

Use of Mini Nutritional Assessment (MNA®) as a Nutritional Screening Tool among Urban Older Adults in Pasay City, Philippines

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ABSTRACT

Objective. This study has been conducted to determine the prevalence of malnutrition and nutritionally-at-risk community-dwelling older adults in an urban setting through the use of Mini Nutritional Assessment (MNA®).

Methods. A cross-sectional survey was done among older adults in Barangay Sto. Niño, an urban poor community in Pasay City, Metro Manila to determine the prevalence of malnutrition and older adults using the short and full form of the Mini Nutritional Assessment (MNA®). Anthropometric assessment was done to determine body mass index as well as physical examination to determine presence of nutrient deficiencies.

Results. Using the Asia Pacific cut-off for BMI, it can be noted that 16.5% were classified as underweight. On the other hand, results of the MNA® short form screening showed that less than half (42.6%) of the study respondents have normal nutritional status. Majority of the respondents were either malnourished (14.8%) or at risk of malnutrition (42.6%). Moreover, results of the Full MNA® form showed that almost half of the study respondents were either malnourished (8.2%) or at risk of malnutrition (39.3%). The rest of the study respondents were classified as having normal nutritional status (52.5%).

Conclusion. As compared to Body Mass Index, which can only identify prevalence of malnutrition, the MNA®, both short and full form, was not only able to identify malnourished and nutritionally-at-risk older adult as well as provide variables that may screen for possible causes of malnutrition. This is necessary and relevant for timely nutrition intervention for improved nutritional outcome among older adults.

Key Words: Mini Nutritional Assessment, Nutritional Screening, Malnutrition, Nutritionally-at- Risk, Older adults

INTRODUCTION

Population aging is now a worldwide phenomenon, and many countries in the developing world are experiencing this at such a rapid pace. This is evidenced by the much more rapid growth of the sector of persons ≥ 60 years old compared to that of the general population. As life expectancy globally is expected to increase by 11 years, from 65 in 1995 – 2000 to 76 in 2045–2050, with 597 million people ≥ 60 -year-old in developing countries. The United Nations projections indicate that both developed and developing regions will face notable increases in the proportions that will be above age 60 in the next 45 years and that, within this older segment, the proportions above age 80 will increase rapidly.¹

This unprecedented demographic shift has potentially adverse effects on socioeconomic development and the well-being of the older population, especially among countries

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with lower levels of socioeconomic development. In South Africa, the number of those 65 and older between 2000 and 2050 will more than double, while it is projected to increase six-fold in the Philippines. A 2000 national census showed that there are about 4.6 million older persons living in the country, and it is projected to increase to 27.6 million after 50 years.² The rapid growth of this population will place great burdens on our country for the provision of health care and other services in the coming years.

These projections should alert our policy makers that they will need to be more attentive to the needs of the older adults, especially those that pertain to their health and well-being. Our policy makers should also give more priority to the marginalized Filipino older adults in particular. Majority of our poor elderly continue to work and push their bodies to the extreme in order to eat, live and provide for those who are still depending on them with the little income that they are earning. Because of this situation, they are overworked and undernourished, making them more vulnerable to diseases and other ailments.³

As people age, their bodies undergo changes which can make them less resistant to chronic, debilitating and disabling conditions. Older persons are also particularly vulnerable to malnutrition – they are at higher risk of developing protein-calorie malnutrition and other vitamin and mineral deficiencies. Many of the diseases suffered by older persons are the result of dietary factors; these factors are then compounded by changes that naturally occur with the aging process. Suboptimal nutrition is common in elderly people due to a number of factors such as their reduced food intake and a lack of variety in the foods that they eat. These can be due to problems such as poor dentition, loss of taste, difficulty swallowing, malabsorption, and drug-nutrient interaction.⁴

The relevance of malnutrition among older adults is exemplified by an increased morbidity and mortality among those who are malnourished. Meeting the nutrient needs of older individuals is indeed critical to ensuring their overall health. With the assumption that there is a high prevalence of malnutrition among the older adult Filipinos, there is a need to take proactive steps to eliminate the underlying causes of malnutrition. To be able to come up with effective strategies, recognition of nutritional problems such as low intake, loss of appetite, unfavorable dietary habits and weight loss among older adults should be identified through screening for malnutrition.

