

# Methodological notes on a collaborative, action-research programme on nutrition and ageing

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## Abstract

*Knowledge on the nutritional needs and vulnerabilities of older people in many low-income countries is limited. A collaborative research programme between HelpAge International and the London School of Hygiene and Tropical Medicine sought to help fill this gap. This paper outlines the approaches used during the research and the ways in which the research outcomes are now being used to directly benefit older persons and to advocate their rights.*

"How does one know if older people are malnourished?" When this question was asked of HelpAge International in 1992, it prompted a major collaborative research initiative in two continents (Africa and Asia) and, seven years later, the start of a nutrition training and advocacy programme based on research outcomes.

In this paper we outline some of the questions which the programme sought to answer; examine challenges which we faced during the course of the programme; and describe how the research outcomes are currently being used. We also endeavour to draw lessons from experience gained thus far for future research and training initiatives.

The paper focusses on the research process; findings of the research have been documented elsewhere (Chilima & Ismail, 1998; Gregory & Peachey, 1997; Manandhar, Anklesaria & Ismail, 1997; Pieterse, Manandhar & Ismail, 1998).

## Partnership

When HelpAge International (HAI) realised that it did not have information with which to respond to enquiries relating to nutrition and older people, it approached the London School of Hygiene and Tropical Medicine (LSHTM) for assistance. A literature review ensued, which highlighted a general lack of information about nutrition issues and appropriate interventions for older people in low-income countries. This gap in knowledge validated a need for research on nutrition and ageing in developing countries, as well as for action.

Following on further discussion between HAI and the LSHTM on the paucity of information in this area, a partnership was formed between the organisations and a collaborative research programme was launched. The programme brought together the needs of NGOs for nutrition-related

information that could help direct programming, and the research and technical expertise of an academic institute with a focus on nutrition in developing countries. Based on yet further discussion with European researchers<sup>1</sup> who had studied nutrition issues affecting older people, a research proposal was developed in which the research design consisted of two parts:

- (1) A community study of older persons to develop and apply a wide range of anthropometric measurements, as well as to examine the relationship between nutritional status and ability to live independently.
- (2) A study to develop and apply nutritional status indicators among older persons in a refugee camp.<sup>2</sup>

Primary concerns that contributed to the development and thrusts of the research programme were as follows:

- The research should demonstrate whether good nutrition is related to a better quality of life in older persons.
- Simple, easy-to-use indicators needed to be identified, based on quality research, to assess nutritional status of older persons in low-income countries, where the effects of ageing on body composition may differ from those observed in largely well-nourished populations.<sup>3</sup>
- The research outcome should be used to advocate for greater attention to be paid to the nutritional and other needs of older persons.

## Study populations and methods

Prior to carrying out the studies, briefing meetings were held with relevant ministries and organisations, and with local leaders and the communities in the selected study areas. The study covered 2 523 subjects aged 50 years and over in three sites: urban slums in India, a refugee camp in Tanzania and rural areas of Malawi. A descriptive summary of the study sites and populations is given in Figure 1.

All studies gathered basic demographic information and assessed functional ability and anthropometric status as follows:

- Piloted questionnaires were used to collect demographic information, details of living arrangements, migration history, and information on socio-economic status and daily activities. Where age determination was problematic, local

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historical events and the age of the oldest surviving child were used to estimate the age of a subject.

- Functional ability was assessed through self-report assessments, observation and physical performance tests, using validated methods adapted to local socio-cultural contexts. The questionnaire determined subjects' ability to carry out activities of daily living (ADL) independently and level of mobility. The physical performance tests<sup>4</sup> measured muscle strength, psychomotor function, flexibility and manual dexterity.
- Weight, height, armspan, halfspan, mid-upper arm circumference and triceps skinfolds were measured. In Tanzania and India, maximal calf circumference, knee height, biceps and sub-scapular measurements were also taken. All measurements were carried out by specially trained research assistants and supervised in the field by the lead researchers. With the exception of housebound individuals, all participants were asked to come (with assistance, if necessary) to a central location: temporary clinics in the slums in Mumbai (India); village centres in the case of Malawi; and the project centre in the refugee camp in Tanzania. We were thus able to undertake all measurements in optimal conditions. Housebound individuals were visited at home, where conditions for anthropometric assessments were sometimes less than ideal.

