

# Self-Reported Morbidities, Nutritional Characteristics, and Associated Factors in Institutionalized and Non-Institutionalized Elderly

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## Research article

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# Abstract

**Background:** Older people make up a large part of the world's population and their numbers are expected to increase significantly by 2030. The objective of this study is to determine socio-economic, health and nutritional characteristics of institutionalized and non-institutionalized elders in the province of Marrakech.

**Methods:** This cross-sectional study was conducted among 368 participants in Marrakech province between March 2017 and June 2019 through a face-to-face interview. Of all participants, 180 elders are residing in public institutions and 188 at home. Face-to-face interviews provided information on socioeconomic and health characteristics.

**Results:** Institutionalized elders were illiterate (80.0%), had low incomes (95.5%), and unmarried (73.3%). They reported less children ( $1.52 \pm 2.35$ ) and no health insurance (98.9%). Institutional residents suffered from malnutrition (22.2%), hearing impairments (35.6%) and severe edentulism (43.3%). There was no significant difference between both groups on daily activities and depression. A multivariate analysis identified a model with three significant variables associated with non-institutionalized elders: health insurance ( $P=0.001$ ;  $OR=107.49$ ), number of children ( $P=0.001$ ;  $OR=1.74$ ) and nutritional status ( $p=0.001$ ;  $OR=3853$ ). The data were analyzed by using SPSS version 16.0. Statistical significance was set at  $p<0.05$ .

**Conclusions:** This study shows that the institutionalization of the elderly is considerably induced by various factors such as nutritional problems, lack of health insurance and family structure. To mitigate the effects of this phenomenon, home care strategies and preventive actions should be carried out to delay the referral of the elderly to institutions and to keep them socially active

## Background

Aging is a natural and inevitable process, which presents new challenges to health care for most countries. There was a strong relationship between old age and cognitive, functional and malnutrition impairments [1, 2, 3]. This demographic trend, related with an increase of chronic illnesses and a rapid advance in medical equipment, will lead to a sharp increase in the number of older people in need of nursing care and health-care facilities [1]. Several studies have shown that aging population trend to suffer from a large number of morbidities related to environmental living conditions [1, 4, 5, 6]. Between 2015 and 2030, the number of elderly people (aged 60 years or over) is projected to grow by 56%, from 901 million to more than 1.4 billion in the world [2]. By 2030, this age group is expected to account for more than 25% in Europe and northern America as well as 20% in Oceania and 17% in Asia [2].

In India, the elderly people represent 7.7% of the total population of 1.20 billion, and this number is increasing. Therefore, the health policy of this country is focused principally on communicable diseases, maternal and child health, but the health status of the elders has not been sufficiently addressed [4]. Furthermore, it was revealed that since 1960 life expectancy in Mexico has risen from 57 to 75 years and the elderly people aged 60 years and older, will almost triple from 6.3% of total population in 2010 to almost 23% by 2050. Unlike all other regions, the tropical African countries today account for less than 5% of the total population aged 65 and above (e.g., Ethiopia, 2.9%, Malawi, 2.7% and Uganda, 2.0%) [7].

In Morocco, elderly population is projected to rise from 10% in 2015 to 15% by 2030. Besides, 52.4% of the Moroccan elders aged 60 and above are lived in urban areas, 65% are either widowers or divorced, 83% are illiterate and almost 92% are keeping a sound relationship with their relatives. [2]. While only 13% of this age group is covered by health care insurance, 53.4% of them suffer from at least two chronic diseases [6]. The main objective of this study was to determine the differences between institutionalized and non-institutionalized elderly and infer the self-reported morbidity, nutritional status and associated factors in the province of Marrakech.

## Methods

### Ethics statement

A group of 368 older persons aged 60 years and over were selected by a non-probability sampling between March 2017 and June 2019 through a face-to-face interview. Study protocol was explained and informed consent was obtained. The illiterate participants were accompanied by a third party to explain themselves (brother, sister, caregiver, or a member of the family). In this case, the consent was signed by both people. We also proceeded to obtain consent in Arabic dialect to facilitate understanding. The protocol was approved by the ethics committee of health authorities in Marrakech's province.

