7-1-1991

Incidence of Functionally Impaired Elderly: Comparing ENOA Samples with a Rural Sample

Chuck Powell
University of Nebraska at Omaha

A RESEARCH REPORT

Prepared for:

THE EASTERN NEBRASKA OFFICE ON AGING (ENOA)

INCIDENCE OF FUNCTIONALLY IMPAIRED ELDERLY: COMPARING ENOA SAMPLES WITH A RURAL SAMPLE

Prepared by:

Chuck Powell, Ph.D.
Associate Professor
Department of Gerontology
University of Nebraska at Omaha

James A. Thorson, Ed.D
Chair & Issacson Professor
Department of Gerontology
University of Nebraska at Omaha

July 1, 1991

This study was funded by the Eastern Nebraska Office on Aging (ENOA) and the Center for Public Affairs Research, University of Nebraska at Omaha (CPAR). Our appreciation to these organizations.

"Listen to the patient,
he'll give you the diagnosis."

Sir William Osler

INTRODUCTION

Justice Oliver Wendell Holmes once remarked: "To be seventy years young is sometimes more cheerful and hopeful than to be forty years old," (Cavanaugh, 1990). The comment by Justice Holmes is positive and rests on hope, the hope that we will be healthy in our old age and capable of living independently.

In the world of 1991, life might not be as optimistic as Judge Holmes would have had us believe. For example, almost every 70 year-old is likely to be suffering from a variety of chronic impairments. Current data shows a 70 year-old is six times more likely to have a heart condition, five times more likely to have arthritis or rheumatism, four times more likely to have hypertension, and five times more likely to be limited in a major life activity than is a 40-year old (Bureau of the Census, 1990).

The increase in both numbers and percentages of older people in the nation and in Nebraska and the presence of impairments among this population is the focus of this study. Specifically, the major purposes of the study are: (1) to find the incidence of older persons, living independently yet suffering functional impairment, in three Nebraska locations, (2) to estimate the number of functionally impaired who need assistance in activities of daily living in these three locations, and, (3) to recommend an experimental course of action that will enhance ENOA's ability to identify and provide services to this functionally impaired group of elderly.

BRIEF BACKGROUND

Carrying out a series of activities and tasks under normal circumstances is central to an individual's independence. To function in an independent setting (one's own home for example) requires certain physical capabilities. When these capabilities are diminished, the person needs assistance in carrying out normal activities of daily living whether at home or in an institution.

A large body of literature is devoted to measuring the individual's ability to function in an independent setting. One of the most commonly used measures of functional status is the index of Activities of Daily Living (ADL). Several ADL instruments exist. For example, Katz and colleagues (1963) were among the first to develop a comprehensive measurement of daily activities. A variety of measures have been developed by Kane and Kane (1987). Perhaps one of the most widely used ADL instruments is the Older Americans Resources and Services questionnaire (OARS) developed by the Center for the Study of Aging and Human Development at Duke University (1978). For the most part, all of the ADL instruments are designed to assess the individual's ability to carry out basic tasks needed for self care. Among the tasks included in the various measures of ADL are the ability to feed, dress, groom, toilet one's self and communicate with others.

Instrumental activities of daily living (IADL) are measures that identify the individual's ability to perform a variety of higher-level tasks. Among the tasks included in the IADL are such things as shopping, preparing and eating meals, managing money, cleaning the house, and use of the telephone. ADL and IADL both measure functional capabilities. In this report, these combined tasks will be reported under the single term "ADL."

Measurement of disability usually relates to the number of ADLs a person is unable to perform. The more liberal interpretation is that a person unable to perform two ADLs is functionally deficient; the more conservative estimate rests on the inability to perform three or more ADLs. Using the liberal formula, it is estimated that over 40,000 elderly Nebraskans would qualify as functionally deficient. On the other hand, if the conservative estimate is accepted, the figure would be approximately 4,110, which is roughly the number in long-term care institutions. Obviously, there is a need for research that goes beyond these rough estimates to determine the scope of disability of older Nebraskans with greater precision. The focus of the present study will be on these vulnerable aged who might be kept out of institutions.