**Figure 1**  
Descriptive summary of the study sites and sample populations

	India	Malawi	Tanzania
<b>Site</b>	Urban slums (Mumbai)	Rural areas (Lilongwe district)	Rwandan refugee camp (Chabalisa 2)
<b>Method</b>	Interviews conducted at temporary community clinics. Housebound subjects interviewed at home. Clinical examinations and blood tests conducted in hospital. Case studies carried out at home.	Interviews conducted at a central place in the village. Housebound subjects interviewed at home. Basic clinical examinations conducted by nurses.	Interviews conducted at various sites in the camp. Housebound subjects interviewed at home. Basic clinical examinations conducted by nurses. Case studies carried out at home.
<b>Number of subjects</b>			
Males	545	97	446
Females	790	199	446
Total	1 335	296	892
<b>Age range</b>	50 - 96 years	55 - 94 years	50 - 93 years
<b>Fieldwork period</b>	March 1993 - March 1994	April - July 1996	October 1995 - July 1996

In addition, in all studies clinical examinations were conducted and information was obtained on social issues and food access. However, the extent and level of detail of the measures varied from site to site.

- Clinical assessments were carried out to measure blood pressure, and questions were asked about health, medical conditions, chronic illnesses, smoking and drinking habits, the availability of care, and so on. In the two African sites, these examinations were conducted by nurses. More detailed, hospital-based examinations by doctors were carried out in India, where biochemical and haematological tests were also done.

- Information was obtained on social issues, including social networks and support structures, assistance received, stressful events and life concerns. These aspects were investigated in detail in the refugee camp site. In-depth case studies at this site also probed the impact of psychological and physical trauma on quality of life, mental state and appetite.
- Detailed information on food access was obtained in the two African sites. In the refugee camp in Tanzania, the nutrient content of the general ration was assessed, and each participant was asked to provide information on other foods procured (by means of own production, purchase, gift or exchange) and a typical day's diet. In addition, a food frequency questionnaire was administered. In-depth case studies were carried out in a sub-sample of the refugees, when detailed information was obtained on intra-household food distribution and food likes and dislikes. In Malawi, information was obtained on meal frequency by season and on meal practices (whether the subject ate alone, who prepared the food and whether assistance was provided with eating).

Quality control issues were at all times paramount. Comprehensive training was provided for the field teams as work started in each site; further refresher training was provided as the data collection progressed. Specially recruited field supervisors with a nutrition background monitored the day-to-day activities, and ensured that procedures were followed and that all questionnaires were fully completed. Equipment was calibrated and checked regularly. In the case of anthropometric data, all measurements were taken twice for each subject; if significant variances were obtained, the measurements were repeated. Technical errors of measurement (TEM) and co-efficients of reliability were calculated for each measurement and found to be within established acceptable limits (Ulijaszek & Lourie, 1994). In each site, a principle researcher supervised the data collection, offered training and provided overall management of the site work.

Ethical clearance for the research was obtained from the LSHTM's Ethics Committee and from the appropriate local authorities. With studies of this magnitude and complexity, costs can be high and external funding is needed, which can take time to secure.

#### Data analysis: some issues and key findings

The data were collated and analysed by the research team at the London School of Hygiene and Tropical Medicine. Analyses ranged from simple descriptive statistics to complex multivariate modelling, in an attempt to answer the following questions:

- (1) What is the prevalence of undernutrition and functional impairment among older persons in the three study sites? Is there a link between nutritional status and functional ability?
- (2) Are there simple, field indicators that can be used by non-nutritionists with training to assess the nutritional status of older persons?
- (3) Why do older persons become malnourished? What were the profiles of nutritional vulnerability in the three sites?

Analysis and interpretation of data on anthropometric measurements and nutritional status from older adults present some special problems:

- *Anthropometric data.* Age-related changes in stature, body composition and ability to stand up straight (because of

poor muscle tone, spinal curvature, bent legs) clearly have implications for the accuracy of anthropometric measurements. In surveys of elderly Caucasians, various long-bone measures have been used as alternatives to height. Armspan, a simple measurement easily obtained in field settings, is almost exactly equal to height in Caucasians, but its relationship to height is different in other ethnic groups (Reeves, Varakamin & Henry, 1996). We therefore needed first to establish the relationship between height and armspan in each site, using only data from subjects in whom accurate height measurements were possible. These relationships could then be used to estimate height from armspan for those people whose height could not be measured. However, it is important to note that the data base for these relationships is limited and extrapolation to other ethnic groups may not be appropriate.