The MNA[®] is a validated nutrition screening and assessment tool that can identify geriatric patients age 65 and above who are malnourished or at risk of malnutrition. The MNA[®] was developed nearly 20 years ago and is the most well validated nutrition screening tool for the elderly.⁵ The Philippines on the other hand has been reliant on the use of Body Mass Index for the assessment of nutritional status among older adults, this is despite the known limitations of this anthropometric index. Thus, this

study has been conducted to determine the prevalence of malnutrition and nutritionally-at-risk status through the use of Mini Nutritional Assessment (MNA[®]) among selected community-dwelling older adults in Pasay City, Philippines.

METHODS

Study Design

In order to determine the burden of malnutrition among the older adults and to identify those who are nutritionally at risk, a cross-sectional descriptive survey was conducted in Barangay Sto. Niño, an urban community located in Pasay City, Philippines.

Study Setting

Barangay Sto. Niño is a densely populated village in Pasay City, Philippines consisting of at least 9,000 households. It is located near a major transport facility, a busy community with hundreds of commuters passing through the area on a daily basis. As such, trading of goods is probably one of the major economic activities that support most of the residents. Yet despite the numerous markets located in the community, based from the data collected, it can be presumed that most of the residents in the said barangay belong to the low socioeconomic group, with a substantial unemployment rate and poor environmental conditions.

Study Participants

The survey population comprised of 61 community-dwelling older adults (≥ 60 years of age). They were invited by the Barangay Health Workers to visit the health center during the days that the survey was implemented. All of the respondents who visited the health center were included in the study. Respondents were recruited through non-probability convenience sampling design. Those who volunteered to participate in the study were enrolled. Informed consent was obtained from the respondents prior to the start of the data collection.

Data Collection Procedures

Mini Nutritional Assessment (MNA[®]) Tool

The MNA[®] is a validated screening tool which was especially developed to help identify older persons who are malnourished or at risk of malnutrition. It is considered as the gold standard for ambulatory living elderly and those living in long-term care facilities. The tool also includes items for functionality and body composition, making it more useful for geriatricians than all the other available tests. It takes into account domains not directly linked to food intake, but crucial when dealing with the frail older persons such as mobility, depression and dementia. It provides nutritional assessment as well as prognostic information.⁶⁻⁹

Anthropometric Assessment

Each respondent was anthropometrically examined by the trained fieldworkers using standardized methodology.¹⁰ The following measurements were taken of study participants: weight in kilograms and height in centimeters. The fieldworkers were equipped with a portable electronic scale (SECA™) and a standard weight for standardizing the scale, measuring board, and a measuring tape.

Physical Examination

Study participants were examined by a licensed medical doctor. Examination included assessment of the following: general appearance, head, eyes, ears, neck and throat, skin, cardio - pulmonary status, chest, back, abdomen, and extremities.

Data Analysis

Descriptive statistics (means, standard deviations, medians, interquartile ranges) and frequency distributions were calculated for all continuous and categorical variables measured.

RESULTS

There was a total of 61 community-dwelling Filipino elderly included in this study, 45 (73.8%) were females and 16 (26.2) were males. The mean age of females was 69.1 ± 6.4 years, while the mean age of the male respondents was 67.6 ± 3.7 years. Table 1 shows the distribution of the respondents according to age group. It can be seen that majority of them belonged to the young - old age group. There were 9 females and no male participants in the old-old group.

Table 1. Age distribution of selected community-dwelling elderly Filipinos in Pasay City, Philippines, 2012

Age in years	Males	Females	Total (%)
≥ 60 to < 65 years (near-old)	4	11	15 (24.6)
≥ 65 to < 75 years (young-old)	12	25	37 (60.7)
≥ 75 years (old-old)	0	9	9 (14.8)
Total	16	45	61 (100.0)

Anthropometric Assessment

The mean weight of male respondents was 60.5 ± 13.0kg, (range: 35.8kg to 76.3kg). The mean weight of female respondents was 49.8 ± 9.9kg (range: 31.1kg to 73.6kg). Using the Asia Pacific cut-off for BMI, it can be noted that 23 or 37.7% of the study population had normal weight for height, while there were 10 or 16.5% who were classified as underweight. The dual burden of malnutrition was evident among the respondents because 6 or 9.8% of them were at risk or overweight, while the remaining 22 or 36.0% were obese. Figure 1 shows the BMI distribution of the respondents classified according to the Asia Pacific BMI cut-off.

