Assessment of Nutritional Status of Elderly Receiving Home Health Care

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ABSTRACT

Background/Purpose: This study was carried out to evaluate the nutritional status of elderly who received home health care.

Methods: A total of 120 elderly were included in this cross sectional study. Elderly were visited in their homes and nutritional status of them was evaluated by Mini Nutritional Assessment-Short Form (MNA-SF) scale. In questionnaire; general information about elderly, presence of chronic disease, pressure sores, anthropometric measurement, nutritional status of elderly were asked. In addition, current biochemical parameters which were routinely evaluated in elderly were recorded by the researcher.

Results: The mean age of elderly (40 males and 80 females) was 81.3±8.3 (65-105) years, and 97.5% of elderly were diagnosed with at least one disease. According to the MNA-SF score, 60.8% of elderly were classified as malnourished, 34.2% at risk for malnutrition and 5.0% as normal nutritional status. Currently, 49.2% of malnourished elderly have pressure sores and 54.8% had at least once before; these rates were higher than elderly without malnutrition (p <0.001). In addition, total MNA-SF score of elderly is strongly positive with hemoglobin, hematocrit and calf circumference; it was found that there was a strong negative correlation with C-reactive protein (CRP).

Conclusion: In this study, it was found that only 5.0% of elderly who received home health care were in good nutritional status and pressure sore was higher in elderly who have risk of malnutrition or malnourished. Nutritional status of elderly receiving home health care should be evaluated by dietitians and more comprehensive scientific studies are needed.

Keywords
Nutrition, home health care, malnutrition, MNA-SF, elderly.

1. INTRODUCTION

Today, changes in social and social structure, development of diagnostic and therapeutic opportunities in medicine, and ease of access to health services have increased the average life expectancy.1 Increasing the need for medical support in parallel with growing elderly population has enabled medical and technological developments to be presented at home. In addition, many factors such as reduced hospitalization time have made home health care services attractive and increased its importance.2,3

Home health services in general defined as; in order to protect and raise the health and comfort...
of individuals with disabilities, elderly and chronic diseases, to restore the health of individual, to alleviate burden of care for individuals in need of care and health care; the presentation of health and social services provided to individual, family or caregiver on multidisciplinary and professional level or by caregivers such as family members in individual’s own home or living environment.4,5

Elderly patients in need of home health care, with multimorbidity and comorbidity- decreased cognitive functions, who are unable to fulfill their own care needs, individuals dependent on home, bed or others, these characteristics are directly related to nutrition; they are also risk factors for malnutrition as a geriatric disorder.6

Assessing nutritional status in home care patients is a requirement. Because the home care patient group, especially elderly patients, are quite susceptible to malnutrition because of complaints such as dementia, depression, decreased oral intake, swallowing and chewing problems and not being able to eat alone, immobility, anorexia and nausea and vomiting.7,8 Physiological changes in body with advancing age, chronic diseases, drug use, changes in nutrition and fluid consumption, in addition, factors such as age, gender, body weight and stress affect the evaluation of biochemical parameters of elderly. Cardiovascular diseases, presence of infection in body, burns and injuries, surgical interventions, sedentary life and stress cause high C-reactive protein (CRP) levels; postoperative period, chronic diseases, insufficient nutrition of vitamins and minerals such as folic acid, B₁₂ and iron may cause low blood hemoglobin level and hematocrit ratios in elderly.9,14 Assessing the nutritional status of elderly who are vulnerable to malnutrition helps to identify the factors and risks that affect malnutrition by identifying the risk factors for malnutrition or by accelerating the identification of malnourished elderly and helping to resolve problems that arise in the early period of nutrition.15,16

Therefore, the aim of this study was to evaluate the nutritional status of elderly receiving home health care by MNA-SF and to investigate the relationship between them and some biochemical parameters (hemoglobin, hematocrit, CRP, creatinine) routinely evaluated by the hospital.

2. MATERIALS AND METHODS

2.1. Location, Universe and Sample Selection of Research

This research was carried out between August-October 2016 on individuals aged 65 years and over who were registered to Home Health Service of Samandağ State Hospital in Hatay attached to Ministry of Health of the Republic of Turkey as inclusion criteria.