### Data collection

The target population was elderly people living in their own homes and those residing in public institution. The exclusion criteria were persons who suffered from severe dementia, and neuropsychological disorders. Inclusion criteria were the individuals aged  $\geq 60$  years. Collection tool was tested with a pilot group as close as possible to the target population. All data were collected by trained nursing students. A group of 368 participants was selected by a simple random sampling method (including 180 residents in public institution (Dar-Ibir) and 188 living at home (alone or with family members)). This public institution is the resort for elderly people and homelessness. It functions as a public non-profit institution provides such services as accommodation, meals, full-time nursing coverage, health care and rehabilitation.

### Variables and modalities

The data was collected through face-to-face interviews such as age, gender, origin (urban or rural), number of children, marital status, and socioeconomic status (SES), which included education, previous occupation and health insurance (covered or not). Education was coded into four categories: 1) Illiterates: those who never went to school, 2) Primary level: those who attended the primary-school; 3) Secondary level: those who have enrolled in middle school and/or high school without getting the baccalaureate certificate; 4) Tertiary level: those went to university. In addition, previous occupation was divided into three main categories: 1) Category with a lower income than 3500 Moroccan dirham (MAD) (about 350 euro): secretary, cashier, janitor, server, housekeepers and maids, etc. 2) Category with middle income ranging between 3500 and 5308 MAD: Police officer, taxi driver, teachers, nurses, etc. 3) Category with income exceeding 5308 MAD (530.8 euro): Financial manager, engineer, professor, doctor, lawyer, accountant, etc. Hence, the degree of physical disabilities was assessed when a person performed basic activities of daily living (ADLs). There are six basic activities of daily living including bathing, dressing, feeding, transferring, continence and toileting. Hence, three categories

are made: 1) no difficulties doing everything, 2) slight difficulty to do some things, 3) difficulty doing everything. We used mini nutritional assessment–Short Form (MNA-SF) to measure nutritional status (ranging from 0 to 14 points). The MNA-SF scale is interpreted as follows: 1) Malnutrition: 0 to 7 points, 2) Risk of malnutrition: 8 to 11 points and 3) Normal: 12 points or greater [8]. Depressive symptoms were assessed with the 15-item version of the Geriatric Depression Scale (GDS-SF), ranging from 0 to 15 points: 1) Normal: 0-5, 2) Moderate depression: 6-10 and 3) Severe depression [9]. In addition, morbidity measures are based on a self-assessment of the elderly person, a clinician's assessment and a brochure providing information such as the type and number of chronic illnesses. Besides, edentulism was estimated by the question "How many missing teeth do you have?". Three categories were categorized: 1) Good status: relatively no problem of dentition, 2) Partial edentulism: more than half of teeth are deteriorated and 3) Severe edentulism: all the teeth are missed or must be removed.

### **Statistical analyses**

The data were analyzed using SPSS version 16.0 (Inc., Chicago, IL, USA). A one-sample Kolmogorov-Smirnov test was used to analyze normality for continuous variables. Chi Square test was used to study relationships between categorical variables. Student's t-test was used to compare means between both groups. Multiple linear regressions identified the independent factors that affect institutionalized elders. Odds ratio (OR) 95%CI was used to show the strength of relationship between independent variables. Wald  $\chi^2$  statistic is used to test the significance of individual coefficients for verifying the true values. Statistical significance was defined as  $p < 0.05$

## **Results**

### **Socio-demographic characteristics**

A total of 368 participants were included; 188 (51.1%) living in their homes and 180 (48.9%) in a public institution in the province of Marrakech. Table 1 shows the socio-demographic and economic characteristics of participants. The mean ages of the institutionalized and non-institutionalized elders were 69.19 years (SD = 9.12) and 70.42 years (SD = 8.94), respectively. Of those interviewed, 45.9% were men and 54.1% were women. The majority of older people have reported the low socio-economic and poor health status in this study. In comparison to non-institutionalized elders a high proportion of institutional residents were significantly illiterate (80.0%), unemployed or had low-income (95.5%) and they had less children with an average equal to  $1.52 \pm 2.35$ . Moreover, the institutionalized elders were more likely to be unmarried (73.3%) and they had no medical coverage (98.9%).