Comparative research argues that rural elderly generally have more needs than urban elderly, have fewer services provided, have lower incomes, have inferior housing and suffer more of the disadvantages of being old living in a rural area. A partial listing of this research includes works by Auerbach, 1976;

Ellenbogen, 1967; Kreps, 1967; Montgomery, 1967; Schooler, 1975; and Youmans, 1977. On the other hand, Krout (1983) argues that the association between residential locale and other variables should be examined more closely. Whether or not there are meaningful differences between urban elderly and their rural counterparts remains unclear and is another issue that may be clarified by the present study.

RESEARCH METHODS

This study was of a random sample of 500 older individuals living independently, in three geographic locations in the State of Nebraska. These samples are labeled "ENOA URBAN," "ENOA RURAL," and "SANDHILLS." The ENOA Urban Sample consisted of 196 interviews with individuals who reside in Douglas County, Nebraska. The second sample, the ENOA Rural Sample, consisted of 104 interviews with individuals who live in the rural areas of the other four counties served by ENOA, Cass, Dodge, Sarpy, and Washington. The SANDHILLS Sample consisted of 200 individuals who live in Arthur, Blaine, Garden, Garfield, Grant, Hooker, Logan, Loup, McPhearson, Thomas, and Wheeler Counties (See Table 1 for details).

In order to insure a probability sample of respondents, all calls were made from a list of random telephone numbers purchased from a national research firm. This is considered to be a standard research procedure. Professional telephone operators from a national telemarketing firm were employed to make the calls and

TABLE 1

THE SAMPLE**

SAMPLE & COUNTIES	TOTAL POPULATION	65+ POPULATION	PERCENTAGE OF 65+
ENOA URBAN			
Douglas County	416,444	47,333	11.4%
ENOA RURAL			
Cass County	21,318	2,776	13.0%
Dodge County	34,500	5,974	17.3%
Sarpy County	102,583	4,892	4.8%
Washington County	16,607	2,252	13.6%
Total	175,008	15,894	9.1%
SANDHILLS AREA			
Arthur County	462	85	18.4%
Blaine County	675	113	16.7%
Garden County	2,460	591	24.0%
Garfield County	2,141	515	24.1%
Grant County	769	118	15.3%
Hooker County	793	220	27.7%
Logan County	878	134	15.3%
Loup County	683	128	18.7%
McPhearson County	546	108	19.8%
Thomas County	851	126	14.8%
Wheeler County	948	140	14.8%
Total	11,206	2,278	20.3%

**Data provided by the Center for Public Policy Research, College of Public Affairs and Community Service, University of Nebraska at Omaha. Data reflects the 1990 Census Figures.

insure that a person of a specific age was the interviewee. A standardized questionnaire consisting of 168 questions on health status, practices, perceptions of providers, adequacy of services, demographics, and activities of daily living was used to obtain the response set.

The interviews were conducted between March 26 and April 14, 1991. A termination rate of six percent occurred in the process of completing 500 usable interviews. A random sample of 50 (10 percent) of the respondents were re-interviewed by supervisory personnel in order to validate the answers. No discrepancies were found in this audit of the data. The length of the interviews was from twelve to 50 minutes, with a mean interview time of 26.7 minutes. Appropriate steps were taken to obtain accurate and correct statistics for this report. This random sample of 500 can be used to generalize to the elderly population within probability estimates of less than five percent.

THE FINDINGS

Table 1 illustrates the population dimensions of each county in the study. The ENOA Urban Sample is drawn from Douglas County. As expected, this political sub-division has the largest number of persons over the age of 65 years. The ENOA Rural Sample was drawn from the non-metropolitan areas outside the towns in Cass, Dodge, Sarpy, and Washington Counties. Sarpy County has a very small percentage of residents over the age of 65 years. This can be partially accounted for by the large number of young persons stationed at Offutt Air Force Base which are included in the County census base.

The Sandhills Sample was drawn from the counties listed in Table 1. As expected, these eleven counties are sparsely populated with percentage of elderly higher than the 13.9 percent state average.

The data in Table 2 reflects the sample sizes, sampling error, and some of the demographics obtained from the respondents. The average age of respondents varied from 72.24 years in the ENOA Rural Sample to 76.64 years in the Sandhills, a difference that is significant. That is, there is less than one chance in 100 that this age difference could be accounted for by chance alone.