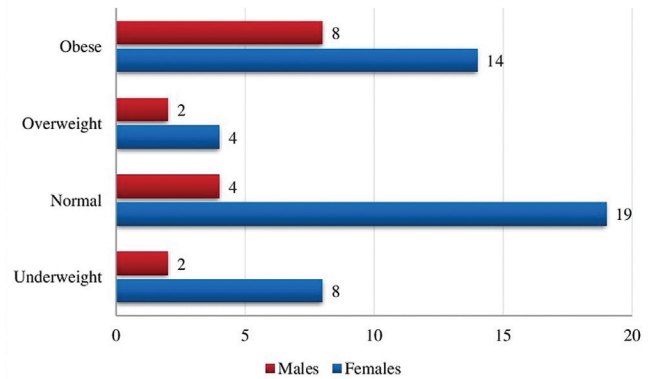


Figure 1. Frequency distribution of BMI classification according to the Asia Pacific cut-off, 2012.

Mini Nutritional Assessment® Short Form

The first part of the MNA® was used as a screening tool. It is comprised of six items pertaining to food intake, involuntary weight loss, mobility, acute disease or psychological stress, neuropsychological problems, and BMI. A score of 12 or greater indicates that the person was well nourished and needs no further intervention. A score of 8 to 11 indicates that the person was at risk of malnutrition, and a score of 7 or less indicates that the person was malnourished. Table 2 shows the distribution of MNA® screening scores of the respondents.

Table 2. Distribution of MNA® screening scores of selected community-dwelling elderly Filipinos in Pasay City, Philippines, 2012

Nutritional Status	Frequency		Total (%)
	Males	Females	
Malnourished	2	7	9 (14.8)
At risk of malnutrition	4	22	26 (42.6)
Normal nutritional status	10	16	26 (42.6)
Total	16	45	61 (100.0)

Results of the MNA® screening showed that less than half (26 or 42.6%) of the respondents have normal nutritional status. Majority of the respondents were either malnourished (9 or 14.8%) or at risk of malnutrition (26 or 42.6%).

There are many causes of undernutrition among older adults, and reduced food intake was one of the most common immediate causes. Results showed that 24 out of the 61 (39.3%) subjects reported to have moderate to severe reduction in food intake for the last three months. Reduction in food intake can be due to loss of appetite, digestive problems, and chewing or swallowing difficulties. Involuntary weight loss during the last three months was also given emphasis in the MNA® screening. There were 7 study respondents who reported to have lost more than 3 kilograms in the last 3 months, among these 7 respondents, 5 were classified as malnourished and 2 were classified as being at risk of malnutrition. The rest of the variables considered in the screening of respondents were shown in Table 3.

Table 3. Nutritional screening variables of the Mini Nutritional Assessment (MNA®) Short Form, among selected community-dwelling elderly Filipinos (n = 61) in Pasay City, Philippines, 2012

Variable	Answers	M	RM	N	Total
Reduced food intake in the last 3 months	Severe	2	0	0	2
	Moderate	5	11	6	22
	Absent	2	15	20	37
Weight loss during the last 3 months	> 3 kg	5	2	0	7
	Does not know	0	2	0	2
	Between 1 - 3 kg	4	13	4	21
	Absent	0	9	22	31
Mobility	Bed or chair-bound	2	0	0	2
	Walks only at home	2	5	1	8
Stress or acute illness in the last months	Normal	5	21	25	51
	Yes	4	5	1	10
	No	5	21	25	51
Has neuropsychological problems, dementia or depression	Severe	1	0	0	1
	Mild dementia	7	12	4	23
	Absent	1	14	22	37
BMI	< 19	3	10	0	13
	19 to 21	4	3	1	8
	21 to < 23	2	8	2	12
	≥ 23	0	5	23	28

Legend: M - malnourished; RM - at risk of malnutrition; N - normal nutritional status

Mini Nutritional Assessment® Full Form

The second part of the MNA® involved complete nutritional assessment of the person. It took into consideration all the other factors that affect the state of nutrition of the individual such as functional ability, intake of prescription drugs, diet, fluid intake and the person’s perception of his/her health. Table 4 shows the distribution of the MNA® Malnutrition Indicator score, which is the sum of the screening and the full MNA® scores. An individual is classified as having normal nutritional status if he or she obtained a score of 24 to 30 points; at risk of malnutrition if the score was between 17 to 23.5 points, and malnourished if the total score was less than 17 points.

