

## Self-rated Health and Some of Its Determinants among the Elderly in Rural Areas in Egypt

Mohamed Mohei El-Din M Makhlouf\*

**Abstract:** Self-rated health (SRH) is a subjective assessment of individual health status that has been well documented as a reliable predictor of functional disability and mortality in aged populations. A house to house survey conducted aiming to investigate self-rated health and some of its determinants among the elderly in two rural areas in Egypt; Dhayf and Carabigo Villages. A pre-designed interviewing questionnaire was utilized to collect information about socio-demographic data, social relations, health related variables, lifestyle, and functional abilities of the elderly. A single-item measure was utilized to assess SRH. The total number of the available elderly in the 2 villages was 99. Results revealed that poor SRH was reported among 41.4% of all elderly in the 2 villages while good SRH was reported among 58.6%. The independent predictors of poor SRH among the elderly were being principally cared by others, higher number of utilized medications, insufficient income, and lack of practicing physical exercise. Being cared principally by others was independent predictor of poor SRH among both sexes, while insufficient income and dependency in one function or more of activities of daily living (ADL) were independent predictors among elderly females only. Further studies are recommended. Socioeconomic development, health promotion and protective interventions should be accomplished to enhance functional independence and physical activities among the elderly. Preventive activities should be adopted to deal with chronic diseases and to prevent polypharmacy among the elderly.

### INTRODUCTION

Self-rated health (SRH) is a subjective assessment of individual health status that has been well documented as a reliable predictor of functional disability and mortality in aged populations.<sup>(1-3)</sup> Moreover, SRH was found to be a predictor of mortality in a middle-aged population and contains information that is not entirely reflected in underlying medical conditions

and risk factors.<sup>(4)</sup> The relationship with mortality is robust, persisting across race and sex and after controlling for socioeconomic status and comorbidity. Possible mechanisms include knowledge of past and current health experiences, implicit comparisons with people of similar age and health status, and the effect of perceived health on personal health

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\*Geriatric Health, Family Health Department, HIPH, Alexandria University

behaviour, which, in turn, influences health outcomes<sup>(5)</sup>.

SRH has exceptional predictive validity in at least two respects. For one, it predicts mortality very well and even performs better than an array of disease-specific indicators.<sup>(6,7)</sup> Secondly, SRH anticipates treatment behaviour accurately.<sup>(8)</sup> SRH is not only a spontaneous assessment of one's health status and related practices; like a self-concept, but it may be regulated by efforts to achieve one's relatively important health-related goals.<sup>(9)</sup>

Variation in SRH was found among the elderly in different communities and in different settings.<sup>(10-12)</sup> Different surveys<sup>(13-16)</sup> revealed that age, chronic disease, functional status, inability to go out alone, physical exercise, and health care coverage, have considerable effects on SRH of the elderly. In addition, gender and rural-urban differences in SRH of the elderly were found in other studies.<sup>(17, 18)</sup>

Self-rated health is among the most pervasive measures of health in the social

sciences. Its popularity comes mainly from the fact that it is easy to include in surveys.<sup>(8)</sup> Despite of that, studies of SRH among elderly population in Egypt is scarce. So, the aim of this study is to investigate self-rated health and some of its determinants among the elderly in rural areas in Egypt.

### **Material and Methods.**

A community based cross sectional study targeting the elderly population (60 years and above) in two rural areas was conducted during the period from March to May 2003. These two areas were Dhayf and Carabigo villages (Ezbet Al-Haj Mahmoud); which are near to Alexandria Governorate. These two villages have approximately similar environmental and socioeconomic conditions except for the presence of some air pollution due to nearby factory and deficiency of some governmental services in Carabigo village. This survey was done during the field training of the High Institute of Public Health (HIPH) aiming at the assessment of

the environmental, social, and health status of the population of these villages as a preliminary step for their development. Cartographers first mapped the area and identified the target houses. The work was done through a house-to-house survey conducted by trained investigators under the supervision of the staff of HIPH. The areas in the 2 villages were screened and the total number of the houses was determined.