Table 1  
Demographic and socio-economic characteristics of institutionalized and non-institutionalized elders

	<b>Institutionalized elders. n = 180</b>	<b>Non-institutionalized elders n = 188</b>	<b><i>p</i>- value</b>
Age (years $\pm$ SD)	69.19 $\pm$ 9.12	70.42 $\pm$ 8.94	0.748
Gender	87 (48.3)	82 (43.6)	0.364
Male	93 (51.7)	106 (56.4)	
Female			
Marital status	132 (73.3)	72 (38.3)	0.001
Without partner	48 (26.7)	116 (61.7)	
With partner			
Education status	144 (80.0)	128 (68.1)	0.001
Illiterate	23 (12.7)	20 (10.6)	
Primary	9 (5.1)	5 (2.6)	
Secondary	4 (2.2)	35 (18.6)	
Tertiary level			
Health insurance	178 (98.9)	113 (60.1)	0.001
None	2 (1.1)	75 (39.9)	
Yes			
Previous occupation and income	172 (95.5)	146 (77.6)	0.001
With low income	6 (3.3)	13 (6.9)	
With middle income	2 (1.1)	29 (15.4)	
With high-income			
Origin	84 (46.7)	101 (53.7)	0.176
Urban	96 (53.3)	87 (46.3)	
Rural			
Number of children	1.52 $\pm$ 2.35	4.84 $\pm$ 2,63	0.001
Abbreviations: SD: standard deviation; ( ): absolute frequency			

Table 2

shows the clinical, nutritional characteristics and self-reported morbidities of elderly people. According to MNA-SF, the institutionalized residents are significantly three times more likely to suffer from possible malnutrition with an average equal to 9.42 points (SD = 1.93). In this investigation, more than half of participants suffered from at least two chronic diseases. Furthermore, there were statistically no significant differences between the two groups on common chronic diseases ( $P > 0.05$ ). Hence, the non-institutionalized elders are complaining about the high proportion of hypertension and heart diseases (37.8%), musculoskeletal diseases (33.5%), gastrointestinal diseases (20.7%) compared to institutionalized elders that suffered from visual disorders (32.8%) and metabolic disorders (22.2%) without significant difference. However, institutionalized individuals were significantly more likely to develop malnutrition (22.2%), severe edentulism (43.3%) and hearing impairments (35.6%) ( $P < 0.05$ ). According to Self-reported activities, 12.8% of institutionalized elders had many difficulties to perform their activities of daily living without assistance compared to those at home ( $P = 0.385$ ). Therefore, when analysing GDS-SF, a proportion of severe depression is slightly assessed in institutionalized elders than those living at home ( $P = 0.313$ ). Table 3 illustrate the independent variables significantly associated with groups of study. We found that the health insurance ( $P = 0.001$ ; OR = 107.49; 95%CI: 14.292-808.524), the number of children ( $P = 0.001$ ; OR = 1.74; 95%CI: 1.498–2.023) and the nutritional status ( $P = 0.001$ ; OR = 3,853; 95%CI: 2.152–6.898) were relatively the predictive variables associated to institutionalized elderly.