Clearly there are also other measurement difficulties: weights (and often mid-upper arm circumference (MUAC)) cannot be obtained from individuals with oedema or missing a limb; arthritis in the shoulder, hand or finger joints may mean that armspan cannot be measured. Bed-bound or very frail subjects present special challenges.

- **Assessment of nutritional status.** Body mass index<sup>5</sup> (BMI) is the established indicator for assessing the nutritional status of adults. Specific cut-offs of the BMI have been identified to define degrees of under and over nutrition in younger adults (James, Ferro-Luzzi & Waterlow, 1988), but the applicability of these measures to older persons has not been established. Age-related changes in body composition may alter, or at least limit the functional significance of these cut-offs.

More recently the use of MUAC as a screening tool for adults in emergency settings has been investigated. Cut-offs have been proposed to define severity of undernutrition in young adults (James, Mascie-Taylor, Norgan *et al.*, 1994). We have used our data sets to calculate similar cut-offs for older adults, and calculated the sensitivity and specificity of these cut-offs. As with the height/armspan relationships, it is important to recall that the MUAC values are also based on a limited data set, and need to be validated further and verified for other ethnic groups.

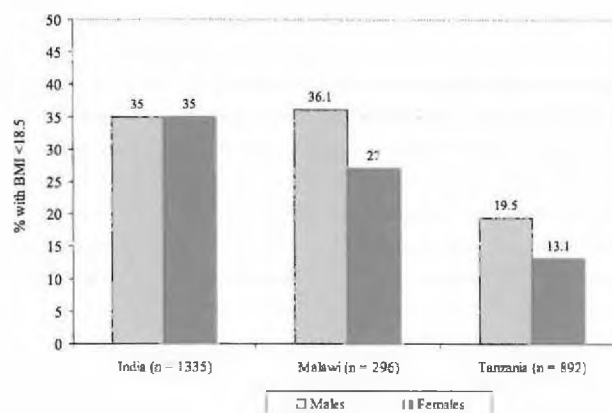
- **Cultural adaptations of measures of functional ability.** These measures need special attention and must be validated for each site. Thus, for example, the ability to use public transport is not an appropriate indicator of function in poor rural populations. Differences in types of toilet facilities, methods of self-feeding (by hand or with cutlery), access to shops, definition of incontinence, and cultural norms and attitudes to receiving assistance in bathing and dressing, are some factors which influence interpretation of findings and cross-cultural comparisons. The extent to which an observer encourages and exhorts an older person when carrying out a physical test will also influence performance. Good training and standardisation of techniques are thus essential.

Figure 2 below shows the prevalence of undernutrition in older males and females in the three sites of the studies conducted by LSHTM and HAI.

In all three studies, the prevalence of undernutrition increased with age among women ( $p < .05$ ). We used multiple regression analyses (for the Malawi and Tanzania studies) and logistic regression (for the India study) to examine the

relationship between nutritional status and functional ability. Nutritional status was significantly associated ( $p < .05$ ) with a number of important dimensions of functional ability (even after controlling for age, sex and disease): muscular strength, psychomotor function, mobility and ability to carry out a number of activities of daily living.

**Figure 2**  
Prevalence of undernutrition in three study sites, by gender: percentages



### Initial dissemination

Analysis of the data from all three sites was completed in 1997. Recommended anthropometric measurements were identified, methods to assess the nutritional status were established for older persons in sub-Saharan Africa and the Indian sub-continent, and vulnerability assessment methods were tested.

