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Assessment of consistency between self reported health status and performance based health status (functionality) as measures of health status of adults in the Kassena-Nankana District, Ghana at the beginning of 21st century

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A Research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg
in partial fulfillment of the requirements for the
Degree of Master of Science in Medicine in the field of Population Based Field Epidemiology.

Entitled

Assessment of consistency between self reported health status and performance based health status (functionality) as measures of health status of adults in the Kassena-Nankana District, Ghana at the beginning of 21st century.

Submitted by

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Declaration

I, Pallavi S. Lele declare that this research report is my own work. It is being submitted for the degree of Master of Science in Medicine in the field of Population Based Field Epidemiology in the University of the Witwatersrand Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signature

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Student number – 0611776H

16th day of February 2009

Dedicated to

my husband

Sachin Arun Lele

Abstract

Introduction: Despite the steady growth of the elderly population in developing countries, this group, remains neglected in health related policies in developing countries, largely due to lack of empirical data on the health problems of elderly. There is need for research and development of convenient and cost effective ways of generating information on the health status of the elderly. Self reports of health are becoming common in health surveys of elderly throughout the world. Despite the considerable use of self reports in developed countries, in developing countries such research is only beginning. Therefore there is need for systematic documentation of factors affecting self reported health status in developing country settings for effective usage of self reports in surveys.

Material and methods: The Adult Health and Aging Survey undertaken by Navrongo Health Research Centre, Ghana, as part of WHO SAGE (Study on Global Aging) aimed at generating longitudinal data on health and wellbeing of the elderly in Kassena-Nankana district of Ghana. This survey provides an opportunity to assess consistency between various dimensions of self reported health by comparing measures in an effort to establish the validity of information obtained by self reports.

Analysis: Statistical analysis of self reported overall health (SRH), experiences of difficulty encountered in work and day to day activities (Overall Difficulty) and component experiences of health over various domains was carried out using ordered logistic regression and kappa analysis in order to understand what type of relationship exists between different types of measures of health. Overall self reported status of health (SRH) was the main outcome variable and three sets of variables were used as explanatory variables. The first set of variables captured functionality,

the second captured psychosocial aspects of health, while the third involved demographic characteristics as possible confounders.

Results: An analysis involving 4483 elderly individuals showed that functionality was associated with overall self reported health status in both summary and component forms. Addition of psychosocial domains to the model improved the model when summary functionality was used. However, addition of possible confounders did not improve the model.

Conclusion and recommendations: The findings indicate that sex, marital status and ethnic background are important factors to be taken into account while interpreting the responses of self reported health in the Kassena-Nankana district of Ghana. For the current analysis both outcome and explanatory variables were self reported. The findings of the study would get validated with further research into associations between self reported measures and performance based measures and qualitative inquiries on meanings of overall and component health experiences in the same population.

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Acronyms

DSS:	Demographic Surveillance System
INDEPTH:	International Network for Demographic Evaluation of Populations and Their Health
WHO:	World Health Organization
SAGE:	Study on Global Aging
SRH:	Self Reported Health Status
OverallDiff:	Overall self reported difficulty in day-to-day activities in past 30 days (Summary functionality)
Mobility:	Self reported ability to move
Selfcare:	Self reported ability to take care of oneself
Pain:	Self reported experience of pain and discomfort
Vision:	Self reported status of vision
SightExam:	Enquiry about whether the respondent has undergone sight examination
GlassesLong:	Enquiry about whether the person uses glasses for long-sightedness
GlassesShort:	Enquiry about whether the person uses glasses for short-sightedness
Functioning ability:	Self reported ability to carry out day-to-day functions
Assistiveaids:	Enquiry about whether the person uses assistive devices other than glasses
Cognition:	Self repored ability to concentrate, remember and learn
Interpersonal activity:	Self reported details about the interpersonal activity
Sleep energy:	Self reported difficulties with sleep and feeling rested
Affect:	Self reported state of mind.
Residence:	Place of residence – urban / rural.

Chapter 1 – Introduction

The past few decades have witnessed demographic transitions around the globe. Developed countries experienced reduction in mortality rates and increased life expectancy which could be attributed to the successful immunization programmes, available antibiotics, enhanced standard of living and hygienic practices, controlled physical environment, control on population size and advances in modern medicine. The increased life expectancy led to an aging of the population. Similar changes were subsequently observed in developing countries (1, 2, 3, 4, 5, 6).

Health care needs of the elderly age group are different from those of the younger age groups. The elderly require health care services much more frequently than the young adults, and some may require extensive intervention in day–to-day life. An aging population has considerable challenges for the health care system. These challenges could be increased as social and financial support that used to be taken care of by the traditional family systems disappear day by day. Consequently, there is the need for appropriate policies to deal with the growing health needs of the elderly, especially in the developing world. (1, 2, 3, 6, 7).

Any change in policies requires an empirical foundation (1, 2, 3). While there is ample evidence on issues related to the elderly population in the developed world, such information is scarce in developing countries (4, 6, 8).

Setting up a good information system is itself a costly undertaking; there is need for research and development of convenient and cost effective ways of generating information on the health status of the elderly. Self reports of health are becoming common in health surveys as cost effective ways of gathering information from elderly throughout the world (9). Research carried out in developed countries has established self reports of health as good predictors of future health and yet different groups of people (based on characteristics such as gender, ethnicity, education) vary in how they use underlying components of health experiences to summarize their health status (9). Despite the considerable use of self reports in developed countries, in developing countries such research is only beginning. Therefore there is need for systematic documentation of factors affecting self reported health status in developing country settings for effective usage of self reports in surveys (6,10, 11, 12).

1.1 Review of literature

As the name suggests self reported health status is reported by the respondent based on his /her own judgment about his/her own health. As self reported health status is based on an individual's own judgment, it is a subjective assessment of that person's health. Self reported health status is often ascertained using a single question "How would you rate your current health? Would you say that it is excellent, very good, good, fair or poor?" (6, 13).

A number of studies have reported that self perceived health status is a very strong predictor of future morbidity and mortality (2, 6, 13, 14). Capturing self reported health status through surveys is a simple, easy to administer and efficient way to ascertain the health status of large populations where gathering information on health by objective

measures is not feasible. Hence it is achieving importance in health research surveys (2, 6, 12, 13, 14, 16).

Self reported health status has been mostly studied as a factor influencing mortality in studies done so far (17, 18, 19). Traditionally, health used to be measured in terms of prevalence of risk factors, prevalence of type of disease, causes of death and level of utilization of health care services (12, 16). However, the current trend among researchers and policy makers is to measure health in terms of functioning and disability of different parts of the body (in terms of different aspects of health). These aspects of health such as ability to move, vision, pain et cetera are termed as domains of health (6, 20).

Self reported health status has been mostly studied as a factor influencing mortality in studies done so far (17, 18, 19). Studies trying to assess agreement between self reported health status and morbidity are scarce (1). Studying agreement between self reported health status and mortality is easy as compared to studying agreement between self reported health status and morbidity. The information required for capturing mortality is very little (whether a person died or not), but when it comes to morbidity the information required involves a battery of questions: starting with whether the person has some kind of morbidity if yes; then exactly what (an extensive set of questions); thirdly how that morbidity has affected respondent's life? One way to deal with the complexity in morbidity is to restrict the study sample to a group of people suffering from comparable morbidity e.g. group of osteoarthritis patients; but that limits generalizability of findings to that particular group of individuals (osteoarthritis patients in this case). In order to make the findings more generalizable another way is to use functionality (ability to perform day-to-day activities) of an individual as a measure capturing morbidity (7, 13). Sullivan's review of health

indicators before 1966, affirms the usefulness of disability (opposite of functionality) in terms of extent of inability to perform daily activities as an objective measure of status health (1, 6).

Sullivan's review of health indicators before 1966 also concludes that ability to perform day-to-day activities is relative to social settings (1, 6). It is necessary to study the association between self reported health status and functionality in developing country settings since most of the studies done so far have been done in developed countries such as the United States (4); the findings from such studies can not be applied directly elsewhere (11).

While physical functioning is usually measured through self reported ability to carry out day-to-day activities (13, 21). Ailinger (1989) reported that self reported health status was not associated with functionality (captured in terms of Instrumental Activities of Daily Living) based on a study among 185 non institutionalized Hispanic elderly. He suggested that the association between self reported health status and functionality should be studied in other groups of people (11).

Findings from the 1996 Study of Rapid Demographic Change and the Welfare of the Elderly (a series of surveys conducted in the Philippines, Taiwan, and Thailand on individuals aged 50 and over) showed no major differences in determinants (set of variables capturing self reported functionality) of self reported health status across the three countries (13). However, there were some "residual differences in the probabilities of reporting favorable self assessed health" even after adjusting for several determinants of health. As the available explanatory variables in the study did not fully explain the variability in reporting favorable health in different settings, the authors suggested that

future research should include more variables, including those that capture psychological factors (6).