	<b>Institutionalized elders n = 180</b>	<b>Non-institutionalized elders n = 188</b>	<b>p- value</b>
MNA-SF score	9.42 ± 1.93	12.55 ± 1.42	0.016
MNA-SF	40 (22,2)	15 (8,0)	0.001
Malnutrition: 0 to 7 points	114 (63,3)	66 (35,1)	
Risk of malnutrition: 8 to 11 points	26 (14.4)	107 (56.9)	
Normal: 12 points or greater			
Number of self-reported morbidity	1.63 ± 0.89	1.66 ± 1.05	0.142

Abbreviations: GDS: Geriatric Depression Scale ; MNA-SF: Mini nutritional assessment short form test ;

( ): absolute frequency, (-): code of CID-10 to transpose diagnoses of diseases and related health problems.

	<b>Institutionalized elders n = 180</b>	<b>Non-institutionalized elders n = 188</b>	<b>p- value</b>
Morbidities Perceived	53 (29.4)	71 (37.8)	0.091
Heart diseases/hypertension (I10-I15)	7 (3.9)	13 (6.9)	0.201
Respiratory diseases (J40-J47)	6 (3.3)	1 (0.5)	0.049
Infectious diseases (B95-B98)	5 (2.8)	3 (1.6)	0.437
Skin diseases (B35-B49)	47 (26.1)	63 (33.5)	0.121
Musculoskeletal diseases (M00- M99)	28 (15.6)	39 (20.7)	0.197
Gastrointestinal diseases (K00 - K93)	40 (22.2)	38 (20.2)	0.637
Metabolic disorders (E00 - E90)	17 (9.4)	11 (5.9)	0.194
Kidney diseases (N00 - N99)	59 (32.8)	60 (31.9)	0.860
Visual disorders (H00 - H59)			
Degree of dehydration	42 (23.3)	43 (22.9)	0.916
Severe dehydration	138 (76.7)	145 (77.1)	
Moderate dehydration			
Hearing status	116 (64.4)	132 (70.2)	0.014
Without problem	64 (35.6)	56 (29.8)	
Hearing impairments (H90-H95)			
Dental status	19 (10.6)	32 (17.0)	0.043
Good status	83 (46.1)	95 (50.5)	
Partial edentulism (K00-K14)	78 (43.3)	61 (32.5)	
Severe edentulism (K00-K14)			

Abbreviations: GDS: Geriatric Depression Scale ; MNA-SF: Mini nutritional assessment short form test ;

( ): absolute frequency, (-): code of CID-10 to transpose diagnoses of diseases and related health problems.

	<b>Institutionalized elders n = 180</b>	<b>Non-institutionalized elders n = 188</b>	<b>p- value</b>
Activity of daily living (ADLs)	113 (62.8)	106 (56.4)	0.385
No difficulties in everything	44 (24.4)	50 (26.6)	
A moderate difficulties	23 (12.8)	32 (17.0)	
Difficulties in everything			
GDS-SF score	5.64 ± 4,13	5.01 ± 3,87	0.513
GDS (Short form)	106 (58.9)	115 (61.2)	0.313
Normal: 0–5	41 (22.8)	49 (26.1)	
Moderate depression: 6–10	33 (18.3)	24 (12.8)	
Severe depression: 11–15			
Abbreviations: GDS: Geriatric Depression Scale ; MNA-SF: Mini nutritional assessment short form test ;			
( ): absolute frequency, (-): code of CID-10 to transpose diagnoses of diseases and related health problems.			

Table 3

Variables independently associated with institutionalized (n = 180) and non-institutionalized elderly (n = 188) according to the multiple logistic regression model.