#### **Dhayf Village:**

The total number of families encountered was 383, however, only 361 families agreed for participation with a response rate of 94%. The total population reached 1747, among them 80 individuals were elderly (4.6%). However, only 70 elderly were available during the survey and completed the study.

#### **Carabigo Village:**

Carabigo village is much smaller than Dhayf Village and included much lower number of houses. The total number of families encountered was 147 families,

however, only 135 families agreed for participation with a response rate of 91.8%.

The total population reached 735 among them 33 individuals were elderly (4.5%).

However, only 29 of these elderly were available during

the survey. So, the total number of the included elderly from the 2 villages was 99.

All included elderly completed pre-designed interviewing questionnaire to collect data about the following:

1. Socio-demographic variables including age, sex, education, previous occupation, marital status, and income.
2. Data about the principal caregiver for the elderly: self/spouse/children or other relatives and neighbours.
3. Elderly relation with spouse and children was assessed with a single-item measure: "In general, how do you evaluate your relation with spouse/children?" with 4 possible responses: (1) excellent, (2) good, (3) fair, and (4) poor; and responses

- were dichotomized as "good" or "poor" by combining response 1 with response 2 and combining response 3 with response 4.
4. Health-related variables including self-reported number of chronic diseases, number of utilized medications, number of outpatient visits to any health care provider and number of hospital admissions during the past 3 months.
  5. Data about lifestyle variables including smoking history and physical exercise. Walking was selected to indicate physical exercise as it is a particularly feasible form for the elderly, especially in rural areas.
  6. Data about the functional abilities of the elderly as measured by Katz index of activities of daily living (ADL)<sup>(19)</sup> and Lawton scale for instrumental activities of daily living (IADL).<sup>(20)</sup> For ADL, 6 functions were enquired about: Bathing, dressing, grooming, toileting, continence, and feeding. Two categories were defined: completely independent in all functions and dependent in one function or more. For IADL, 8 functions were enquired about; 6 of them were common for both males and females and included : the ability of using telephone, going out more than walking distance, shopping, managing money, preparing meals, and taking medications without assistance ( or the ability to take it if supposed to do so). Two more functions were exclusively for females including house keeping and laundry. Two categories were defined: totally independent or dependent in two functions or less and dependent in three functions or more.
  7. SRH was assessed with a single-item measure: "In general according to your age, how do you think about your health?" with 5 possible responses: (1) excellent, (2) good, (3) very good, (4) fair, and (5) poor; and responses were dichotomized as "good" or "poor" by

combining response 1 with responses 2 and 3 and combining response 4 with response 5. SRH is an easy tool to be conducted in surveys and respondents appear to have little difficulty in rating their health from “excellent” to “poor.”<sup>(8)</sup>

### **Statistical analysis**<sup>(21, 22)</sup>

Analyses were performed using the Statistical Package for Social Science (SPSS), version 11.0. The differences between categorical variables were tested by Chi-Squared test; Fisher’s Exact Test (FET) and Monte-Carlo Exact test (MCE) were used in case of small frequencies. Multivariate associations were evaluated in a logistic regression model, including only significant variables in univariate analyses. Three models were utilized; one for all elderly, second for elderly males, and a third one for elderly females.

### **Dependent variable:**

SRH was divided into poor and good

### **Independent variables:**

Reference categories were chosen according to literature review and results of the univariate analysis. For all variables, the reference category is mentioned first, and the predictor category was contrasted with the reference category. The variables included in the models were:

Village: (Dhayf vs. Carabigo), previous work: (other jobs vs. farmers and housewives), income: (sufficient vs. insufficient), principal caregiver: (self vs. others than self), number of chronic diseases (no vs. 1-2 and 3 or more), number of utilized medications: (less than 3 vs. 3 or more), physical exercise: (yes vs. no), ADL: (completely independent in all functions vs. dependent in 1 function or more). P value less than 0.05 was considered significant.

## **RESULTS**

Figure (1) shows distribution of the elderly according to self-rated health and villages. The figure reveals that poor SRH was reported among 41.4% of all elderly in the 2 villages while good SRH was

reported among 58.6%. The figure also reveals that more than half of the elderly in Carabigo Village (58.6%) rated their health as poor compared to around one third (34.3%) of those in Dhayf village. This difference was found to be statistically significant ( $\chi^2 = 5.01$ ,  $P < 0.05$ ).