It can be seen from Table 4 that almost half of the respondents were either malnourished (5 or 8.2%) or at risk of malnutrition (24 or 39.3%). The rest of the study respondents were classified as having normal nutritional

Table 4. Full MNA® Nutritional assessment results among selected community-dwelling elderly Filipinos (n = 61) in Pasay City, Philippines, 2012

Nutritional Status	Males	Females	Frequency
Malnourished	0	5	5 (8.2)
At risk of malnutrition	5	19	24 (39.3)
Normal nutritional status	11	21	32 (52.5)
Total	16	45	61 (100.0)

status (32 or 52.5%).

Table 5 shows the other variables considered in the full MNA®. It can be noted that most of the respondents were able to live independently. There were only 3 (4.8%) respondents who needed special assistance from their relatives or caregivers. These three respondents had chronic

debilitating illness (two suffered from stroke and one had osteoarthritis of the hip). With regards to dietary factors, Table 5 shows that less than half of the respondents regularly eat three full meals per day. Three of the respondents (4.8%) have reported to have only one full meal per day, while 31 (50.8%) only have two full meals per day.

Dietary diversification is one of the ways to ensure that a person obtains enough of the required nutrients, however, most of our respondents reported to consume a limited selection of food items. The question that refers to consumption markers for protein intake showed that only 3 out of 10 consume dairy products every day, 6 out of 10 consume two or more servings of legumes or eggs every week, while almost all of them consume either meat, fish or poultry every day. It is however quite reassuring that majority of the respondents regularly eat fruits and vegetables, which are good sources of dietary fiber, vitamins, and minerals. With regards to the respondents’ self-view of their nutritional and health status, majority (37 or 60.6%) considered themselves as having no nutritional problems, and almost half of them (30 or 49.2%) considered themselves as having a better state of health compared to other people of the same age.

Physical Examination Findings

Respondents were examined for any physical signs that may be suggestive of malnutrition or underlying medical conditions.

Dermatologic Findings

Majority (47 or 77%) of the respondents were noted to have dry scaly skin, 3 (4.9%) of them also manifested with scaly dermatoses, 2 (3.3%) had signs of skin atopy, 2 (3.3%) had erythematous maculopapular rashes, 1 (1.6%) had milia

Table 5. Nutritional screening variables of the full MNA® among selected community-dwelling elderly Filipinos (n = 61) in Pasay City, Philippines, 2012

Variable	Answers	M	RM	N	Total
Lives independently	Yes	3	0	0	3
	No	2	24	32	58
Takes more than 3 prescription drugs per day	Yes	0	4	3	7
	No	5	20	29	54
Pressure sores or skin ulcers	Yes	0	0	0	0
	No	5	24	32	61
Number of full meals eaten daily	1 meal	0	3	0	3
	2 meals	4	13	14	31
	3 meals	1	8	18	27
Selected consumption markers for protein intake:					
At least one serving of dairy products per day	Yes	0	7	14	21
	No	5	17	18	40
Two or more servings of legumes or eggs per week	Yes	3	18	19	40
	No	2	6	13	21
Meat, fish or poultry every day	Yes	5	23	31	59
	No	0	1	1	2
Consumes two or more servings of fruit or vegetable per day	Yes	3	17	30	50
	No	2	7	2	11
Fluids consumed per day	< 3 cups	0	0	1	1
	3 to 5 cups	0	5	2	7
	> 6 cups	5	19	29	53
Mode of feeding	Unable to eat without assistance	0	0	0	0
	Self-feed with some difficulty	1	0	0	1
	Self-feed without any problems	4	24	32	60
Self-view of nutritional status	Malnourished	3	12	3	18
	Uncertain	2	1	3	6
	No problem	0	11	26	37
Self-view of health status	Not as good	3	7	4	14
	Does not know	0	1	0	1
	As good	2	5	9	16
	Better	0	11	19	30

Legend: M - malnourished; RM - at risk of malnutrition; N - normal nutritional status

on the face and 1 (1.6%) had postural lesions of the feet, suggestive of impetigo. Other than the milia noted on the face, all the other dermatologic lesions were noted on the extremities, particularly the legs and feet.

The preponderant dermatologic finding of dry scaly skin can be one of the physiologic signs of aging, or it may also reflect hydration status. Dehydration among ambulatory older persons may be partly due to inadequate ingestion of free fluids. Poor intake of fluids among older person is common because of the alterations in thirst, osmoreceptor and baroreceptor sensitivities, and impairment of renal capacity to conserve water or to concentrate urine effectively. Other than poor hydration status, micronutrient deficiencies also present with dermatologic conditions such as follicular hyperkeratosis and xerosis for Vitamin A deficiency, and pellagrous dermatitis for niacin deficiency.