	$\beta$	Wald	P-value	OR (95% CI)
Origin: (Urban)	0.197	0.288	0.591	1.218(0.593–2.501)
Marital status: (Without partner)	0.512	1.756	0.185	1.669 (0.782–3.558)
Education status: (Illiterate)	0.252	0.289	0.591	1.286 (0.514–3.218)
Health insurance: (None)	4.677	20.643	0.000	107.495 (14.292-808.524)
Previous occupation level: (low income)	-0.645	2.670	0.102	0.525 (0.242–1.137)
Number of children: (None)	0.554	52.407	0.000	1.741 (1.498–2.023)
Heart diseases/hypertension (I10-I15)	-0.616	2.465	0.116	0.540 (0.250–1.165)
Infectious diseases (B95-B98)	-3.581	5.063	0.024	0.028 (0.001–0.630)
Musculoskeletal diseases (M00-M99)	0.586	2.364	0.124	1.796 (0.851–3.790)
Gastrointestinal diseases (K00 - K93)	0.133	0.085	0.770	1.142 (0.469–2.780)
Hearing status/ Hearing impairments (H90-H95)	0.188	0.337	0.561	1.206 (0.641–2.272)
Dental status/ severe edentulism (K00-K14)	-0.061	0.121	0.728	0.941 (0.667–1.327)
MNA-SF: (malnutrition) (E40-E46)	1.349	20.597	0.000	3.853 (2.152–6.898)
Abbreviations: MNA-SF: Mini nutritional assessment short form; $\beta$ : Coefficient; P: Significance level of the Wald test; OR: Odds ratio; and CI: Confidence interval; (-): code of ICD-10 to transpose diagnoses of diseases and related health problems.				

## Health Characteristics And Nutritional Status

Most elderly complained significantly from chronic diseases but with a higher prevalence of malnutrition, depression, hearing impairments and severe edentulism among institutionalized elders. In fact, the multiple illnesses are the common burden of elderly people in institutions [11, 16]. For elderly people, the decision to move into health facilities is most often made in case of severe cognitive or functional impairment, in the absence of support and home-care [11]. The degree of malnutrition in Morocco is under-reported among the elderly people. Furthermore, institutionalized elders are significantly more likely to suffer from malnutrition in our study. Indian studies showed that more than 50% of the elderly people are underweight and 90% have an energy intake below the recommended allowance [4, 10]. In Mexico, it can reach as high as 15%, 21% and 23% in persons with cognitive impairments, those in institutional care, and those hospitalized, respectively [3]. These findings are confirmed by other studies elsewhere [1, 17, 18]. The prevalence of malnutrition is from 21 to 71% among the elderly living in special housing [3]. Nevertheless, prevalence of malnutrition is lower among Chinese, Spanish and Taiwanese elders [18, 19, 20]. As a result, aging is often decreasing the acuity of

taste and smell as well as dental health and gastrointestinal function, which may affect the quality of nutrient intake [6, 10, 17]. Saltetti et al. noted that only 8% of non-institutionalized elders were malnourished, because they are often well supported by their families and relatives [21].

Concerning health status, the majority of elderly suffered from many chronic diseases. Similar findings are published elsewhere in the world [6, 22, 23]. These chronic diseases are often leading to an increased need for medical care and long-term support services for older persons as active members in their society. Following an earlier study, most residents are independent to carry out their basic daily activities [24]. In tropical country, Mexican study indicates that nearly 24–28% of elderly have the physical limitations to do their activities of daily living [1]. Hence, 53% of institutionalized residents are heavily dependent in tropical country such as Brazil [25]. Therefore, when we analysed oral health, a higher rate of edentulism is significantly observed among institutional residents. Earlier studies found similar results in Spanish, Indonesian and Brazilian elderly [26, 27, 28]. Similarly to tropical country, this finding can be attributed to unhealthy behaviours and attitudes towards dental care in Morocco. In this terms, poor education, low income, lack of health insurance, poor hygiene, malnutrition, diabetes, hypertension may increase tooth impairments [26, 27, 28, 29]. Moreover, 63.7% and 16.8% of Singapore and South Korean elders are suffered from these impairments, respectively [30, 31]. Hence, the proactive efforts are needed to identify the risk factors and develop the measures to prevent negative consequences of hearing impairments. Concerning depression, a minority of participants suffered from severe depression. However, the high prevalence of depression is observed among nursing homes residents [10, 11]. As a tropical country, Mexico has reported a prevalence of depression from 10–37% among non-institutionalized elderly individuals [1]. Adequately managing depression in the elderly may lead to essential healthcare cost savings for our society [1, 32]. This problem could be reduced by improving nutritional status and social relationship with friends and relatives [10]. Our study has several limitations. This study uses self-reported data to examine autonomy, dehydration, hearing and dental status. Further, it was conducted on a small sample of institutional elderly.