Analysis of the data yielded a clear picture of the nutritional situation of older persons in each of the surveyed communities. Based on the research outcome, papers were published and information disseminated through various mediums. During the initial phase of the programme, dissemination was mainly targeted toward academic and technical audiences, which included presentations at conferences and publications in scientific journals (Manandhar, 1995; Manandhar, Anklesaria & Ismail, 1997; Chilima & Ismail, 1998; Pieterse, Manandhar & Ismail, 1998; Chilima & Ismail, in press). Such dissemination not only helped validate the research methodologies but also encouraged debate. Dissemination was subsequently broadened, to include non-technical audiences (Gregory & Peachey, 1997; Chilima, 2000) and nutrition and health networks (Ismail & Manandhar, 1997; Ismail, 1999). Throughout the dissemination, efforts were made to incorporate the wider realities of ageing as well as the technical findings of the nutrition research.

### Application of the findings

Both HAI and the LSHTM recognise the limitations of the research. Ideally, the data sets at each site should have been larger to permit specific analyses; for example, the relationship between BMI categories and functional outcome, including mortality, and differential analyses by age group. A greater number of sites would also have enabled a more in-depth examination of ethnic differences and differences between urban and rural populations. Similarly, although tools were developed to aid the identification of malnutrition, the problem of how to address malnutrition had not been tackled. As such, the completion of the data analysis in 1997 was an important juncture; however, although much had been

attained, much was also left unanswered. It was decided, although further research was needed, that there was a need to apply the outcomes of the research in a way that would provide direct benefit to older persons. As a result, the research collaboration between HAI and the LSHTM gradually shifted towards appropriate application of the findings.

A fieldworker's handbook was compiled, which sought to explain nutritional assessment concepts and approaches (both nutritional status and vulnerability) in non-technical terms for use by community workers in both development and emergency situations. The translation of technical concepts into simple, understandable but technically correct terms proved challenging. Initial drafts of the handbook were field tested in Ethiopia, Grenada and the Philippines, and substantial changes were subsequently made to the content and style of the book. The handbook *Better nutrition for older people: assessment and action* (Ismail & Manandhar) was finally published in 1999.<sup>6</sup>

At this stage, the aims of the programme had been met and arguably the need for collaboration between the LSHTM and HAI had come to end. However, it was recognised that without further significant investment in dissemination and training, there was a danger that the research outcomes would not be used and that the benefit to older persons would be minimal.

Plans for a broad-based programme of training and information on nutritional assessment approaches for older persons were subsequently developed with technical input from the LSHTM. The HelpAge International Africa Regional Nutrition Programme was launched in March 1999. A central premise of the programme is to work with a number of critical audiences that are well positioned to influence both policy and practice relating to nutritional issues affecting older people. In particular, the programme seeks to work with nutritionists from key nutrition institutes and organisations for older people, and to target NGOs involved in emergency work.

A workshop held in Nairobi in January 2000 brought together nutritionists from Kenya, Tanzania, Uganda, South Africa, Zimbabwe, Sudan, Ghana and Ethiopia. The workshop<sup>7</sup> provided an overview of ageing issues, as well as training on the assessment of nutritional vulnerability and anthropometric measurements – namely weight, height, armspan, half span and MUAC. Debate among the workshop participants on the research and the application of the findings in different settings ensued. As a result of the workshop, researchers at the universities of Stellenbosch (South Africa), Kenyatta (Kenya) and Addis Ababa (Ethiopia) have since launched research initiatives on nutrition and older persons in their countries. In two of the three cases, the work is being carried out in conjunction with local NGOs who will be able to apply the outcomes of the research in programme activities. In addition, the relevant departments at the universities of the North (South Africa) and Kenyatta (Kenya) have begun to adapt their academic curriculae to give greater focus to the nutrition needs of older people.

In addition to the training of nutritionists, training is being targeted at development workers in older people's organisations, with an aim to increase awareness of good nutrition among this group. The first of these workshops took place in June 2000; as such it is too early to assess the impact of the training but it is anticipated that it will gradually help to improve the quality of programmes that aim to improve the nutritional status of older people.

Training materials have been developed, including a series of posters on anthropometric measurements, MUAC tapes and a pocket guide for fieldworkers. The handbook has been

translated into Arabic; French and Portuguese versions are planned.

Recognising the vulnerability of older individuals in emergency situations, work has started on the preparation of recommendations for food intake in such situations. Once finalised, it is anticipated that the recommendations will provide guidance for organisations which operate in emergencies, on ways in which to address the nutritional needs of older people, i.e. in terms of programme design and dietary intake. As such, the food intake recommendations will provide a strong platform from which to advocate for the nutrition rights of older people.