Head and Neck Examination Findings

Examination of the head and neck revealed that 2 (3.3%) of the respondents had conjunctivitis (manifested as conjunctival erythema with associated purulent eye discharge), 1 (1.6%) had cataract in both lenses, and 1 (1.6%)

had pinguecula. None of the respondents had xerophthalmia indicative of vitamin A deficiency, but 11 (18%) of them had pale conjunctiva. Although not a specific finding, pale conjunctivae may be a sign of anemia, especially if it is also accompanied by other signs of central pallor such as pale lips. Incidentally, 2 (3.3%) of the respondents also manifested with pale lips.

Poor oral status may be both the etiology and manifestation of poor nutrition. Oral examination showed that dental problems among respondents were very common. Eight of the respondents do not have complete set of teeth, while 28 (45.9%) of them only had few teeth left (less than 10). Majority of the respondents had dentures, but some of them had poorly fitting dentures, which may interfere with chewing of food. Other than lack of teeth, 12 (19.6%) also had dental caries with accompanying periodontal diseases, 1 (1.6%) had oral thrush, and 1 (1.6%) had cheilosis. Angular fissures around the mouth may be a sign of niacin or riboflavin deficiency.

Pallor

It was also noted that 20 (32.8%) of the respondents had

pale nail beds, 11 (18%) of them also had pale conjunctivae and 2 (3.3%) had pale lips. Although pallor is a non-specific finding, it may still be a sign of an underlying anemia.

Bones and Joints and extremities

One respondent had a nodule on his right forearm, 1 (1.6%) had an amputated toe (fifth digit of the right foot) due to trauma, 5 (8.2%) manifested with toe nail deformities, and 3 (4.8%) had onychomycoses. One female respondent had osteoarthritis which debilitated her and made her unable to walk without assistance. Three (4.8%) of the respondents had finger joint deformities, which is a sign of arthritis. Four (6.6%) had varicose veins, and two (3.3%) had bilateral ankle edema (one of them is suffering from chronic renal disease). Five (8.2%) of our study participants suffered from stroke a few years ago, and all five (8.2%) had unilateral residual weakness.

DISCUSSION

Malnutrition may be unrecognized in older individuals because many of the changes that are seen with inadequate nutrition are often associated with changes that occur with aging. It was observed from the study participants, that the commonly seen dry skin may either be due to the aging process or it may already be a sign of an underlying medical condition, inadequate hydration or micronutrient deficiency. Because both clinicians and health promoters cannot rely on physical examination alone, conducting a comprehensive nutritional assessment is an important component of providing quality health care to elderly people. Those who are involved in providing nutritional services for the elderly will agree that one of the more challenging aspects of providing nutrition to this group is the determination of their nutritional status. The difficulty lies on the fact that people age at individual rates (contributing to the heterogeneity of the older group), and that many of the existing nutritional tools have not yet been validated among older Filipinos.

The importance of nutrition interventions for older persons cannot be overemphasized. The study done by Furman¹¹ among older adults has shown that the rate of malnutrition among older persons living in the community cannot just be ignored. If malnutrition among older persons can be as high as 5 to 10% in a developed country, this could be a lot more problematic in developing countries like the Philippines. There have been few published studies done to determine the prevalence of undernutrition among older adult Filipinos but they have not used any of the validated tools to assess their study participants' nutritional status. Pedro et al¹² included data from the 1993 National Nutrition Survey and described the nutritional situation of the elderly on a national scale: that 30% of Filipino adults aged 60 years and over had a BMI less than 18.5 kg/m² indicating chronic energy deficiency, while 11% were obese with

BMI \geq 25 kg/m².

In a study among Filipino urban older persons¹³ which assessed the nutritional status of 289 elderly Filipinos living in communities in San Juan Metro Manila and two institutions for old age— the government-run Golden Acre Home and the Religious of the Virgin Mary (RVM) which is a private institution for aging nuns, dietary and anthropometric measurements were used to determine the prevalence of malnutrition among this study population. Using the BMI as an indicator of nutritional status, the authors found that about a quarter of community-dwelling elderly was underweight while 43.7% were normal. In Golden Acres, 57.4% were underweight while only a third were normal. In RVM, more than a third of the nuns were underweight and nearly the same proportion were normal; the remaining third were either overweight or obese. The authors noticed that the older persons confined in public institutions had poorer nutritional status than their counterparts in a private home for the aged or those living with their families in the community. Further, the authors observed that those living in the community with their families seem to be the best nourished of the three groups.