The WHO defines health as “A state of complete physical, mental and social well being and not merely the absence of disease or infirmity” (6). As it indicates, there has been an expansion of the concept of health beyond just physical wellbeing. The normativist group supports the WHO definition of health agrees that health is “integrated human functioning within social context”. On the other hand the descriptivist group does not support the WHO definition of health, arguing that “diseases are concepts that can be specified in a value neutral manner purely in terms of statistical deviation from typical levels of biological functioning” (6, 20).

If we think about illness it is often a consequence of a combination of physical and social processes and as a result people having similar physical health status may or may not rate their overall health status in similar manner due to differential social influences (12, 20). Thus cross cultural differences are inevitable in health valuation due to the “multifaceted nature” of health valuation (3). Consequently, there is the need for standardized ways to understand the way individuals ascertain their health status (6).

Physical functioning could be divided into two parts - morbidity and its effect on physical functioning. Here too inconsistencies can be seen in terms of differential physical functioning among individuals having similar morbidity status but living in different environments as well as differences in the mechanisms of coping with the situations among individuals belonging to diverse groups (5, 6, 15).

Our three project hypotheses are based on the findings above. We have hypothesized that addition of variables capturing psychosocial aspects to the set of explanatory variables of

self reported health status together with factors capturing functionality would form a more complete set of explanatory variables.

The hypothesis is based on

- Findings from Study on elderly Hispanics (i.e. it is important to study association between self reported health status and functionality among groups of people other than Hispanics) (11),
- Study of Rapid Demographic Change and the Welfare of the Elderly (i.e. psychosocial factors should be included in the set of explanatory variables together with factors capturing functionality while studying self reported health status as an explanatory variable) (6),
- Normativists group on WHO definition (i.e. health is "integrated human functioning within social context") (6, 20) and conceptualization of factors influencing illness mentioned above in preceding paragraphs,.

Self reported health status is influenced by social, psychological, and demographic factors, but there are no studies that examine the ways these factors impact self reported health status across population in different societies. There is need for further empirical evidence from developing countries in particular that allows meaningful cross national and cross-cultural comparison (2, 10, 11, 12, 13, 14, 23).

Ailinger (1989) reported that self reported health status was associated with education among elderly Hispanics. He suggested the importance in future research to explore what demographic characteristics influence self assessed health in other minorities. Based on this we hypothesize that the addition of demographic factors as explanatory variables in the analysis will improve the association between self reported health status and functionality.

Terwee et al. (2006) reported that self reported functionality is influenced by experience of pain. They also suggested that further research is required to see whether the finding still holds true in other groups of patients and other groups of people (24). Therefore, our third hypothesis in this study is that the experience of pain will be strongly correlated with self reported overall difficulty in day-to-day activities.

To test these hypotheses I have carried out an analysis using data from the WHO Study of Adult Health and Aging (WHO-SAGE) dataset collected by Navrongo Health Research Centre, Ghana. WHO-SAGE is aimed at establishing a longitudinal information system on health and well being of elderly in developing settings to fill the gap between the needs of elderly and policy.

1.2 Aim:

To assess the agreement between self reported health status and self reported functionality among the elderly.

1.3 Specific objectives:

1. To calculate summary scores for each component health experience independently.
2. To calculate overall summary score by putting all the components of health together.
3. To assess the agreement between self reported overall health status and self reported overall difficulty in day-to-day activities in past 30 days (as measure of functionality).
4. To assess agreement between self reported overall health status and component health experiences capturing functionality.
5. To assess the agreement between self reported overall difficulty in day-to-day activities in past 30 days encountered and component health experiences.

Chapter 2 - Methodology

2.1 Study design

This study involves secondary data analysis of the WHO-SAGE Survey (Summary Version) undertaken by the Navrongo Health Research Centre, Ghana. Additional variables on marriage and education have been drawn in aggregate from the demographic surveillance system of the Navrongo Health Research Centre.

The Navrongo Health Research Centre (NHRC) is a research institution of the Ghana Health Service based at Navrongo, the capital of the Kassena-Nanakana District in the Upper East region of Ghana. In addition to a variety of public health research projects on malaria, vitamin A deficiency, and adolescent sexual health, the Centre also has a demographic surveillance system in place that keeps track of demographic dynamics of the Kassena-Nanakana district and provides a platform for research. As a demographic surveillance site NHRC is a member of the INDEPTH Network. The INDEPTH Network is an international association of demographic surveillance sites in Asia and Africa (www.indepth-network.org).

2.2 Study site and population

The Adult Health and Aging Survey was conducted in the Kassena-Nankana District of the Upper East Region of Ghana. The district is spread over an area of 1675 km^2 and is placed between latitude 10° 30' N and 11° 00' N and longitude 1° 00'E and 1° 30' E. It is bordered by Burkina Faso on the north, Bolgatanga and Bongo districts on the east, Northern Region on the south and by Builsa District and Upper West Region on the west (WHO INDEPTH SAGE study proposal).

Most parts of the Kassena-Nankana district are rural. Navrongo (the district capital) and its surrounding area form the urban part of the district. The population of the Kassena-Nankana district is estimated at 149,491 with 15.6 % (23,231 people) of the population above 50 years. The sex ratio is 90.3 males to 100 females.

The Adult Health and Aging survey targeted the population aged 50 years or older in the Kassena-Nankana district. The study involved administration of two versions of the SAGE questionnaire: a summary version and a full version. Data analyzed in this report come from the summary version of the SAGE survey.

2.3 Adult Health and Aging Survey (Summary version)

The Adult Health and Aging Survey is an INDEPTH Network multi site activity in collaboration with the World Health Organization's Study on Global Aging (WHO SAGE). The survey forms part of efforts by the INDEPTH Network to establish a longitudinal database on the elderly to inform policies related to the well being of the elderly.

The current situation in developing countries as far as health and well being of elderly are concerned is characterized by: increased life expectancy; social transition reflected in terms of erosion of traditional family system that used to provide support to elderly; low economic development; financial constraints at individual as well as national level in terms of social security; already overstretched health care systems, and the HIV/AIDS epidemic. Despite the growing need to improve the quality of life of elderly, efforts in this direction have been hampered by lack of data on the health and well being of elderly that can direct the policy formulation. Therefore, there is an urgent need for studies on ageing and adult health to facilitate formulation of policies. The research on adult health and aging being undertaken by the INDEPTH Network in collaboration with WHO SAGE (Study on Global Ageing and Adult Health) is intended to address this need.

The NHRC's component of the study is intended to generate data on the health and well being of the elderly in the Kassena-Nankana district. A summary version of the questionnaire was administered in the district to explore the possibility of its inclusion in the regular demographic surveillance data collection. The data collection was integrated into the routine demographic surveillance system (DSS) data collection round that took place between January to April 2007. The information was collected through structured face-to-face interviews by trained data collectors. Data collectors involved in survey were trained in interviewing techniques and they also underwent a special training for the adult health survey. During regular DSS rounds each and every household in Kassena-Nanakana District is visited by the data collectors. Each data collector was provided a list of adults to be interviewed during their household visits. The survey was welcomed by the elderly age group in the community. There was a good response to the survey as it targeted elderly in contrast to most of the research activities that targeted women and children. Most of the questions in the questionnaire have 5 point scale response categories.

2.4 Sampling and Sample size

According to recommendations of the WHO/INDEPTH Network sites implementing the summary version may sample about 4000 50+ years individuals plus 1000 18-49 year individuals. The recommended sampling strategy is a single stage simple random sampling of 50+ years individuals from an updated listing, and a single stage simple random sample of 18-49 years individuals from an updated listing.

In order to ensure that the sample size of 4000 elderly and 1000 adults was attained, a sample of 6074 elderly (50+ years) and 1360 adults (18-49 years) in the Kassena-Nankana

district was drawn using the demographic surveillance data as sampling frame. Each DSS interviewer was given a list of sampled individuals in the households under their catchment area. These individuals were to be interviewed as interviewers updated events in the respective households.

2.5 Ethical considerations

Approvals from the University of the Witwatersrand Ethics approval committee for research on Human Subjects as well as the Institutional Review Board of Navrongo Health Research Centre were obtained to carry out this secondary data analysis.

Approval for the original survey was obtained from the Ghana Health Service Ethics Review Committee and the NHRC IRB. Before the commencement of the survey, community consultation and sensitization (giving information about the study) was done through meetings with chiefs and elders of various communities in the district. Community approval for the study was obtained from the chiefs and elders. At the time of interview individual written consent was obtained from the respondents.

2.6 Instruments

The WHO SAGE summary questionnaire was used for the survey. These are standardized questionnaire validated in different parts of world (Appendix 5).

2.8 Description of variables

The variables used in the analysis come from two sources: the summary version of the adult health and aging survey and the demographic surveillance data regularly collected by NHRC. Individuals in the adult health survey were linked to the demographic surveillance data base to obtain information on possible confounders (personal characteristics of the

respondents) using their personal identification numbers. Relevant personal information used in the analysis includes sex, age, ethnicity, marital status and place of residence.