## Discussion

To our knowledge there are few studies have been devoted to aging population in Morocco. This cross-sectional study explores socio-demographic, economic and health status of elderly people in the province of Marrakech.

## Socio-demographic And Economic Characteristics

In this study the majority of institutional elders had a low socioeconomic status and poor health conditions. Besides, the mean ages of non-institutionalized elders was 70.42 (SD = 8.94), which meant that elderly (aged over 70 years) continue to live in their homes as long as possible with their families or alone. They are afraid to lose their independence, their identity and their self-determination in nursing homes. Though, the mean age of institutionalized elders was 78.4+/-7.7 and 82.6+/-3.9 years in Lebanon and Germany, respectively [10, 11]. Our results revealed a predominance of elderly women in both study groups. Prior studies have often shown that females tend to live longer than males in tropical and non-tropical countries [1, 4, 6, 11].

Regarding socio-demographic status, institutionalized elders were significantly more likely to be single or widowed and illiterates. It has reported that advanced age and being single or widowed (compared to being married) were the variables significantly associated with increased risk of institutionalization [11]. Institutional residents reported the lack of health insurance, no partners, poor education levels, few children and low income in their previous job. Our data were corroborated by many studies in developing countries [6, 10, 12]. Illiteracy has been found to be a significant determinant strongly associated with institutionalized elders, especially in elderly women [12]. This finding has been confirmed by other studies conducted in developing countries [13, 14]. As a result, children (especially daughters) are considered as a source of help for the elderly, which may prevent or at least delay their movement to health care facilities [15]. This data corroborates the findings of many earlier studies [6, 10]. Moreover, the uninsured elderly are more likely to live in institutions, which provide such services as free medication and full-time nursing coverage. Previous studies have shown that many institutional elders are uninsured in the Middle East [6, 10]. Therefore, the presence of children is an important key of institutionalization. Thus, older people prefer to remain in familial surroundings as long as possible, because they can keep their social network and improve their quality of life with friends and relatives [10, 11]. While previous studies have shown that few institutionalized elders had children and they prefer to remain at home with family members, relatives, friends and colleagues [6, 10, 11].

## Conclusion

The study at hand shows the differences between institutionalized and non-institutionalized elders in Morocco. Besides, most elderly people had poor socioeconomic and health status, functional disabilities and depression in tropical and non-tropical countries. However, institutional elders are more likely to suffer from poor nutritional status. They have also fewer children and lack of health insurance coverage. These findings encourage health care providers and government agencies to enhance the quality of life of elderly people, with more attention giving to those living in institutions.

## Abbreviations

GDS

Geriatric Depression Scale

MNA-SF

Mini nutritional assessment short form test

ICD-10

International Statistical Classification of Diseases

ADLs

Activity of daily living

## Declarations

### **Ethics approval and consent to participate:**

This study was conducted with the approval of the Ethic of the health authorities in the Region of Marrakech-Safi. Informed written consent was obtained for all participants before the start of the study via an

information sheet on the course of the survey. The confidentiality of the information was preserved throughout the study.

**Consent for publication:**

Not applicable.

**Availability of data and materials:**

The data will be made available on reasonable request to the corresponding author.

**Competing interests:**

All authors declare no conflict of interest with respect to the research, authorship, and/or publication of this article.

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**Author's Contributions:**

Concept: A.B., A.H., M.C., Design: A.B., A.H., M.C., Data Collection or Processing: A.B., A.H., M.C., Analysis or Interpretation: A.B., A.H., R.A.A., E.K., M.C., Literature Search: A.B., A.H., R.A.A., M.C., Writing: A.B., A.H., M.C.

I confirm that the manuscript has been read and approved by all named authors and that the order of authors listed in this manuscript has been approved by all of us.

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