Table (1) shows distribution of the elderly according to socio-demographic variables, social relations and self-rated health in rural areas in Egypt. The table demonstrates that poor self-rated health was more commonly reported among older than younger age groups (53.3% vs. 39.3%), among females than males (47.4% vs. 33.3%), among illiterates and those who only read & write compared to those with primary education or above (41.8 vs. 37.5%), and among unmarried than married elderly (45.1% vs. 37.5%). However, none of these differences reached a statistically significant level. On the other hand, housewives showed the highest percentage of poor self-rated health (53.1%) compared to farmers and

those of other occupations (38.5% and 20.8%, respectively) and the difference was found to be statistically significant ( $\chi^2 = 7.02$ ,  $P < 0.05$ ). Also, elderly persons whose income were insufficient were more commonly to report poor self-rated health compared to those with sufficient income (59.4% vs. 32.8%) and the difference was found to be statistically significant ( $\chi^2 = 6.29$ ,  $P < 0.05$ ).

The table also reveals that elderly persons who principally care for themselves had the lowest percentage of poor self-rated health (17.8%) compared to the elderly whose their principal caregivers were the spouse, children, or other relatives and neighbours (47.6%, 69%, and 75%, respectively) and the difference was found to be statistically significant (MCE :  $P < 0.01$ ). The table also showed that elderly with poor relations with their spouse or children had higher percentage of poor self-rated health (75% for both) compared to those with good relations (34.1% and 40.0%, respectively). However,

the difference was found to be statistically insignificant.

Table (2) shows distribution of the elderly according to health related, lifestyle variables, and self-rated health in rural areas in Egypt. The table reveals that poor self-rated health was more common among the elderly who reported having 3 chronic diseases or more (75%) compared to those with 1 or 2 diseases and those who reported having no diseases (43.8% and 17.4%, respectively) and the difference was found to be statistically significant (MCE:  $P < 0.01$ ). The table also demonstrates that poor self-rated health was more common among the elderly reported utilizing 3 medications or more (65.5%) compared to those utilizing 1 or 2 medications and those who reported utilizing no medications (32.6% and 29.6%, respectively) and the difference was found to be statistically significant ( $\chi^2 = 9.88$ ,  $P < 0.01$ ). The table also shows that poor self-rated health was more common among the elderly who reported 2 or more outpatient

visits (48.9%) or hospital admissions (66.7%) compared to those reported 1 or no visits (25% and 41.2%, respectively) and 1 or no hospital admissions (42.9% and 38.2%, respectively). However, the differences regarding outpatient visits or hospital admissions were found to be statistically insignificant. Concerning lifestyle variables, the table reveals that poor self-rated health was more common among non-smokers (43.4%) than smokers (31.3%), however, the difference was statistically insignificant. On the other hand, poor self-rated health was more common among elderly who were not practicing physical exercise (walking outside the home) at all (88.9%) compared to those who were practicing once or more/week and once or more/day (33.3% and 29.4%, respectively) and the difference was found to be statistically significant (MCE,  $P < 0.01$ ).

Table (3) shows distribution of the elderly according to functional abilities (ADL and IADL) and self-rated health in

rural areas in Egypt. The table reveals that poor self-rated health was more common among those dependent in one function or more of ADL (73.9%) compared to those completely independent in all functions ( 31.6% ) and the difference was found to be statistically significant ( $\chi^2 = 13.04$ ,  $P < 0.01$ ). On the other hand, elderly persons who were dependent in three functions of IADL or more were more commonly to report poor self-rated health (43.2%) compared to non of those who were completely independent or dependent in two function or less. However, the difference was found to be statistically insignificant (FET  $P > 0.05$ ).