Information on the result of interview was used to calculate response rate and in distinguishing between participants and non participants to be able to drop non participants from the analysis.

The first subsection of the summary version of the questionnaire has two questions as shown in Table 2.1

Table 2.1: The first subsection of the summary version questionnaire

Question number	Question	Possible answer	Dependent variable	Independent variable
Q1000	In general, how would you rate your health today?	Very good, Good, Moderate, Bad, and Very Bad	Objective 1	----------
Q1001	Overall in the last 30 days, how much difficulty did you have with work or household activities?	None, Mild, Moderate, Severe, and Extreme/cannot do	Objective 5	Objective 1

Independent variables

Summary score calculated using variables in subsections of section 1000 in summary version questionnaire were used as explanatory variables for objective 4 and 5. These subsections capture self reported component health experiences (Appendix 5).

Calculation of summary scores (Objective number 1 and 2)

As a first step in data analysis composite indices were calculated as described below and these indices were used as explanatory variables. I have referred to these composite indices as summary scores throughout the report.

1. Averaging (4)

I will use the mobility subsection to explain the method of calculating summary scores by the averaging method.

In the questionnaire the mobility section appears as shown in Table 2.2

Table 2.2: Mobility subsection in the questionnaire

	Overall in the last 30 days,…	*None*	*Mild*	*Moderate*	*Severe*	*Extreme / Cannot do*
Q1002	…how much difficulty did you have with moving around?	1	2	3	4	5
Q1003	…how much difficulty did you have in vigorous activities (vigorous activities' require hard physical effort and cause large increases in breathing or heart rate)?	1	2	3	4	5

The Mobility subsection has two questions. The respondent has to rate his difficulty in mobility in the past 30 days on a 5 point scale from None to Extreme / cannot do. Before calculating summary score the order of numeric codes was reversed such that the favorable outcome (None) has highest numeric code i.e. 5.

There was an additional response category as “Not applicable” in addition to the 5 point rating scale for pain and discomfort subsection and the functioning assessment subsection. Not applicable indirectly means absence of difficulty therefore this category was merged with the response category “None”. It appeared as either “0” (Pain

subsection) or “8” (Functioning assessment subsection) and was replaced by numeric code 5 (Appendix 1).

An average score was calculated for each respondent based on his/her responses to items on each domain. For instance, if a respondent reported mild difficulty (a converted score of 4) in moving around and severe difficulty (a converted score of 2) in vigorous activities then his mobility score becomes 3. A similar procedure was carried out for all the domains (self care, pain and discomfort, vision, etc.). The summary scores calculated ranged from 0 to 5. As a result most of the summary scores did not have normal distribution therefore these variables were recoded into categorical variables. The cut off points used for categorizing summary scores were 0-1 (Extreme / Cannot do), 1.1-2.0 (Severe), 2.1-3.0(Moderate), 3.1-4.0 (Mild) and 4.1-5.0(None). I have used summary scores obtained by averaging method both for univariate and multivariate analysis.

2. Factor analysis

The reason behind using factor analysis in calculating summary score is as follows: overall summary scores (all the variables in all the subsections combined) calculated by averaging method would appear as single number combining all the underlying component health experiences in it and may not reflect the way these component health experiences influence each other. In contrast factor analysis arranges all these component variables in an order that is based on correlations among themselves. There are several combinations of variables in the output of factor analysis. These combinations are called factors. Factor 1 is the best possible combination. It was followed by generating a predicted variable on factor 1 and which was further divided into 5 quintiles to get the categorized variable. In the averaging method it would not have been possible to adjust for possible confounders for e.g. age could not have been

combined with the component health experiences as age has different type of response categories than health experiences, but in factor analysis method of calculating summary scores it was possible to add possible confounders (These variables included age, sex, education, marital status, ethnic background and place of residence of the respondent).

Other explanatory variables (possible confounders)

Six characteristic of respondents were available viz: age, sex, marital status, ethnic background, education and place of residence (Table 2.5). These other explanatory variables provided a context for the association between dependent variables (SRH and OverallDiff) and the explanatory variable (Component health experiences).

Table 2.3: Other explanatory variables / possible confounders

Variable	Source Data	Response categories
Age	Demographic Surveillance System.	- 50-59 years - 60-69 years - 70-79 years - 80 years and above
Sex	Summary version adult health questionnaire	- Male - Female
Marital status	Marriage Survey (add on module on the DSS administrated annually).	- Never married - Ever married
Ethnic background	Demographic Surveillance Survey.	- Kaseem - Other ethnic group
Level of education	Demographic Surveillance Survey	- Ever been to school - Never been to school
Place of residence	Demographic Surveillance Survey.	- Rural - Urban

2.9 Data management and cleaning

I obtained a dataset of 6019 individuals from the Navrongo Health Research Centre. My analysis was restricted to individuals 50 years and above, therefore 998 individuals (below 50 years of age) were dropped leaving 5021 individuals. A further 538 people were

dropped because they were not interviewed for various reasons. A total of 4483 individuals aged 50 years or older were successfully interviewed and form the sample for my analysis. There were few non responses for some of the variables as shown in the table below and such non responses appeared as numeric code "9" in the dataset and were replaced by system missing values (".") so that they drop out of the respective analysis. The changed denominators for calculations with variables having missing values appear in the column 3 of Appendix 1.

2.10 Data analysis

The descriptive analysis involved calculating the response rate, a comparison between participants and non participants, and a distribution of participants across response categories of the outcome variables (SRH and OverallDiff). The main analysis has been organized in terms of the main hypothesis of the study.

Descriptive statistics

- Calculating the response to the survey

$$\text{Response rate} = \frac{\text{Number of individuals who completed the interview}}{\text{Total number of individuals approached}}$$

- Comparison between participants and non participants

  I have made a comparison between the participants and non participants with respect to possible confounders using chi square to see if the two groups differ significantly in terms of their personal characteristics that are available. If there are

significant differences in the participants and non participants then the generalizability of findings would remain limited to the type of individuals similar to participants in terms of their characteristics.

- Distribution of outcome variables among subgroups of independent variables.

  Again chi square test was applied to see if there are differences in the distribution across response categories of the outcome variables in subgroups of the study population. (Self reported health status and self reported difficulty in day-to-day activities).

Main analysis

The main analysis involved ordered logistic regressions (25) and kappa analysis (26) to assess the validity among various measures of self reported health. The reason behind choosing ordered logistic regression is the ordered categorical nature of independent variables. I have also carried out kappa analysis as the variables are measures of health and kappa measures the level of agreement between various summary and component self reported measures of health. Results of analysis will indicate which component health experiences (aspects of health e.g. ability to move, experience of pain etc.) have agreement with overall self reported health status and overall self reported difficulty in day–to-day activities.

2.11 Limitations

Limitations of the secondary data analysis presented in this report are mostly related to the way the original data were collected.

- Marital status of men – The annually conducted DSS marriage survey targets women in the Kassena-Nankana district. The marital status of men was obtained indirectly from the marriage survey dataset. Those men whose permanent ID appeared as husbands of women in the data set were categorized as ever married and the rest were categorized as never married. It is possible that some married men were not captured in the survey as husbands; such men would have been wrongly classified in our analysis as never married. However, since our analysis involves only the elderly such misclassification would not be in great numbers.
- Ethnic background – The ethnic background data was available at the household level, but not at the individual level. As a result of intermarriages between ethnic groups sometimes the woman does not belong to the same ethnic group as the rest of the household. In such cases assigning the household's ethnicity to the woman may lead to misclassification.
- Place of residence – In the Kassena Nankana district, Navrongo town where NHRC is located and the surrounding area is classified as urban and the rest of the district as rural. In reality, the urban or rural status of some of the clusters of settlements does not conform to this broad categorization. This is another possible source of misclassification.
- Difficulty in differentiating between mild and moderate response categories – Response categories 'mild' and 'moderate' looked similar to some respondents. Thus some respondents may have given a 'mild' response when they meant 'moderate' and vice versa.

Chapter 3 - Results

3.1 Descriptive statistics

3.1.1: Response to survey

A total of 4,483 adults completed the interview out of 5,021 adults (50 years and above) approached, resulting in a fairly good response rate of about 89% (Table 3.1.1). The main reasons for non participation were either respondents were not found after three visits or the respondents had traveled or migrated.

Table 3.1.1: Response to survey

	Frequency	**Percentage**
Participants	4,483	**89.29**
Non participants	538	10.71
Total	5,021	100.00

3.1.2: Comparison between participants and non participants based on their background characteristics

A comparison between participants and non participants based on available background characteristics (from the DSS data) revealed that except ethnic background there were significant differences between those who completed and those who did not complete the interview (Table 3.1.2).

There were fewer participants belonging to age group 51-60 years as compared to non participants (49 % as compared to 43%). There were more female participants as compared to males. Ever married individuals participated more than those who were never married. There were more participants who have never been to school as compared to those who have ever been to school (83% as compared to 73%). Participation of the rural residents was more than the urban residents. The observed significant differences between participants and non participants in terms of background characteristics may limit the

generalizability of the observed influence of component health experiences on overall self reported health status and self reported overall difficulty in day to day activities in past 30 days.