### Lessons learned

The nutrition research programme has been a unique learning experience for both HelpAge International and the London School of Hygiene and Tropical Medicine. Remarkable features of the programme have been how few problems were encountered in the field and the smooth collaborative relationship between the two organisations, whilst the greatest frustration has been a lack of funding which hampered progress.

Lessons learned by the collaborators as outlined below once again pertain only to the research process and not to the research findings *per se*.

- The guiding principles for the research that were established at the start of the programme provided a solid foundation for both the research programme and the training programme. There was a commitment to conducting quality research and disseminating pertinent information.
- A clear understanding of the research questions helped to keep the research on course. The collaboration between an academic institute and an NGO proved effective and valuable. The need for answers to questions that would directly affect approaches to "hands-on" work with older people helped to keep the research focussed.
- Research on its own is not enough though. Whilst a need for more research on ageing and nutrition issues is recognised, research *per se* will not meet the needs of older people. The collaboration between the two agencies ensured that the work was needs driven and that the research outcomes would have direct application in work with older people.
- Effective collaboration between organisations is not always easy, particularly if there are differences in ideologies and areas of expertise. However, in this case the differences presented opportunities and a range of complementary skills rather than difficulties.

### The way forward

In recent years, there has been a gradual expansion of literature on ageing in Africa and this expansion is also reflected in the field of nutrition and ageing. The work of Charlton and colleagues (Charlton, 1998, 1997, 1995 and others) is of particular note and has contributed to the body of information on specific nutritional issues affecting older people in South Africa. In Kenya, longitudinal research over a 15-month period provided monthly information about dietary intake and body weight which highlighted large inter-seasonal weight changes among persons aged 65 years and over (Kigutha, Van Staveren & Hautvast, 1998). An important step has been taken by the United Nations' Sub-committee on Nutrition: its most recent report on the World Nutrition Situation (January 2000) includes for the first time a section entitled "Nutrition of older people in developing countries." Whilst it is encouraging to note that interest and research in

this area are increasing, in these countries nutrition and ageing remains an area in which information is poor.<sup>8</sup>

What else is needed? Certainly we need more data, both quantitative and qualitative, on the situation of older persons in developing countries, to refine our methodological tools and for advocacy. Above all, operational research is needed. We have almost no experience of nutrition interventions with older people. We need examples of good practice: we need to know what works, what is cost-effective and what is sustainable.

Through the dissemination of information and the encouragement of debate, it is hoped that the HelpAge International Africa Regional Nutrition Programme will act as a catalyst for further research and action to address the nutrition needs of older people in Africa.

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### Notes

1. The European researchers consulted were Dr Joan Bassey, Dr Paul Deurenberg, Professor John Durmin, Dr Tamara Harris, Professor Jeya Henry and Dr Geraldine McNeill.
2. When the study was first conceptualized, it was anticipated that the research would be carried out in camps for Mozambican refugees in Malawi, but the refugees returned to Mozambique before funding was secured for the study. A new study site was therefore found, in a camp for Rwandan refugees in Tanzania.
3. Chronic undernutrition in low-income countries and chronic overnutrition in developed countries may predispose individuals to different health and nutritional status in old age.
4. The physical performance tests used were as follows: Muscle strength: handgrip strength in kg (Bassey, 1990b) using a dynamometer; timed rises from a chair without using hands (Csuka & McCarty, 1985); psychomotor function: plate-tapping test (Bassey, 1990a); flexibility: internal and external shoulder rotations (Bassey, 1990a); manual dexterity: lock-and-key test (Williams, Gaylord & Gerritty, 1994).
5. Body Mass Index (BMI) = weight in kg/(height in m)<sup>2</sup>.
6. *Better nutrition for older people: assessment and action* (Ismail & Manandhar, 1999) is available from HelpAge International, London and the HAI Africa Regional Development Centre in Nairobi, Kenya.
7. The workshop report is available from the HAI Africa Regional Development Centre in Nairobi.
8. A symposium entitled "Nutrition and ageing in developing countries" has for the first time been included in the scientific programme of the USA Experimental Biology Annual Meeting, to be held in Orlando, Florida in April 2001. Information: <http://www.faseb.org/meetings/eb2001>

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