Table (4) Shows results of the stepwise logistic regression analysis of the factors associated with poor self-rated health among the elderly in rural areas in Egypt. Model I reveals that the independent predictors of poor self-rated health among all elderly were insufficient income (OR=4.26, 95% C.I= 1.40-12.96), being cared principally by others than self

(OR= 8.34, 95% C.I= 2.85-24.39), utilizing three or more drugs (OR=3.33, 95% C.I= 1.13-9.86), and not practicing physical exercise (OR=2.98, 95% C.I= 1.08-8.22). Model II shows that the independent predictor of poor self-rated health among elderly males was being cared principally by others than self (OR= 6.17, 95% C.I= 1.57-24.26). On the other hand, model III demonstrates that the independent predictors of poor self-rated health among elderly females were insufficient income (OR=4.55, 95% C.I= 1.19-17.46), being cared principally by others than self (OR= 4.24, 95% C.I= 1.26-14.28), and being dependent in one function or more in ADL (OR=4.40, 95% C.I= 1.06-18.04).

## DISCUSSION

Global self-evaluations of health have proven to be sensitive predictors of morbidity and mortality.<sup>(9)</sup> Studies have shown that SRH varies from country to another. The level of self-rated good health varied from 30 to 60% among the elderly in different areas of Latin America.<sup>(12)</sup> In

Japan,<sup>(10)</sup> 64.4% of non-institutionalized aged persons answered that they were healthy, while 28.8% were not. In Finland,<sup>(11)</sup> about half the participants (75 years or older) self-rated their health as good or unusually good. On the other hand, more than two-thirds of the elderly rated their health as fair or poor in Spain.<sup>(23)</sup> The present study also revealed that 58.6% of the elderly rated their health as good, while 41.4% rated it as poor (Figure1). Racial and cultural factors may lead to variations of SRH in different studies.<sup>(24,25)</sup> Urban and rural differences in SRH were also found.<sup>(18)</sup> The present study also revealed that there was a statistically significant difference in the level of SRH between the elderly in the two included rural areas in the univariate analysis (figure 1). However, this difference disappeared in the multivariate analysis (table 4). So, this difference may be due to other confounders. It was postulated that observed regional difference in SRH may be related to the influence of socio-demographic and environmental factors, and level of awareness concerning certain health conditions.<sup>(18)</sup> Among the socio-demographic variables investigated, age was found to be significantly associated with SRH; but with inconsistent results among different age groups. In China,<sup>(14)</sup> SRH was found to be significantly associated with age group, where elderly aged 100 years and over reported a more positive health status than did persons aged 80 to 89 and 90 to 99 years. On the other hand, compared with those who were 85 years of age or older, a high health status was reported among those aged between 75 and 84 years, but not those aged 65 to 74 years.<sup>(10)</sup> The present study also showed that poor SRH was more prevalent among older age group (75+) compared to younger age group (60-74) but the difference was not statistically significant (table1). The present study also demonstrated that poor SRH was more common among females than males, among non-educated compared to those

with primary education or more, and among unmarried than married elderly. However, like age, all the differences were not statistically significant. Females and those of lower education were also found to have poorer SRH in other studies.<sup>(14,23,26)</sup> The present study also revealed that previous occupation was significantly associated with SRH, where the highest prevalence of poor self-rating was found among housewives, followed by farmers compared to other jobs (table 1). This is consistent with the study done in China,<sup>(14)</sup> where non-agricultural professionals reported more positively rated their health status than did farm labours. Other studies<sup>(24, 27)</sup> also documented a relation between SRH and occupation. It was suggested that the association between traditional measures of socioeconomic status, such as educational level and occupational status, and poor self-rated health is mediated through other socioeconomic conditions such as experiences of being belittled, economic hardship, and lack of

social support.<sup>(28)</sup> The present study also revealed that , among all socioeconomic variables studied, insufficient income was the only significant and independent predictor of poor SRH both at univariate (table1) and multivariate analysis among all elderly and among elderly females ( table 4). This was also found in different studies.<sup>(29,30)</sup> In addition to providing means for purchasing health care, higher incomes can provide better nutrition, housing, and recreation which may affect SRH.<sup>(31)</sup>