Table 3.1.2: Comparison between participants and non participants for background characteristics

Characteristics	Participants		Non participants		Pearson chi2(1)
	No	Percent	No	Percent	
Age (years)					
50-59	1,927	42.0	265	49.3	0.044
60-69	1,606	35.8	171	31.8	
70-79	744	16.6	77	14.3	
80+	206	4.6	25	4.7	
Sex					
Male	1,747	38.0	238	44.2	0.018
Female	2,736	61.0	300	55.8	
Marital status					
Ever married	2,865	63.9	315	58.6	0.015
Never married	1,618	36.1	223	41.5	
Education					
Never been to school	3,738	83.4	395	73.4	0.0000
Ever been to school	385	8.6	63	11.7	
Not known	360	8.0	80	14.9	
Ethnic group					
Kaseem	2,135	47.6	267	49.6	0.379
Other than Kaseem	2,348	52.4	271	50.4	
Place of residence					
Urban	243	5.4	45	8.4	0.006
Rural	4,240	94.6	493	91.6	

3.2: Distribution of outcome variables among subgroups of study population – There were significant differences across the subgroups of study population in the distribution of frequencies across response categories of outcome variables (Table 3.2.1 and table 3.2.2).

Table 3.2.1: Distribution of self reported health status among subgroups of study population

Possible confounders ↓	Self reported health status (SRH)										P value
	Very Poor		Poor		Moderate		Good		Very Good		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Sex											
Male	1	0.1	85	4.9	530	30.3	911	52.2	220	12.6	0.0000
Female	7	0.3	136	5.0	1,113	40.7	1,294	47.3	186	6.8	
Age											
50-59 years	2	0.1	54	2.8	593	30.8	1,048	54.4	230	11.9	0.0000
60-69 years	4	0.3	82	5.1	614	38.2	771	48.0	135	8.4	
70-79 years	1	0.1	59	7.9	346	46.5	306	41.1	32	4.3	
80 & above years	1	0.5	26	12.6	90	43.7	80	38.8	9	4.4	
Education											
No school	7	0.2	198	5.3	1,417	37.9	1,828	48.9	288	7.7	0.0000
School	1	0.3	8	2.1	104	27.0	197	51.2	75	19.5	
Marital status											
Ever Married	2	0.1	109	3.8	963	33.6	1,476	51.5	315	11.0	0.0000
Never Married	6	0.4	112	6.9	680	42.0	729	45.1	91	5.6	
Ethnic background											
Kassem	8	0.4	140	6.6	661	31.0	1,079	50.5	247	11.6	0.0000
Other than kassem	0	0.0	81	3.5	982	41.8	1,126	48.0	159	6.8	
Place of residence											
Rural	5	0.1	197	4.7	1,579	37.2	2,082	49.1	377	8.9	0.0000
Urban	3	1.2	24	9.9	64	26.3	123	50.6	29	11.9	

Table 3.2.2: Distribution of overall difficulties in day to day activities across subgroups of study population:

Possible confounders ↓	Overall difficulty in day today activities (OverallDiff)										P value
	Extreme / Cannot do		Severe		Moderate		Mild		None		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Sex											
Male	42	2.4	106	6.1	429	24.6	728	41.7	442	25.3	0.0000
Female	60	2.2	195	7.1	899	32.9	1,114	40.7	468	17.1	
Age											
50-59 years	13	0.7	64	3.3	456	23.7	919	47.7	475	24.7	0.0000
60-69 years	31	1.9	98	6.1	509	31.7	657	40.9	311	19.4	
70-79 years	34	4.6	101	13.6	293	39.4	219	29.4	97	13.0	
80 & above years	24	11.7	38	18.5	70	34.0	47	22.8	27	13.1	
Education											
No school	94	2.5	271	7.3	1,149	30.7	1,542	41.3	682	18.3	0.0000
School	2	0.5	14	3.6	85	22.1	149	38.7	135	35.1	
Marital status											
Ever Married	37	1.3	122	4.3	756	26.4	1,301	45.4	649	22.7	0.0000
Never Married	65	4.0	179	11.1	572	35.4	541	33.4	261	16.1	
Ethnic background											
Kassem	58	2.7	184	8.6	737	34.5	638	29.9	518	24.3	0.0000
Other than kassem	44	1.9	117	5.0	591	25.2	1,204	51.3	392	16.7	
Place of residence											
Rural	89	2.1	276	6.5	1,271	30.0	1,747	41.2	857	20.2	0.001
Urban	13	5.4	25	10.3	57	23.5	95	39.1	53	21.8	

In all there are five objectives for the secondary data analysis presented in this research report. Out of these five objectives, objective no. 1 and 2 are calculation of the summary scores as preparation to carry out analysis of objective no. 3, 4 and 5. The method of calculating summary scores (objective no. 1 and 2) has been described in the methodology chapter of the report. The results have been organized as objective no. 3 (i.e. to assess the consistency between the self reported health status and overall difficulty in day-to-day activities in past 30 days.), objective no. 4 (To assess consistency between self reported overall health status and component health experiences) and objective no. 5 (To assess the consistency between overall difficulty in day–to-day activities in past 30 days and component health experiences) in this chapter.

3.3: Objective 3 and 4: SRH as outcome variable

Objective number 3 and 4 are based on the first hypothesis, which states that factors capturing functionality together with factors capturing psychosocial aspects would form a more complete set of determinants of overall self reported status of health (SRH).) and on the second hypothesis, that the addition of demographic factors as explanatory variables in the analysis would improve the association between self reported health status and functionality.

The outcome variable is Self reported overall status of health (SRH) for both objective 3 and 4. These two objectives differ in terms of measures of functionality used as main explanatory variables. For objective 3 the main explanatory variable is Overall difficulty in ability to carry out day–to-day activities in past 30 days (OverallDiff) as a summary measure of functionality. For objective 4, however, component health experiences(ability to move, ability to take care of one self, experience of pain and discomfort, vision,

functioning ability) capturing difficulty in day-to-day activities in past 30 days provide a set of main explanatory variables as a measure of functionality. Similar explanatory variables i.e. psychosocial domains and possible confounders (age, sex, marital status, ethnic background, level of education and place of residence) have been used in the analysis for objectives 3 and 4.

Ordered logistic regression and kappa analysis have been used to assess the association between overall self reported status of health and the measures of functionality.

Steps in analysis using ordered logistic regression analysis

The multivariate analysis is in three steps: the first step involved use of only variables capturing functionality as explanatory variable(s). In the second step, variables capturing psychosocial domains were added to the model. Lastly, we made adjustment for possible confounders.

While interpreting results of ordered logistic regression 95% confidence intervals and associated p values were used to decide whether a particular factor is significant or not in a particular model to arrive at a short list of factors that seem to be associated with the outcome variable. The log likelihood test was used to see at which level (three steps described above) can be taken as an indication of the best set of explanatory variables from the available explanatory variables.

Steps in kappa analysis

Summary scores calculated by averaging method were used as explanatory variables to carry out univariate kappa analysis. It was not possible to carry out univariate kappa analysis using a number of variables measuring vision including sight examination, use of glasses for long sightedness, use of glasses for short sightedness and use of assistive aids because these variables had Yes/No as their response categories. It was also not

possible to carry out univariate kappa analysis on any of the possible confounders as these variables had response categories dissimilar to the outcome variables.

Two methods were used in the multivariate kappa analysis. First, all the component health experience summary scores calculated by averaging method were put together in one model (excluding variables with dissimilar response categories (e.g. Yes/ No) from the outcome variables). In the second method a summary score calculated by factor analysis was used. This method of calculating the summary score allowed the inclusion of all the variables even if they have different type of response categories. Table 3.3 is a reference table used for kappa (28) interpretation

Table 3.3: Interpretation of kappa (28)

Kappa	**Agreement**
< 0	Less than chance agreement
0.01–0.20	Slight agreement
0.21– 0.40	Fair agreement
0.41–0.60	Moderate agreement
0.61–0.80	Substantial agreement
0.81–0.99	Almost perfect agreement

3.3a: Objective 3 and 4: SRH as outcome variable – Results of ordered logistic regression univariate models

Functionality domains		**Psychosocial domains**		**Possible confounders**	
Variable	***OR***	***Variable***	***OR***	***Variable (Reference category)***	***OR***
Objective 3		*Objective 3 and 4*		*Objective 3 and 4*	
- OverallDiff †	3.94*	- Cognition †	2.61*	- Age group	
		- Interpersonal † activity	2.6*	60 + years	0.66*
Objective 4		- Sleep energy †	3.03*	50-59 years	1
- Mobility †	2.88*	- Affect †	2.19*	- Sex	
- Selfcare†	3.07*			Male	1.59*
- Pain †	2.99*			Female	1
- Vision †	1.57*			- Marital Status	
- SightExam †	0.86			Ever married	0.59*
- GlassesLong †	1.13			Never married	1
- GlassesShort †	0.97			- Ethnic Background	
- Functioning † ability	3.76*			Other (Kaseem)	0.76* 1
- Assistiveaids †	3.38*			- Education	
				Some school	2.18*
				No school	1
				- Residence †	
				Urban	1.12*
				Rural	1

* 0.1 > p

†Acronyms (Page xii)

3.3.1: *Objective number 3 was to assess the agreement between self reported overall health status and self reported overall difficulty in day-to-day activities in past 30 days (as measure of functionality).*

Findings of ordered logistic regression

The univariate ordered logistic regression analysis revealed that overall difficulty in day to day activities in past 30 days (OverallDiff) as measure of functionality was significantly associated with the self reported overall status of health (SRH). All the psychosocial factors (cognition, inter-personal relationship, sleep and energy and presence of psychological disturbance (affect)) were significantly associated with SRH in the univariate regression analysis. Except place of residence (urban/rural) all the other possible confounders were significantly associated with SRH (Table 3.3a).