The race distribution in the total sample and in the ENOA Sample are the same. These data compare favorably with the racial distribution for the State of Nebraska. Our sampling, however, failed to pick up minorities in the rural areas. The male/female ratio in the three areas shows no statistical difference and is comparable to what we would expect to find in this population.

Moving along to the number of persons in the household, we find a statistically significant difference between the samples. We are more likely to find older persons living alone in the Sandhills Sample than in the two ENOA Samples. As for marital status and income, there is no difference between the samples.

TABLE 2

SAMPLE DEMOGRAPHIC DATA

ITEM	SAMPLE ENOA URBAN (N=196)	ENOA RURAL (N=104)	SANDHILLS SAMPLE (N=200)	TOTAL (N=500)
Error Probability (+/-)	7.14%	9.80%	7.07%	4.47%
Average Age (years)	73.85	72.42	76.64	74.67%
Age (standard deviation)	6.43	6.82	7.16	7.01%
Race				
white (%)	93.0%	100.0%	100.0%	93.0%
minority (%)	7.0%	0.0%	0.0%	7.0%
Sex				
female (%)	71.9%	72.1%	73.0%	72.4%
male (%)	28.9%	27.9%	27.0%	27.6%
Person in Household				
lives alone	38.3%	41.4%	49.9%	43.4%
lives with someone	61.7%	58.6%	50.1%	56.6%
Marital Status				
married-living with spouse	55.1%	53.8%	47.5%	51.8%
widow/widowed	34.7%	42.3%	41.0%	38.8%
single	4.6%	2.9%	3.5%	3.8%
divorced	3.6%	0.0%	4.0%	3.0%
never married	1.0%	0.0%	2.5%	1.4%
married/living alone	1.0%	1.0%	1.5%	1.2%
monthly income	$1133.00	$ 911.00	$1131.00	$1040.00

Table 3 provides the self-reported health status of the respondents in each sample. The data in this table show that the health status among those in the ENOA Urban and the Sandhills samples are not statistically different. On the other hand, the respondents in the ENOA Rural sample report somewhat better health than their counterparts in the other two samples.

The findings in **Table 4** are the result of a combined ADL and IADL test administered to the respondents. (The data listed in this table does not include use of phone and other similar questions. These items were eliminated inasmuch as the individual was interviewed by telephone and indicated no signs of cognitive impairment during this process.)

The problems reported are incontinence, inability to perform own house work, to get to places beyond walking distance of home, shop for necessities, prepare own meals, and shop for groceries. Other tasks were less problematic, with dressing/undressing and care for own appearance affecting the least number of individuals. One final observation with regard to the Activities of Daily Living: the average person in this battery reported that they can perform 12 of the 13 tasks listed.

Table 5 shows the percentage of respondents who are able to perform the total number of tasks. The data is presented in a declining format beginning with ability to perform all 13 tasks and terminating with 8 or fewer activities of daily living. A substantial majority of respondents are able to perform all 13 tasks

TABLE 3

SELF REPORTED HEALTH STATUS

QUESTION: "HOW WOULD YOU CLASSIFY YOUR HEALTH TODAY?"
"WOULD YOU SAY YOUR HEALTH IS VERY POOR, POOR, FAIR, GOOD, OR EXCELLENT?"

	SAMPLE RESPONSE							
	ENOA URBAN (N=196)		ENOA RURAL (N=104)		SANDHILLS SAMPLE (N=200)		TOTAL SAMPLE (N=500)	
Response	%	(N)	%	(N)	%	(N)	%	(N)
0 Very Poor	3.6%	(9)	0.0%	(0)	0.5%	(1)	1.6%	(8)
1 Poor	6.6%	(13)	1.0%	(1)	11.0%	(22)	7.2%	(36)
2 Fair	20.9%	(41)	23.1%	(24)	29.0%	(58)	24.6%	(123)
3 Good	57.7%	(113)	57.7%	(50)	47.0%	(94)	53.4%	(267)
4 Excellent	11.2%	(22)	18.3%	(19)	12.5%	(25)	13.2%	(66)
Totals	100.0%	(196)	100.0%	(104)	100.0%	(200)	100.0%	(500)
Average Score	2.66		2.93		2.60		2.68*	
Standard Deviation	.89		.67		.86		.85	

*There is no significant differences in self reported health status between the ENOA Urban and the Sandhills Sample responses. There is a statistically significant difference between the ENOA Rural and ENOA Urban/Sandhills Responses ($r = .16$, $p < .001$).