Concerning social support, the present study showed that elderly persons with poor relations with their spouse and children had higher, but insignificant, rate of poor SRH. A North American longitudinal study showed that children's emotional and instrumental support has beneficial effects on survival and psychological wellbeing of parents, particularly when the elderly experience widowhood or declining health.<sup>(32, 33)</sup> The authors stated that older parents prefer to

be functionally autonomous for as long as possible but support from children becomes important at times of crisis. Other studies carried out in the US have found no<sup>(34)</sup> or negative consequences of children's support on the morale and mental health of elderly parents.<sup>(35,36)</sup> These negative effects have been explained by the decline in self-esteem associated with the loss of autonomy and physical and/or economic dependence. The present study also demonstrated that those elderly caring for themselves had the highest rate of SRH compared to those who were cared principally by spouse, children or others (table 1). Moreover, being cared by others than self was found to be the only independent predictor for poor SRH which remained consistent in the three models (among all elderly and among both sexes; table 4). Also, perceived control over life was also found to be strongly related to SRH and physical functioning in Russia.<sup>(37)</sup> Going in the same direction, dependency in functional abilities (ADL) was significantly

associated with poor SRH in the present study (table 3). This is consistent with the results of many studies.<sup>(10,26,31,38)</sup> However, dependency in one function or more of ADL and not IADL was independent predictor of poor SRH only among elderly females in the present study (table 4). This was also previously found among elderly men, where those with disabilities in IADL had no different health ratings than those without disabilities. However, those with disabilities in mobility and ADL had an odds ratio of 4.7 for poor self-rated health.<sup>(39)</sup> ADL is more basic than IADL and it seems that its impairment may lead to more distress and poorer SRH than impairment in IADL. This impact may be even more severe among females, which bear the whole burden of the family especially in rural areas, which need support in their basic daily life activities; as appeared in the present study (table 4).

Going further step in physical abilities, it was found that practicing physical exercise outside the home (walking) was

significantly associated with SRH in the present study. Those who were going out frequently for walking (once/day or more) had the lowest rate of poor SRH compared to those going out less frequently and those not going at all (table 2). This is consistent with many other studies<sup>(10,11,17,24)</sup>. The present study also revealed that lack of physical activity is an independent predictor of poor self-rated health among the elderly. Unlike physical activity, smoking didn't appear to be significantly associated with poor SRH in the present study (table 2). This is not consistent with the results of other studies,<sup>(17,24)</sup> which revealed that smokers had a less favourable health category than non-smokers. However, the first study<sup>(17)</sup> found the relation of poor SRH with heavy smoking and the second one<sup>(24)</sup> included only women. Smoking is still uncommon among females in rural areas in Egypt, and the relation between heavy smoking and SRH was not investigated in the present study as only a few elderly were smokers

(table 2). Some of the inconsistencies between the result of the present study and others may also be attributed to the small number of included elderly in the present study.

A study done in USA,<sup>(40)</sup> investigated elderly people's ratings of the importance of health-related factors to their self-assessments of health. The results revealed that factors indicating overall functioning/vitality were rated highly by all participants, while factors indicating current disease were rated highly by people reporting poor/fair SRH. Also, several studies have shown that illness related variables are strong predictors of poor SRH. Among these are necessity for periodical visit to hospitals and clinics,<sup>(10,38)</sup> number and type of chronic diseases and symptoms,<sup>(11,38,41)</sup> depressive symptoms and cognitive capacity<sup>(11,24)</sup>. The present study also revealed that elderly reported higher - Number of outpatient visits and of hospital admissions during the past 3 months had high but insignificant rate of

poor SRH. Also those with higher number of chronic diseases and higher number of medications had higher significant rate of poor SRH (table 2). However, only higher number of utilized medications (3 or more) was independent predictor of poor SRH among all elderly (table 4). This was also found in other studies<sup>(42,43)</sup> Higher number of utilized medications may be more bothering to the elderly than the disease itself, especially if these diseases are asymptomatic.

## **CONCLUSION and**

## **RECOMMENDATIONS**

It could be concluded that poor SRH is common among the elderly in the studied rural areas; more in Carabigo than in Dhayf villages. Factors significantly associated with poor SRH included previous occupation, insufficient income, being cared principally by others, higher number of chronic diseases and utilized medications, lack of practicing physical exercise, and dependency in one function or more of ADL. The independent

predictors of SRH among the elderly were being principally cared by others, higher number of utilized medications, insufficient income, and lack of practicing physical exercise. Being cared principally by others was independent predictor of poor SRH among both sexes, while insufficient income and dependency in one function or more of ADL were independent predictors among elderly females. Further studies from bigger rural and urban areas are required. SRH is a simple tool and should be included in different surveys assessing the health status of the elderly population.