Log likelihood test results revealed that (Table 3.3.1a), addition of psychosocial factors to the model together with functionality was significant, Indicating that functionality together with psychosocial factors form more complete set of explanatory variables of self reported health status. Log likelihood test was no more significant after addition of possible confounders to the model, although some possible confounders were significant independently. In this model, self reported overall difficulty in day today activities in past 30 days (functionality) was significant; all the psychosocial factors were significant although interpersonal activity was significant to a lesser extent. Among possible confounders sex and marital status were highly significant and level of education was significant to a lesser extent (Table 3.3.1a). From the list of significant factors the magnitude of the odds ratio (2.9) was highest for the overall difficulty in day-to-day

activities in past 30 days (OverallDiff) whereas the lowest odds ratio was for marital status (0.57).

Objective 3: Findings from kappa analysis

The univariate ordered kappa analysis (Table 3.3b) revealed that the magnitude of agreement estimated as kappa between SRH and overall difficulty in day-to-day activities in past 30 days (OverallDiff) as measure of functionality was 0.2833. Among the psychosocial factors sleep and energy was having highest agreement (kappa = 0.1886). This finding is similar to results of ordered logistic regression where odds ratio (3.03) was highest in magnitude among univariate analysis for psychosocial domains.

Multivariate kappa analysis involving summary score calculated by averaging method showed that the magnitude of kappa dropped down from 0.2833 to 0.1966 (Table 3.3.1b) when psychosocial domains were added to the model (step 2 model) which is not in conformity with the results of ordered logistic regression.

Multivariate kappa analysis using summary score by factor analysis method revealed that from step 1 to step 2 model agreement as magnitude of kappa dropped from 0.2833 to 0.0683 (Table 3.3.1b) and then for step three magnitude of kappa increased slightly i.e. 0.0783 from model 2. These findings are not showing any pattern as observed in the ordered logistic regression.

Table 3.3b: Objective 3 and 4: SRH as outcome variable – Results of kappa analysis univariate models

Functionality domains		**Psychosocial domains**		**Possible confounders**	
Variable	***Kappa***	***Variable***	***Kappa***	***Variable***	***Kappa***
Objective 3		*Objective 3 and 4*		*Objective 3 and 4*	
- OverallDiff †	0.2833*	- Cognition †	0.1446*	- Age group	--N/A--
		- Interpersonal † activity	0.0877*	- Sex	--N/A--
Objective 4		- Sleep energy †	0.1886*	- Marital Status	--N/A--
- Mobility †	0.1477*	- Affect †	0.1443*	- Ethnic Background	--N/A--
- Selfcare †	0.0422*			- Education	--N/A--
- Pain †	0.2172*			- Residence †	--N/A--
- Vision †	0.0474*				
- SightExam †	--N/A-**				
- GlassesLong †	--N/A-				
- GlassesShort †	--N/A-				
- Functioning † ability	0.0639*				
- Assistiveaids †	--N/A-				

* 0.1 > p

** N/A - These variables had binary response categories as Yes /No, hence it was not possible to carry out kappa analysis with these variables as the outcome variable (Self reported health status) had five point rating scale as response categories.

† Acronyms (Page xii)

Table 3.3.1a: Objective 3: SRH Vs OverallDiff – Results of ordered logistic regression models

	SRH as outcome variable and Explanatory variable as OverallDiff (measure of functionality)	***SRH as outcome variable and Explanatory variables = OverallDiff + Psychosocial domains***	***SRH as outcome variable and Explanatory variables = OverallDiff + Psychosocial domains + Possible confounders***
		Log likelihood test Prob> chi2 = 0.0000	Log likelihood test Prob> chi2 = 0.0903
Functionality domains	***OR***	***OR***	***OR***
OverallDiff †	3.94*	2.8*	2.91*
Psychosocial domain			
- Cognition †		1.28*	1.21*
- Interpersonal activity †		1.21*	1.11
- Sleep energy †		1.6*	1.53*
- Affect †		1.05	1.18*
Possible confounders			
- Age			0.94
- Sex			1.33*
- Marital status			0.57*
- Ethnic background			0.99
- Education			1.26
- Residence †			0.88

* 0.1 > p

† Acronyms (page xii)

Table 3.3.1b: Objective 1: SRH Vs OverallDiff – Results of kappa analysis

SRH as outcome variable and Explanatory variable as OverallDiff (measure of functionality)		***SRH as outcome variable and Explanatory variables = OverallDiff + Psychosocial domains***		***SRH as outcome variable and Explanatory variables = OverallDiff + Psychosocial domains + Possible confounders***	
Variable	***Kappa***	***Variable***	***Kappa***	***Variable***	***Kappa***
- OverallDiff †	0.2833*	- Using summary scores by averaging method	0.1966*	- Using summary scores by averaging method**	--------N/A----------
		- Using summary scores by factor analysis	0.0683*	- Using summary scores by factor analysis***	0.0783*

* 0.1 > p

** As possible confounders had binary response categories it was not possible to include them in this model where rest of the summary score had five point scales as response categories.

***It was possible to adjust for possible confounders in the summary score calculated by factor analysis.

† Acronyms (page xii)

3.3.2 *Objective 4 to assess agreement between self reported overall health status and component health experiences capturing functionality.*

The univariate ordered logistic regression analysis revealed that among functionality domains ability to move, ability to take care of oneself, experience of pain and discomfort, vision, functioning ability and use of assistive aids (other than glasses) were significantly associated with self reported overall status of health. All the psychosocial factors (cognition, inter-personal relationship, sleep and energy and presence of psychological disturbance (affect)) were significantly associated with SRH in the univariate regression analysis. All the possible confounders (except place of residence) were significantly associated with SRH (Table 3.3a).

Log likelihood test results revealed that, addition of psychosocial factors to the model together with functionality was not significant, indicating that component functionality together with psychosocial factors do not form more complete set of explanatory variables of self reported health status when component functionality was used. Log likelihood test was not significant after addition of possible confounders to the model, although some possible confounders were significant independently. From the component health experiences capturing functionality category of determinants, ability to move, ability to take care of oneself, experience of pain and discomfort, vision and functioning ability were significant. From the psychosocial determinants category, cognition and sleep and energy were significant. Among possible confounders ethnic background was highly significant whereas sex and level of education were significant to lesser extent (Table 3.3.2a). From this list of significant factors the magnitude of the odds ratio for ability to move (1.52) was highest whereas the lowest odds ratio was for ethnic background (0.55)

Objective 4: Findings from kappa analysis

The univariate ordered kappa analysis (Table 3.3b) revealed that among factors capturing functionality the magnitude of agreement was highest for pain and discomfort (kappa = 0.2172). This does not confirm the finding from ordered logistic regression where functioning ability had highest odds ratio (3.76)

Among the psychosocial factors sleep and energy had the highest agreement (kappa = 0.1886). This finding is similar to results of ordered logistic regression where odds ratio (3.03) for sleep and energy was highest in magnitude among univariate kappa analysis for psychosocial domains.

Multivariate kappa analysis using summary score calculated by averaging method showed that the magnitude of kappa improved from 0.1459 to 0.1764 (Table 3.3.2b) when psychosocial domains were added to the model (step 2 model) which is in conformity with the results of ordered logistic regression.

Multivariate kappa analysis using summary score by factor analysis method revealed that from step 1 to step 2 model agreement as magnitude of kappa dropped slightly from 0.0873 to 0.0848 (Table 3.3.2b) and then for step three magnitude of kappa went slightly down i.e. 0.0824 from model 2. These findings are contrary to results from multivariate ordered logistic regression where the model improved at each step.