TABLE 4

AVERAGE DAILY LIVING ACTIVITIES:
COMPARISON OF ENOA URBAN, ENOA RURAL, AND SANDHILLS SAMPLES

Activity	ENOA URBAN	ENOA RURAL	SANDHILLS SAMPLE
	Percentage Unable to Perform this Activity		
1. Go places beyond walking distance of home?	12.37%	12.46%	17.5%
2. Do you shop for groceries?	9.69%	3.85%	8.50%
3. Do you shop for necessities?	10.20%	5.77%	9.50%
4. Prepare and eat own meals?	10.20%	6.73%	8.50%
5. Do your own house work?	12.76%	13.46%	12.00%
6. Take your own medications (take proper medications at right time)	1.53%	0.96%	2.50%
7. Handle your own money?	2.55%	0.96%	2.00%
8. Dress and undress yourself?	0.51%	0.96%	0.00%
9. Take care of your own appearance?	0.51%	2.88%	0.50%
10. Walk without assistance?	8.16%	1.92%	8.00%
11. Get in/out of bed without assistance?	1.02%	0.00%	0.00%
12. Bath/shower without assistance?	1.02%	0.96%	3.00%
13. Trouble getting to bathroom on time?	14.51%	9.71%	11.06%
Average Score (cumulative total, all items)	12.14%	12.39%	12.17%

TABLE 5

RESPONDENTS ABILITY TO PERFORM ACTIVITIES OF DAILY LIVING:
PERCENTAGE OF RESPONDENTS IN EACH SAMPLE

	SAMPLE			
	ENOA URBAN (N=196)	ENOA RURAL (N=104)	SANDHILLS SAMPLE (N=200)	TOTAL SAMPLE (N=500)
	Percentage (%) and Number (N) of Individuals in Each Category			
# Total Activities	% (N)	% (N)	(%) (N)	% (N)
13 Activities	58.7% (115)	61.5% (64)	59.0% (118)	59.4% (297)
12 Activities	18.9% (37)	26.0% (27)	21.5% (43)	21.4% (107)
11 Activities	13.8% (27)	6.7% (7)	11.0% (22)	11.2% (56)
10 Activities	2.6% (5)	3.8% (4)	2.5% (5)	2.8% (14)
9 Activities	3.6% (7)	1.0% (1)	2.5% (5)	2.6% (13)
8 or Less	2.5% (5)	1.0% (1)	3.5% (7)	2.6% (13)
TOTALS	100.0% (196)	100.0% (104)	100.0% (200)	100.0% (500)
Average Activities	12.14	12.39	12.17	12.20
Standard Deviation	1.46	1.06	1.42	1.36

(approximately 60 percent of each sample). That is, the majority of this random sample of older Nebraskans have no functional impairment. The decline in performance of ADLs is consistent among and between groups with between 77.6 percent and 87.5 percent able to perform 12 or 13 tasks. The standard deviations are consistent. There is no statistical difference among the three groups. These data show that only about eight percent of the people in each sample are deficient in three or more ADL categories.

The data in **Table 6** provide information on respondents who have someone who provides assistance with ADLs, a perception of needing assistance with ADLs, and the population estimates of those needing assistance in each sample. The data show that about 25 percent of the sample has someone to provide assistance with ADLs. The greatest part of this 25 percent is provided by the family, followed by friends, neighbors, and agency personnel.

On the question, "Do you need assistance?" we find that six to nine percent of the sample say their deficits are great enough to need assistance. Finally, when those who feel they need assistance are sorted against those who have no assistance and are deficient in three or more ADL task areas, we have between four and five percent of the sample who are functionally impaired yet still living independently without assistance.

