;12:343-347

Teleneurology

Edited by

Richard Wootton

Centre for Online Health, University of Queensland, Brisbane, Australia

Victor Patterson

Royal Victoria Hospital, Belfast, UK

Foreword by

Charles Warlow

Professor of Medical Neurology, University of Edinburgh, Edinburgh, UK

The Royal Society of Medicine Press Limited

▶7

Telemedicine in Rehabilitation

Elsie Hui

Introduction

Telerehabilitation is the assessment, diagnosis, direct therapy, education, monitoring and support of patients at remote sites via telecommunication methods, ranging from use of the telephone to videoconferencing through the Internet or dedicated digital links. Rudimentary telerehabilitation was developed to provide care to disabled patients living in remote areas, who, due to their physical limitations, had particular difficulty in travelling to urban rehabilitation facilities. Since then, significant advances have been made in the technology involved, both in the equipment used to provide direct patient care and in the stations and networks used to link therapist and patient. It has been suggested that telerehabilitation could become an important modality to service providers who are seeking to extend post-acute care into a non-clinical setting.[1] For example, by extending rehabilitation beyond the hospital and into the community or into the home, providers can continue to monitor patients' progress, identify areas in need of improvement before complications set in, and ultimately improve patient function and decrease long-term disability and costs.[2]

Overview

While many centres are using telemedicine to provide otherwise conventional rehabilitative care to patients with neurological diseases, some researchers are exploring the use of human–computer interface systems to enhance the quality of care provided and, hence, clinical outcomes.[3–5] With the increasing availability and affordability of home computers and Internet connections, the cost of telerehabilitation has fallen substantially in recent years. Telerehabilitation has been applied in numerous neurological conditions, including stroke, brain and spinal injury, and cognitive impairment. In addition to direct links between patients and healthcare professionals, disease-specific websites provide important information on neurological conditions to patients and their families and carers.

Home-based teletherapy

Home-based teletherapy is the delivery of healthcare, in particular physical therapy, to disabled patients at home. Researchers at the Jim Thorpe Rehabilitation Center in

Success & Limitations in Tele-geriatrics
(our experience)

Success
- 'Believers'
  - Service users
  - Service providers
- User-friendly equipment
  - Commercially available
  - Affordable
  - High / low end
- High volume
  - RCHEs, social centres
  - Multidisciplinary
  - Health promotion & maintenance

Limitations
- Skepticism
- Techno-phobia
- Stethoscope
- Home alone
- Changes in health care delivery model
  - Visiting Medical Officer after SARS

Thank you

huie@ha.org.hk