Table 3.3.2a: Objective 4: SRH Vs Component health experiences capturing functionality – Results of ordered logistic regression models

	SRH as outcome variable and Explanatory variable as Component health experiences (measure of functionality)	***SRH as outcome variable and Explanatory variables = as Component health experiences (measure of functionality) + Psychosocial domains***	***SRH as outcome variable and Explanatory variables = as Component health experiences (measure of functionality) + Psychosocial domains + Possible confounders***
		Log likelihood test. Prob>chi2 = 0.0062	Log likelihood test. Prob>chi2 = 0.0504
	OR	***OR***	***OR***
Functionality domain			
- Mobility †	1.59*	1.45*	1.52*
- Selfcare †	1.45*	1.3*	1.3*
- Pain †	1.85*	1.64*	1.7*
- Vision †	0.96	0.9	0.89
- SightExam †	1.11	1.05	0.99
- GlassesLong †	0.89	0.91	0.86
- GlassesShort †	0.99	0.97	1.13
- Functioning † ability	1.51*	1.28*	1.35*
- Assistiveaids †	1.15	1.2	1.14
Psychosocial domain			
- Cognition †		1.29*	1.22*
- Interpersonal † activity		1.16	1.04
- Sleep energy †		1.5*	1.43*
- Affect †		0.97	1.07
Possible confounders			
- Age			0.93
- Sex			1.18
- Marital status			0.99
- Ethnic background			0.55*
- Education			1.31
- Residence †			0.89

† Acronyms (page xii)

Table 3.3.2b: Objective 4: SRH Vs Component health experiences capturing functionality – Results of kappa analysis

SRH as outcome variable and Explanatory variable as Component health experiences (measure of functionality)	***SRH as outcome variable and Explanatory variables = as Component health experiences (measure of functionality) + Psychosocial domains***	***SRH as outcome variable and Explanatory variables = as Component health experiences (measure of functionality) + Psychosocial domains + Possible confounders***
Variable ***Kappa***	***Variable*** ***Kappa***	***Variable*** ***Kappa***
- Summary scores by averaging method 0.1459*	- Summary scores by averaging method 0.1764*	- Using summary scores by averaging method** --------N/A----------
- Summary score by Factor analysis method 0.0873*	- Summary score by Factor analysis method 0.0848*	- Using summary scores by factor analysis*** 0.0824*

* 0.1 > p

** As possible confounders had binary response categories it was not possible to include them in this model where rest of the summary score had five point scales as response categories.

***It was possible to adjust for possible confounders in the summary score calculated by factor analysis.

3.4 *Objective 5 was to assess the agreement between self reported overall difficulty in day-to-day activities in past 30 days encountered and component health experiences.*

There are two purposes for carrying out this analysis. First, to assess an agreement between the different measures of functionality those have been used interchangeably in objective 3 and 4 as explanatory variables. Secondly, to test the third hypothesis that experience of pain correlates strongly with the self reported overall difficulty in day –to-day activities.

Agreement between two measures of functionality

Results based on ordered logistic regression (Table 3.4a) revealed significant association between overall self reported difficulty in day–to-day activities and most of the component health experiences capturing functionality viz: mobility, self care, pain, vision, functioning ability and use of assistive aids. In terms of magnitude mobility had the highest odds ratio (3.83).

Results of kappa were partly similar; mobility still topped amongst all others with a kappa of 0.3767. Results of kappa (3.4b) were different in terms of the order in which component health experiences showed correlation with the overall difficulty. The multivariate kappa findings also demonstrate consistency between the two sets of measures of functionality with the level of agreement as fair (Table 3.4c). All these findings together are indications of association between summary functionality and component functionality.

Pain and summary functionality

Results of regression and kappa analyses demonstrate an association between pain and overall functionality but it is not highest in magnitude, the magnitude of odds ratio for mobility is highest (Table 3.4a and Table 3.4b). These findings are not sufficient to prove or disprove the hypothesis 3.

3.5 Summary of results

The findings of objective 3 and 4 revealed that addition of psychosocial determinants together with functionality determinants do form a more complete set of determinants when summary functionality is used hence provide some evidence that strengthens the first hypothesis. Addition of possible confounders does not improve the model both in objective 3 and 4 analysis and it does not strengthen the second hypothesis.

Although, pain was associated with summary functionality mobility was associated more strongly with summary functionality; thus, the third hypothesis remains inconclusive based on current analysis. In other words, ability to perform day-to-day activities (summary functionality) is not only influenced by experience of pain but also ability to move.

3.4a: Objective 5: Overall functionality versus component functionality - Results of ordered logistic regression

	Univariate models	Multivariate model
Variable	***OR***	***OR***
- Mobility †	8.02*	3.83*
- Selfcare †	4.83*	1.44*
- Pain †	3.92*	1.67*
- Vision †	2.31*	1.13*
- SightExam †	0.64*	0.91
- GlassesLong †	1.46	0.64
- GlassesShort †	1.23	1.21
- Functioning † ability	10.5*	2.59*
- Assistiveaids †	7.99*	1.38

* 0.1 > p

† Acronyms (page xii)

3.4b: Objective 5: Overall functionality versus component functionality – Results of univariate kappa analysis

Variable	***Kappa***
- Mobility †	0.3767*
- Selfcare †	0.1078*
- Pain †	0.2773*
- Vision †	0.1009*
- SightExam †	--N/A--**
- GlassesLong †	--N/A--
- GlassesShort †	--N/A--
- Functioning † ability	0.1006*
- Assistiveaids †	--N/A--

* 0.1 > p

** N/A - These variables had binary response categories as Yes /No, hence it was not possible to carry out kappa analysis with these variables as the outcome variable (Self reported health status) had five point rating scale as response categories.

† Acronyms (page xii)

3.4c: Objective 5: Overall functionality versus component functionality – Results of multivariate kappa analysis

Variable	***Kappa***
- Summary scores by** averaging method	0.2144*
- Summary score by*** Factor analysis method	0.2019**

* 0.1 > p

*** As possible confounders had binary response categories it was not possible to include them in this model where rest of the summary score had five point scales as response categories.*

****It was possible to adjust for possible confounders in the summary score calculated by factor analysis.*

Chapter 4 - Discussion

The secondary data analysis presented in this report aimed at exploring the factors influencing self reported health status. The reason behind undertaking such an exercise was to make an attempt to understand how component health experiences, i.e. experience of pain, or the ability to take care of oneself, influence the way people rate their health – exploring the question "What do the elderly consider when they are asked about their health status?" Only after understanding this can researchers make effective use of self reported health data as a measure of health from which to design health related policies. Most of the studies of self reported health have been in developed countries and there is need for information on determinants of self reported health status in developing countries.

There are a few studies that have used morbidity as a determinant of self reported health status. Several researchers have highlighted that, the best way to capture morbidity is through functionality. Zimmer et al. (2000) used functionality in terms of difficulty in day-to-day activities, as a determinant of self reported health status. They suggested that the addition of psychosocial determinants to the set of determinants of self reported health status would improve the association between self reported health status and functionality (13). Past studies have also demonstrated that self reported health status is influenced by characteristics of respondent (such as age, sex, marital status and education). Therefore, in the current analysis the determinants of self reported health status were divided into three categories and were added to analysis one by one to see what combination of categories represent a more complete set of determinants.

The secondary data analysis presented here showed that in the Navrongo setting, self reported health status is associated with functionality, although functionality alone does not sufficiently predict self reported health status. This finding is similar to what Zimmer et al. (13) have reported, but contrary to the findings of Ailinger (1989), who reported that self reported health status was not associated with functionality (captured in terms of Instrumental Activities of Daily Living). The study by Ailinger was conducted in the United States of America (11), whereas Zimmer et al.'s study (13) was conducted in Asia. Our current study is based on data from Ghana. Thus, it will be worthwhile to explore further whether it is just by chance that findings from developing settings are similar to each other or if there are some factors (e.g. awareness about health, level of education, and availability of health care services) that contribute to the observed differences between developed and developing countries.

In our analysis, adding psychosocial factors to the model improved the model when summary functionality was used as measure of functionality and the findings support the hypothesis that the addition of psychosocial factors would improve the association between self reported health status and functionality. All the psychosocial factors (cognition and disturbances with sleep and energy, psychological disturbances) showed significant association with self reported health status based on associated p values. In other words these psychosocial factors did influence self reported health status as anticipated by Zimmer et al. (13).

In the third step of the analysis we added characteristics of respondents to the model to see if they mediate the association between self reported health and functionality and psychosocial determinants. Out of six possible confounders studied sex, marital status and ethnic background were significantly associated with self reported health status. The findings showed that men are more likely to report favorable health as compared to women. The finding is similar to the results of Ailinger's (1989) study that showed that older male Hispanics report health more positively than women, and men are less likely to accept the presence of any health problem as compared to women (11). Fillenbaum (1979) reported from a study on self assessments of health among elderly in the community and among those who have been institutionalized that sex of the respondent is an important factor to be taken into account for more precise interpretation of the responses of self reported health status. He reported that a man and a woman with similar physical health status, e.g. ability to move at similar level, similar amount of pain, etc., will report health differently--the woman's self report would be poorer than the man's--men tend to report health more satisfactorily for the similar level of performance (16). The ways in which factors such as sex influence self reported health status may be different in different settings (rural /urban or developing / developed countries)

While sex seems to be an important indicator, sex differences are sometimes mediated by other factors, like level of education. Johnson and Wolinsky (1993) reported that men with lower level of education tend to rate their health poorer as compared to women having higher educational level (15).