TABLE 6

RESPONSES TO THREE QUESTIONS REGARDING ASSISTANCE WITH ACTIVITIES OF DAILY LIVING

QUESTIONS & RESPONSES	SAMPLE RESPONSE PERCENTAGES							
	ENOA URBAN (N=196)		ENOA RURAL (N=104)		SANDHILLS SAMPLE (N=200)		TOTAL SAMPLE (N=500)	
	%	#	%	#	%	#	%	#
Is there someone who helps you with daily living tasks?								
No	73.5%	(144)	67.3%	(70)	82.0%	(164)	75.5%	(378)
Yes	26.5%	(52)	32.7%	(34)	18.0%	(36)	24.4%	(122)
Total	100.0%	(196)	100.0%	(104)	100.0%	(200)	100.0%	(500)
Do you feel you need help with your daily living tasks?								
No	91.3%	(179)	98.1%	(102)	9.35%	(187)	93.6%	(468)
Yes	8.7%	(17)	1.9%	(2)	6.5%	(13)	6.4%	(32)
Totals	100.0%	(196)	100.0%	(104)	100.0%	(200)	100.0%	(500)
Percentage who feel they need assistance, have no assistance and are deficient in three or more ADL tasks	4.6%	(9)	1.9%	(2)	5.0%	(10)	4.2%	(21)
Population estimate (# of elderly)		2,177		301		113		2,751
Probability range (# of elderly)		up to 4,610		up to 1,859		up to 289		up to 5,679

The final item in **Table 6** is the population estimate of those who are functionally impaired and need assistance. Generalizing to the population from the random sample, we find 2,751 functionally impaired persons distributed among the three samples. We would estimate that 2,177 are in Douglas County, 301 in the ENOA Rural sample, and 113 in the Sandhills sample. These numbers were obtained by multiplying the percentage of those who feel they need assistance, have no assistance, and are deficient in three or more ADL tasks by the elderly population in each respective area.

One final comment in regard to **Table 6**, an application of the sampling error statistic could yield up to 5,679 functionally impaired elderly located in the three sample areas. Thus, there might be up to 4,610 in Douglas County, up to 1859 in the ENOA Rural area, and up to 289 in the Sandhills area.

Correlation coefficients are shown in **Table 7**. These illustrate the relationships between the variables and the statistical significance of these relationships. Inasmuch as we are primarily interested in examining the incidence of functional impairment in the samples, we will examine the ADL scores in relation to the other variables.

Moving to the bottom row of **Table 7**, the first comparison is ADL scores by place of residence, ENOA Urban, ENOA Rural, and the Sandhills samples. The very small correlation coefficient (.01) indicates that there is essentially no relationship between urban or rural residence and level of disability. Moving to

TABLE 7

CORRELATION COEFFICIENTS

VARIABLES ***	RESIDENCE	HEALTH STATUS	MARITAL STATUS	# IN HOUSEHOLD	RACE	AGE	INCOME	SEX
Health	-.03	-						
Marital	-.04	-.04	-					
# in HH	-.10*	.05	.21**	-				
Race	-.27**	-.20**	.00	-.03	-			
Age	.18**	-.19**	-.20**	-.35**	.06	-		
Income	-.07	.15**	.06	.17**	-.10	-.14*	-	
Sex	-.01	-.11*	.18**	.20**	.04	-.09*	.21**	-
ADL	.01	.33**	.08	-.03	-.25**	-.22**	.04	-.10*

* $p < .05$
** $p < .01$
*** Explanation of the variable labels given below.

Residence=residence is in ENOA Urban, ENOA Rural, Sandhills
Health=self reported health status
Marital=status is widow/widowed, single, etc. or married with spouse
# in HH=persons living in household, one or more than one
Race=white or minority
Age=chronological age as reported by respondent
Income=self reported monthly income
Sex=female or male respondent
ADL=all activities added to produce a total score (scale)

the right, ADL correlates strongly with self-reported health status. This statistic tells us that those reporting poor health are not able to perform some of the activities of daily living.

Examining ADL with relation to marital status and to the number of persons in the household, we find no important differences. In regard to race and age, we find two significant, inverse relationships. This means that minorities are more likely to report poor ADL scores, and that the older persons are more likely to have a poor ADL score.

The last two variables are income and sex of the respondent. There is no correlation between income and low ADL scores. On the other hand, males are more likely to report lower scores than females. (Males are coded as "0" for the computer analysis, while females are "1." Thus the negative correlation: As "sex" goes down in score, ADL goes up.)