In the study done among rural Filipino older adults¹⁴ which assessed their physical activity, energy requirements, and adequacy of dietary intakes, it was found that out of the 98 study participants from Batangas Province; more than a third was chronic energy deficient, based on a BMI of less than 18.5.

It can be observed that all the previous studies done in the Philippines used only the body mass index to classify the nutritional status of the elderly. This present study utilized the validated MNA[®] tool, which has been considered as the gold standard for assessing the nutritional status of the older adults, and has found a lower prevalence of malnutrition (8.2%) compared with the other studies done. Although the use of MNA[®] generated lower prevalence of malnutrition, it was able to explain some of the possible causes of malnutrition among the older adults. The findings however, may not be reflective of the true situation of the nutritional status of community dwelling older adults in Metro Manila because of the small sample size and inability to examine those older adults who were not able to visit the health center during the study period. There is a possibility that selection bias was committed because of the use of non-probability convenience sampling design. Since only those who were motivated and strong enough to go to the health center were included, there is a possibility that missing out on the frailest and more undernourished older adults. This can be an explanation for the low malnutrition prevalence.

Even if dietary assessment was not completely conducted in terms of 24-hour food recall or food frequency questionnaires, the use of the MNA[®] have also shown valuable information reflecting the quality of the foods consumed by the respondents. It was observed that only a few of the respondents consumed milk or dairy products

which are good sources of calcium and protein. Likewise, the respondents need to eat more eggs and legumes so that they are ensured that they take in adequate amounts of dietary protein. The findings are similar to the findings in other studies done among Filipino older adults. The study of Pedro et al¹² revealed deficiencies in energy and protein intake among the older adult Filipinos included in their research. From 24 - hour dietary recall, De Guzman et al¹³ found that all their study participants, whether community- dwelling or institutionalized, have inadequate calorie and protein intake, especially those elderly who live in Golden Acres. Risonar et al¹⁴ also had similar findings among the elderly living in rural areas. They found that the actual energy intakes were only 65% adequate for all subjects, as compared to energy expenditure. Protein, fat and micronutrients (Vitamin A and C, thiamin, riboflavin, iron and calcium) intakes were only 24 – 51% of the recommended daily intake.

Although biochemical analysis was not done, some of the study participants are believed to be suffering from some form of malnutrition as well as micronutrient deficiencies. The study also noted several non-specific physical signs which may be suggestive of vitamin deficiency, as well as nutritional anemia. These findings, may not be a reliable indicator of micronutrient deficiency but when combined with the MNA[®] assessment, it may still be prudent for policy makers to consider micronutrient supplementation among the elderly. From the physical examination, it was also found out that dental problems such as poor dentition and dental caries were so common among the study population. Poor oral health may contribute to malnutrition because it interferes with chewing and swallowing, leading to a decrease in nutrient intake.

CONCLUSION AND RECOMMENDATION

The study found out that using the MNA[®], which is a validated tool for assessing the nutritional status of older adults that the proportion of malnourished older adults was 8.2% but there was an even greater proportion of nutritionally at-risk older adults at 39.3%.

According to Florencio,¹⁵ malnutrition does not only tell us about the present condition of those affected, it also indicates their past and signals their future. Malnutrition does not only show individuals with impaired functions, it also bears witness to society's failure to provide an environment that enables its people to attain their full genetic potential. Because there is a considerable proportion of malnourished and an even greater number of nutritionally at-risk elderly, this study recommends that there should be immediate nutritional interventions that should be initiated.

Since the older adult is more vulnerable to malnutrition due to increased risk of poor economic status, social isolation and inappropriate or inadequate intake, specific strategies to improve their nutritional status should place higher priority on nutrition screening. Interdisciplinary, community-based

models for nutrition care should also be established.¹⁶

The older adults as well as the entire community should be educated about the importance of nutrition status to overall health and quality of life and on ways to improve nutritional health. Since there are several studies showing that the older adults have inadequate dietary and micronutrient intake, micronutrient supplementation would be very effective to address this issue. Finally, it is recommended to implement targeted food assistance to address the problem of food insecurity among impoverished Filipino older adults. Stimulating partnerships and volunteer efforts in cooperation with a variety of lay people and professionals will address the problem of limited financial and other resources.¹⁷

Statement of Authorship

All authors have approved the final version submitted.

Author Disclosure

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