In this analysis, education was not found to be associated significantly with self reported health status in my analysis. The finding is dissimilar with the one reported by Ailinger where education was found to be associated with self reported health status. (11).

Johnson and Wolinsky (1993) reported that elderly respondents tend to rate their health status more satisfactorily as compared to their younger counterparts for a similar morbid state. The age group in this study was 55 years and above (15), this is dissimilar to finding of the current analysis where age was not significantly associated with self reported health status.

Lastly, in the current analysis the association between two measures of functionality was studied in order to determine whether the two measures of functionality could be used interchangeably. One measure of functionality was summary functionality whereas the other was component functionality. The two measures did demonstrate an association but the findings were not sufficient to decide whether the two measures could be used interchangeably since there was /were no reference variable(s) that could determine the extent of association between the two measures of health. Among components of functionality that were significantly associated with summary functionality, mobility had the highest odds ratio. That means people tend to report their overall health less favorably when there is presence of problems with moving around. This is dissimilar to the finding from a study on knee osteoarthritis patients where presence of pain was found to affect the way respondents rate their level of physical functioning (24). In our analysis, although pain was significantly associated with summary functionality pain ranked third

in terms of magnitude of odds ratio. This observation brings two things to mind; either it is differential setting that somehow contributes to the ranking differences in component health factors or it is different ways of perceiving component health aspects.

In summary, functionality and psychosocial factors were associated with self reported health status and also together formed more complete set of explanatory variables of self reported health status when summary functionality was used. Sex, marital status and ethnic group did influence self reported health status. These findings indicate that sex, marital status, and ethnic background influence how individuals, rate their health status and therefore these three factors should be taken into account while interpreting self reported health data in Kassena-Nankana district of Ghana.

Chapter 5 - Conclusion and Recommendations

The secondary data analysis presented in this report was an effort towards exploring the factors influencing self reported health status in Ghana, a developing country setting. Knowledge about the factors influencing self reported health status in different settings can enhance its effective use as a measure of health.

Elderly people in the Kassena-Nankana district in Ghana do take into account their ability to carry out day- to-day activities while rating their overall health.

Among component functionality, mobility, the ability to take care of oneself, the experience of pain, vision, and functioning ability were significantly related to overall self reported health status. That means presence of problems with any of these component health aspects increase the possibility of people reporting their health status poorly.

In a model with summary functionality as a measure of functionality among psychosocial domains, cognition, sleep disturbances, energy levels, and psychological disturbances were significantly related to the overall self reported health status.

In a model with component functionality, among psychosocial domains cognition, sleep disturbances, and energy levels were significantly related to the overall self reported health status. That means presence of problems with any of these psychosocial aspects could increase the possibility of people reporting their health status poorly.

In a model with summary functionality as a measure of functionality among possible confounders sex and marital status were significantly related to the overall self reported health status.

In a model with component functionality, among possible confounders only ethnic group was significantly related to the overall self reported health status. That means men and women rate their health differently, married and unmarried people tend to perceive their status of health differently, while different ethnic groups also rate their health differently.

Poor rating of health may indicate problems in components of health that are associated significantly with self reported health status e.g. mobility, sleep disturbances. One must treat all the groups defined by sex, marital status and ethnic background separately while interpreting the results of self reported health status in Kassena-Nankana district of Ghana.

Recommendations

For validation of the findings of this report, further qualitative inquiries into meanings of components health such as mobility and self care are required. Information could be colle collected in a open ended interview in which the respondent explains what he/she means by mobility and self-care. These insights are not revealed in structured quantitative inquiries.

Studying associations between self reported health status and measured health parameters in the same population would also be useful for validation. This could be done first by

asking verbally whether an individual has any difficulty with component health experience e.g. in moving around and then by actually observing whether a person has any difficulty in moving around as described in some of the research articles.(24)

We observed that when summary functionality was used as a measure of functionality sex and marital status were significant, whereas when component functionality was used as an independent variable ethnic background was significantly associated with SRH. This observation again highlights the importance of qualitative inquiries. The possible reasons for these differences could be that the two measures of functionality capture different aspects of health. These underlying aspects can be exposed by in-depth open-ended interviews on meanings of different measures of functionality.

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Appendices

Appendix 1

Following question numbers (Table A) in the SAGE Summary questionnaire had an additional sixth response category as Not Applicable in addition to 5 point rating scale i.e. None, Mild, Moderate, Severe, Extreme / Cannot do. This additional category was merged with None category before analysis.

Table A: Details of Questions with additional response category as Not Applicable

Variable	Number of 0s and 8s i.e. N/A (Combined with none)
Q 1009	657
Q1026	1
Q1028	1
Q1029	1
Q1030	3
Q1031	1
Q1034	4
Q1035	235

Following questions had few non responses (Table B). These non responses appeared as 9 in the dataset and were replaced by system missing value (".") in stata software so that these missing values are dropped in the respective analysis. The changed denominators of the analysis involving variables with missing values are as appear in column three of Table B

Table B: Details of variables with non response / missing values

Variable	9s (Replaced as system missing value in stata software)	Denominator for calculations involving these variables.
Q1006	1	4482
Q1009	6	4477
Q1017	1	4482
Q1021	1	4482
Q1022	2	4481
Education	440	4043

Appendix 2 – Human research ethics clearance from WITs school of Public Health, University of the Witwatersrand

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Lele

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER MO61130**
PROJECT	Assessment of consistency between self reported health status and performance based health status.....in Ghana beginning of 21st Century
INVESTIGATORS	Mrs PS Lele
DEPARTMENT	School of Public Health
DATE CONSIDERED	06.11.24
DECISION OF THE COMMITTEE*	APPROVED UNCONDITIONALLY

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 07.06.07 **CHAIRPERSON** .....
(Professors PE Cleaton-Jones, A Dhai, M Vorster, C Feldman, A Woodiwiss)

*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor : Dr C Delspuur

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

15/6/07
(PALLAVI S. LELE)

Appendix 3 – Postgraduate committee approval from WITs school of Public Health, University of the Witwatersrand

Faculty of Health Sciences
Medical School, 7 York Road, Parktown, 2193
Fax: (011) 717-2119
Tel: (011) 717-2075/6

Reference: Mrs Alison Mclean
E-mail: mcleanam@health.wits.ac.za
06 July 2007
Person No: 0611776H
PAG

Ms PS Lele
Marathe Amoli Apts
Sangam Press Road
Kothrud, Pune
India
0000
411038, India

Dear Ms Lele

Master of Science in Medicine (Population-Based Field Epidemiology): Approval of Title

We have pleasure in advising that your proposal entitled "*Assessment of consistency between self reported health status and performance based health status (functionality) as measures of health status of adults in the Kassena-Nankana District, Ghana*" has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

Appendix 4 – Institutional review board clearance, Navrongo Health Research Center, Ghana

In case of reply the number and date of this letter should be quoted.

My Ref. : NHRCIRBA/09/2004
Your Ref. No.

GHANA HEALTH SERVICE
Your Health - Our Concern

Institutional Review Board
Navrongo Health Research Centre
Ghana Health Service
P. O. Box 114
Navrongo, Ghana
Tel: +233-742-22380
Fax + 233-742-22320

Email: irb@navrongo.mimcom.net

12TH March, 2007

Mrs. Pallavi S. Lele
Navrongo Health Research Centre
Navrongo

Dear Mrs. Lele,

Ethical Clearance – NHRCIRBO62

Project Title: "Assessement of consistency between self reported health status and performance based health status (functionality) as measures of health status of adults in the Kassena-Nankana District at the Beginning of the 21st Century"

I write to inform you that the Navrongo Health Research Centre Institutional Review Board has approved your proposal, which was submitted for ethics review on 24th January 2007.

Please, note that any amendment to this study must be submitted to the IRB for ethical clearance before its implementation.

This approval requires that you submit a final report to the NHRCIRB when this study ends.

If you have any further questions, please contact Ms. Paulina Tindana or Mr. Thompson Apempale, the IRB Administrators of the NHRC IRB.

Sincerely,

THE CHAIR
Navrongo Health Research Centre
Institutional Review Board
BOX 114, NAVRONGO UE/R

Dr. Joseph Amankwa
(Chairman, NHRCIRB)

CC: The Director, NHRC

Appendix 5 - Navrongo Adult Health and Aging Summary Version Survey Questionnaire

World Health Organization

WHO and INDEPTH

STUDY ON GLOBAL AGEING AND ADULT HEALTH 2007

INDEPTH Short Summary Module – Set A

sage

NAVRONGO HEALTH RESEARCH CENTRE

COMPOUND ID	
HOUSEHOLD ID	
RESPONDENT ID	
SEX OF RESPONDENT	1. MALE 2. FEMALE
RESULT OF INTERVIEW	1. COMPLETED 2. REFUSED 3. NOT MET AFTER THREE VISITS 4. DECEASED/DIED 5. NOT ELIGIBLE (under 18 years; too ill; mentally unfit) 6. UNABLE TO LOCATE RESPONDENT 7. MIGRATED/TRAVELED 8. OTHER:_____ (SPECIFY)
INTERVIEWER ID	
DATE OF INTERVIEW	

Section 1000: Health State Descriptions

Time Begin: ☐☐:☐☐

NOTE TO INTERVIEWERS: Where a DON'T KNOW response category is listed as an option - do not read this category out to the respondent.