Finally, the data in **Table 7** along with a forced entry multiple regression procedure suggest that the primary predictors of inability to perform activities of daily living (vulnerability) are age (as age goes up, so does disability), reporting poor health, and being a member of a minority group. Other variables that are associated with ADL deficits are living alone and gender of the individual.

Comments on these findings are reserved for the discussion section.

DISCUSSION

The discussion will address the lack of substantial differences between the ENOA Urban and the Sandhills samples and the implications of substantial numbers of functionally impaired elderly living independently without assistance who say they need help.

These data seem to show that the proportion of elderly persons living alone is higher in rural (Sandhills) areas than in the urban (Douglas County) area. The single causal factor that may account for this finding is the larger number of widow/widowers that we found in the rural sample.

There is no statistical difference in the self-reported monthly income among the three groups. This finding cuts against conventional wisdom that rural elderly suffer greater economic deprivation then their urban counterparts.

A second finding that disputes conventional stereotypes is the health status of rural elderly. It is often accepted that rural elderly are more likely to suffer poorer health. These data show no difference, however, between the ENOA Urban and the Sandhills samples in terms of health status. The ENOA Rural sample, moreover, shows a significantly better self reported health status than either of the other samples.

The authors point to the study done by Idler, Kasl, and Lemke (1990) that shows self-reported health status as a unique predictor variable in mortality studies. That is, self-report generally is as good or better than clinical assessment. Our data indicate that there are no significant differences in health

status between urban and rural elderly.

With regard to the ADL deficits and the levels of functional impairment among the respondents, our findings closely match mean scores on the OARS tests gathered by Duffy and MacDonald (1990). Secondly, the incontinence statistics obtained in this sample are consistent with those reported by Resnick (1986). Finally, the population estimates of functionally impaired elderly found in this study fall within the statistical parameters reported by Stone and Murtaugh (1990).

Having found these conditions, we feel that a programmatic approach to the problem of functional impairment within the ENOA area is in order.

RECOMMENDATION

We would offer a simple, inexpensive, pilot project in Douglas County aimed at discovering and offering assistance to the community dwelling functionally impaired elderly who say they need help and have none. There are several reasons for promoting this recommendation. First, we have long suspected that a cadre of functionally impaired elderly lived in the community. Second, those who work in agencies serving the aging have asked researchers and others to identify the extent of the problem facing functionally impaired elderly. This research has identified elderly who are impaired, who have no help and need assistance in activities of daily living. To paraphrase the quote at the beginning of this study, "we listened and they gave us the diagnosis." Here is a crude framework for the proposed course of action.

First, ENOA should recruit from among Senior Companion or RSVP Volunteers a cadre of individuals who are sufficiently motivated to carry out a telephone recruitment program that will run for a period of at least two years.

Second, these volunteers should receive in-depth training from a professional who is versed in a least three fields: persuasion, public relations, and gerontology.

Third, after the training has been completed, the volunteers should be placed under the direct supervision of a paid ENOA employee who has received the same training.

Fourth, a calling program should be initiated that includes: (1) A listing of all operational telephone numbers in Douglas County, sorted to eliminate persons under the age of 65 years (60 if you wish). This is not an unusual request for a national marketing and research firm. (2) Sufficient telephone lines available during working hours. These work stations should be located near the supervisor. (3) A standardized instrument to be used in the telephone contacts. (4) Follow up materials that can be mailed to contacts. And (5), a record keeping system that can be used to measure the effectiveness of the effort.

Twenty to thirty calls may need to be made to find each targeted person. Next would be the task of identifying needs of these individuals and offering services.

Finally, at the end of the first year, the results of the effort should be critically examined. If the agency considers the pilot project a success, the same procedures should be replicated in the ENOA rural areas. At the end of the second year, both Urban and Rural results should be critically examined and published. If the total results are judged to have identified and assisted functionally impaired elderly to remain independent, the proposal should be considered for implementation in all AAAs.

There is little doubt that a pessimist could come up with a hundred reasons why this recommendation will fail. The idea of using volunteers to identify the target population could be questioned. As a matter of fact, Fischer, Mueller, and Cooper (1991) are doubtful that a vast reservoir of elderly volunteers exists. On the other hand, we invite you to ponder a remark made by Benjamin Franklin. "The person who does things makes many mistakes. However, they fail to make the greatest mistake of all -- doing nothing!"

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