Socioeconomic development to increase population income in rural areas may have its impact on SRH of the elderly. Health promotion and protective interventions should be accomplished to enhance autonomy, functional independence, and physical activities among the elderly population. Different levels of prevention should be adopted to deal with chronic disease and their subsequent disabilities,

and to prevent polypharmacy among the elderly.

**Table 1: Distribution of the elderly according to socio-demographic variables, Social relations, and self-rated health in rural areas in Egypt.**

Socio-demographic Variables and relations	SRH				Total (n=99) No. %	Significance test	
	Good (n=58) No. %		Poor (n=41) No. %				
<b>Village</b>							
Dhayef	46	65.7	24	34.3	70	100	$\chi^2 = 5.01^*$
Carabigo	12	41.4	17	58.6	29	100	
<b>Age (Years)</b>							
60-	51	60.7	33	39.3	84	100	$\chi^2 = 1.04$
75 +	7	46.7	8	53.3	15	100	
Mean : 66.5 ± 6.2							
<b>- Sex</b>							
Males	28	66.7	14	33.3	42	100	$\chi^2 = 1.96$
Females	30	52.6	27	47.4	57	100	
<b>- Education</b>							
Illiterate/read &write	53	58.2	38	41.8	91	100	FET: p > 0.05
Primary & above	5	62.5	3	37.5	8	100	
<b>- Previous Occupation</b>							
Farmer	16	61.5	10	38.5	26	100	$\chi^2 = 7.02^*$
Others	19	79.2	5	20.8	24	100	
House wives	23	46.9	26	53.1	49	100	
<b>- Marital Status</b>							
Married	30	62.5	18	37.5	48	100	$\chi^2 = 0.59$
Unmarried	28	54.9	23	45.1	51	100	
<b>- Income</b>							
Enough	45	67.2	22	32.8	67	100	$\chi^2 = 6.29^*$
Not enough	13	40.6	19	59.4	32	100	
<b>- Principal Caregiver</b>							
Self	37	82.2	8	17.8	45	100	MCE: P < 0.01
Spouse	11	52.4	10	47.6	21	100	
Children	9	31.0	20	69.0	29	100	
Other relatives/neighbours	1	25.0	3	75.0	4	100	
<b>- Relation with Spouse #</b>							
Good	29	65.9	15	34.1	44	100	FET P > 0.05
Poor	1	25.0	3	75.0	4	100	
<b>- Relation with children ◇</b>							
Good	54	60.0	36	40.0	90	100	FET P > 0.05
Poor	1	25.0	3	75.0	1	100	

# : n = 48

◇ : n= 94

\* P < 0.05

\*\* P < 0.01

**Table 2: Distribution of the elderly according to health-related, lifestyle Variables, and self-rated health in rural areas in Egypt.**

variables	SRH				Total (n=99) No. %	Significance test	
	Good (n=58) No. %		Poor (n=41) No. %				
<b>Health related</b>							
- Number of chronic diseases							
0	19	82.6	4	17.4	23	100	MCE: P<0.01
1-	36	56.3	28	43.8	64	100	
3+	3	25.0	9	75.0	12	100	
- Number of utilized medications							
0	19	70.4	8	29.6	27	100	$\chi^2 = 9.88^{**}$
1-	29	67.4	14	32.6	43	100	
3+	10	34.5	19	65.5	29	100	
- Number of outpatient visits during the past 3 months							
0	20	58.8	14	41.2	34	100	$\chi^2 = 3.26$
1	15	75.0	5		20	100	
2+	23	51.1	25.0		45	100	
- Number of hospital admissions during the past 3 months							
0	47	61.8			76	100	MCE: P >0.05
1	8	57.1	29	38.2	14	100	
2+	3	33.3	6		9	100	
			42.9				
			6				
			66.7				
<b>Life style</b>							
- Smoking							
No	47	56.6	36	43.4	83	100	$\chi^2 = 0.81$
Yes	11	68.8	5		16	100	
- Physical exercise (Frequency of walking outside home)							
No	2	11.1			18	100	MCE: P<0.01
Once or more/week	20	66.7	16	88.9	30	100	
Once or more/Day	36	70.6	10	33.3	51	100	
			15	29.4			