I would like to ask you questions about your health and well-being. I know some of these questions may be sensitive or difficult to answer, but please try to provide an answer. I will ask about your overall health, including both your physical and your mental health. Some of the questions may sound similar or repetitive, but I need to ask all of the questions for the sake of completeness. This information is confidential and you will not be identified individually or without your consent.

Q1000	In general, how would you rate your health today?	1 Very good 2 Good 3 Moderate 4 Bad 5 Very bad
Q1001	Overall in the last 30 days, how much difficulty did you have with work or household activities?	1 None 2 Mild 3 Moderate 4 Severe 5 Extreme/cannot do

Now I would like to review the different functions of your body. When answering these questions, I would like you to think about the last 30 days, taking both good and bad days into account. When I ask about difficulty, I would like you to consider how much difficulty you have had, on average, in the last 30 days, while doing the activity in the way that you usually do it. By difficulty I mean requiring increased effort, discomfort or pain, slowness or changes in the way you do the activity. Please answer this question taking into account any assistance you have available.

NOTE TO INTERVIEWER: Read and show scale to respondent

MOBILITY

	Overall in the last 30 days...	NONE	MILD	MODERATE	SEVERE	EXTREME / CANNOT DO
Q1002	...how much difficulty did you have with moving around?	1	2	3	4	5
Q1003	...how much difficulty did you have in vigorous activities (such as cycling or working in the fields)? 'Vigorous activities' require hard physical effort and cause large increases in breathing or heart rate.	1	2	3	4	5

Study on Global Ageing and Adult Health (SAGE)
WHO and INDEPTH/NHRC Summary Version

SELF-CARE

	Overall in the last 30 days, how much difficulty ...	NONE	MILD	MODERATE	SEVERE	EXTREME / CANNOT DO
Q1004	... did you have with self-care, such as washing/bathing or dressing yourself?	1	2	3	4	5
Q1005	... did you have in taking care of and maintaining your general appearance (for example, grooming, looking neat and tidy).	1	2	3	4	5
Q1006	... did you have in staying by yourself for a few days (for example, 3 to 7 days)?	1	2	3	4	5

PAIN AND DISCOMFORT

	Overall in the last 30 days...	NONE	MILD	MODERATE	SEVERE	EXTREME / CANNOT DO
Q1007	...how much of bodily aches or pains did you have?	1	2	3	4	5
Q1008	...how much bodily discomfort did you have?	1	2	3	4	5
If Q1007 and Q1008 are both = 1, "None" ..... →						Q1010
Q1009	... how much difficulty did you have in your daily life because of your pain/discomfort?	1	2	3	4	5

COGNITION

	Overall in the last 30 days, how much difficulty ...	NONE	MILD	MODERATE	SEVERE	EXTREME / CANNOT DO
Q1010	... did you have with concentrating or remembering things?	1	2	3	4	5
Q1011	... did you have in learning a new task (for example, learning how to get to a new place, learning a new game, learning a new recipe)?	1	2	3	4	5

INTERPERSONAL ACTIVITIES

	Overall in the last 30 days, how much difficulty...	NONE	MILD	MODERATE	SEVERE	EXTREME / CANNOT DO
Q1012	... did you have with personal relationships or participation in the community?	1	2	3	4	5
Q1013	...did you have in dealing with conflicts and tensions with others?	1	2	3	4	5
Q1014	... did you have with making new friendships or maintaining current friendships?	1	2	3	4	5
Q1015	...did you have with dealing with strangers?	1	2	3	4	5

SLEEP AND ENERGY

	Overall in the last 30 days, how much of a problem ...	NONE	MILD	MODERATE	SEVERE	EXTREME / CANNOT DO
Q1016	... did you have with sleeping, such as falling asleep, waking up frequently during the night or waking up too early in the morning?	1	2	3	4	5
Q1017	... did you have due to not feeling rested and refreshed during the day (for example, feeling tired or not having energy)?	1	2	3	4	5

AFFECT

	Overall in the last 30 days, how much of a problem ...	NONE	MILD	MODERATE	SEVERE	EXTREME / CANNOT DO
Q1018	... did you have with feeling sad, low or depressed?	1	2	3	4	5
Q1019	... did you have with worry or anxiety?	1	2	3	4	5

VISION ***(If respondent normally wears glasses or contact lenses, should answer the following Qs as when wearing glasses/contact lenses.)***

Q1020	When was the last time you had your eyes examined by a medical professional? **INTERVIEWER: ENTER YEARS OR MONTHS AGO. ENTER "00" IF LESS THAN 1 YEAR OR 1 MONTH AGO.**	☐☐ YEARS AGO ☐☐ MONTHS AGO 0000 NEVER *8888 DON'T KNOW*
Q1021	Do you use eyeglasses or contact lenses to see far away (for example across the street)?	1 YES 2 NO
Q1022	Do you use eyeglasses or contact lenses to see up close (for example at arms length, like when you are reading)?	1 YES 2 NO

	Overall in the last 30 days, how much difficulty did you have ...	NONE	MILD	MODERATE	SEVERE	EXTREME / CANNOT DO
Q1023	... have in seeing and recognising a person or object you know across the road (from a distance of about 20 meters)?	1	2	3	4	5
Q1024	... in seeing and recognising an object at arm's length (for example, reading)?	1	2	3	4	5

Study on Global Ageing and Adult Health (SAGE)
WHO and INDEPTH/NHRC Summary Version

FUNCTIONING ASSESSMENT

These next questions ask about difficulties due to health conditions. Health conditions include diseases or illnesses, other health problems that may be short or long lasting, injuries, mental or emotional problems, and problems with alcohol or drugs. Think back over the last 30 days and answer these questions thinking about how much difficulty you had doing the following activities.

INTERVIEWER: For each question, please circle only one response.

	In the last 30 days, how much difficulty did you have ...	None	Mild	Moderate	Severe	Extreme/ cannot do	N/A
Q1025	... in standing for long periods?	1	2	3	4	5	98
Q1026	... in taking care of your household responsibilities?	1	2	3	4	5	98
Q1027	... in joining in community activities [*for example, festivities, religious or other activities*] in the same way as anyone else can?	1	2	3	4	5	98
Q1028	... concentrating on doing something for 10 minutes?	1	2	3	4	5	98
Q1029	... in walking a long distance such as a kilometer?	1	2	3	4	5	98
Q1030	... in washing (bathing) your whole body?	1	2	3	4	5	98
Q1031	... in getting dressed?	1	2	3	4	5	98
Q1032	... in your day to day work?	1	2	3	4	5	98
Q1033	In the last 30 days, how much have you been emotionally affected by your health condition(s)?	1	2	3	4	5	98
Q1034	Overall, how much did these difficulties interfere with your life?	1	2	3	4	5	98

Q1035	Besides any vision (eyeglasses, contact lenses) or hearing aids, do you use any other assistive devices (such as a cane, walker, or other) for any difficulties you experience?	1 YES 2 NO

Time End ☐☐:☐☐

Section 2000: Subjective Wellbeing and Quality of Life

Time Begin ☐☐:☐☐

Now, we'd like to ask for your thoughts about your life and life situation.

Q2001	Do you have enough energy for everyday life?	1 Completely 2 Mostly 3 Moderately 4 A little 5 None at all
Q2002	Do you have enough money to meet your needs?	1 Completely 2 Mostly 3 Moderately 4 A little 5 None at all

Please tell us how satisfied you are with the following issues.

		VERY SATISFIED	SATISFIED	NEITHER SATISFIED NOR DISSATISFIED	DISSATISFIED	VERY DISSATISFIED
Q2003	How satisfied are you with your health?	1	2	3	4	5
Q2004	How satisfied are you with yourself?	1	2	3	4	5
Q2005	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
Q2006	How satisfied are you with your personal relationships?	1	2	3	4	5
Q2007	How satisfied are you with the conditions of your living place?	1	2	3	4	5
Q2008	Taking all things together, how satisfied are you with your life as a whole these days?	1	2	3	4	5

Q2009	How would you rate your overall quality of life? **Read responses**	1 Very Good 2 Good 3 Moderate 4 Bad 5 Very Bad 8 *DON'T KNOW*
Q2010	Taking all things together, how would you say you are these days? **Read responses**	1 Very happy 2 Happy 3 Neither happy nor unhappy 4 Unhappy 5 Very unhappy 8 *DON'T KNOW*

Time End ☐☐:☐☐