\* P < 0.05

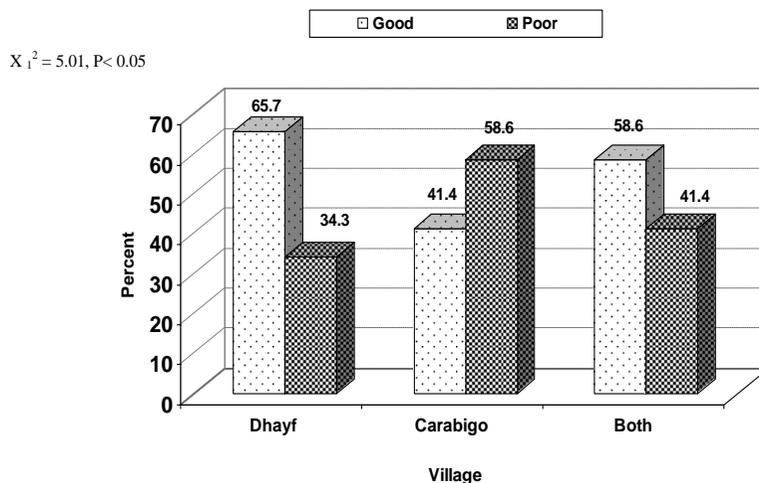
\*\* P < 0.01

**Table 3: Distribution of the elderly according to functional abilities (ADL and IADL), and self-rated health in rural areas in Egypt.**

Functional Abilities	SRH		Total (n=99) No. %	Significance Test
	Good (n=58) No. %	Poor (n=41) No. %		
- ADL				
Completely independent in all Functions	52 68.4	24 31.6	76 100	$\chi^2 = 13.04^{**}$
Dependent in one function or more	6 26.1	17 73.9	23 100	
- IADL				
Completely independent in all Functions or dependent in less than 3 functions	04 100	0.0 0.00	04 100	FET P >0.05
Dependent in 3 functions or more	54 56.8	41 43.2	95 100	

\* P < 0.05

\*\* P < 0.01



**Figure ( 1 ) : Distribution of elderly according to self rated health and villages**

**Table 4: Results of the stepwise logistic regression analysis of the factors associated with poor self-rated health in rural areas in Egypt.**

Independent variable	B	S.E	P	OR	95% C.I.
<b>Model I : For all elderly</b>					
<b>Income</b> Insufficient	1.448	0.568	0.01	4.26	1.40- 12.96
<b>Principal caregiver</b> Other than self	2.120	0.548	0.000	8.34	2.85 - 24.39
<b>Number of utilized medications</b> Three or more	1.204	0.553	0.03	3.33	1.13 - 9.86
<b>Physical activity</b> No	1.091	0.518	0.04	2.98	1.08 – 8.22
<b>Constant</b>	-3.009	0.629	0.000	0.05	
<b>Model II: For elderly males</b>					
<b>Principal caregiver</b> Other than self	1.820	0.698	0.009	6.17	1.57 –24.26
<b>Constant</b>	-1.646	0.546	0.003	0.19	
<b>Model III: For elderly females</b>					
<b>Income</b> Insufficient	1.515	0.686	0.03	4.55	1.19- 17.46
<b>Principal caregiver</b> Other than self	1.443	0.620	0.02	4.24	1.26- 14.28
<b>ADL</b> Dependent in one function or more	1.475	0.723	0.04	4.40	1.06- 18.04
<b>Constant</b>	-2.142	0.681	0.002	0.12	

**Reference category** ®

**Income:** ® = Sufficient

**Principal caregiver** ® = Self

**Number of utilized medications** ® = less than three

**Physical activity** ® = Yes

**ADL** ® = Completely independent in all functions

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