It was found that there were approximately 200 elderly registered to the Home Health Service Unit and actively monitored. Firstly, a pilot study of 10 elderly was conducted and the effect size was found to be 0.48 in 5% error margin and 95% confidence interval for correlation. In the G-Power analysis, it was determined that the sample should be at least 100; for the Anova test, the effect size was found to be 0.30 in 5% error margin and 95% confidence interval. Considering±10% margin of error in the study, it was decided to perform the study with 120 elderly and the study was completed with 120 elderly.

For the research, firstly, the approval of the ethics committee of Ankara University Faculty of Medicine Ethics Committee dated 11 April 2016 numbered 07-303-16; and then the necessary permission was obtained from the Secretariat General of the Association of Hatay Public Hospitals.

The study was carried out in collaboration with the home health care team. Elderly were visited at their home and a questionnaire was applied and their nutritional status was evaluated. Elderly with good cognitive status (n: 10) answered the questions themselves. Information about elderly with poor cognitive status (n: 110) was obtained through the caregivers of elderly. At the beginning of the study, consent was obtained from elderly and caregivers of elderly with poor cognitive status. The questionnaire was completed by researcher using face to face interview method with each participant. The elderly/caregivers who did not sign the voluntary consent form and did not agree to participate were not included in study, as exclusion criteria.

2.2. Data Collecting

In questionnaire applied to elderly, questions such as general information about the elderly and socio-demographic characteristics, presence of chronic disease, pressure sore, nutritional habits and oral, enteral or parenteral nutrition type were included. Apart from the questionnaire, nutritional status of elderly was evaluated with MNA-SF and some biochemical parameters (hemoglobin, hematocrit, CRP, creatinine) routinely evaluated by the hospital were recorded.

2.2.1. Mini nutritional assessment-short form (MNA-SF)

Mini Nutritional Assessment-Short Form (MNA-SF) scale was used to evaluate the malnutrition status of elderly. MNA-SF consists of six highly correlated questions in assessment of nutritional status.17
Scoring is performed by calculating “decrease in food intake due to loss of appetite, digestive problems, chewing or swallowing in the last three months”, “weight loss in last 3 months”, “mobility/addiction”, “psychological stress or acute illness in last 3 months”, “the presence of neuropsychological problems” and “Body Mass Index (BMI)” in MNA-SF. Because of being a good indicator of muscular depletion and risk of undernutrition, calf circumference measurement was added as an alternative to patients who were unable to measure BMI after the update of MNA-SF.  

The MNA-SF used to detect malnutrition status can be used alone or as part of a long form of MNA. MNA-SF when used alone; categorized as, normal nutritional status (12-14 points), malnutrition risk (8-11 points) or malnutrition (0-7 points). The highest screening score that can be calculated in MNA-SF is 14.18

2.2.2. Evaluation of biochemical parameters

Biochemical measurements on elderly included in study was made by the Ministry of Health of the Republic of Turkey Samandağ State Hospital, current biochemical parameters (hemoglobin, hematocrit, CRP, creatinine) routinely examined in elderly were recorded by researcher. Biochemical measurement analyzes were performed with Roche Hitachi Cobas® c501. Colorimetric and microhematocrit methods were used for hemoglobin and hematocrit analysis; respectively; immunoturbidimetric method in CRP analysis, Jaffe analysis method was used for creatinine analysis.

2.3. Evaluation of Data

SPSS 22.0 (Statistical Package for the Social Sciences) was used to evaluate the data in study. Pearson Chi-Square test was used to compare qualitative data and to investigate differences between groups; in cases where Pearson Chi-Square test could not be applied, Fisher’s Exact Chi-Square test was applied. One-Way Anova test was used to compare the mean values of two independent groups with normal distribution. Spearman correlation coefficients were determined in correlation analysis. Statistical significance was evaluated at \( p<0.05 \) and \( p<0.001 \) levels.19

3. RESULTS

This study was conducted on 65 years and older elderly registered to Republic of Turkey Ministry of Health Samandağ State Hospital Home Health Services Unit. A total of 120 elderly, 40 males and 80 females, were included in study. Table 1 presents the general results of elderly receiving home health care. The average age of 81.3±8.3 (65-105) years, 55.8% of elderly’s wife has passed away, 82.5% is not literate, 95.8% is not working or housewife. The average number of children aged 6±2.8 (0-13), while the average number of individuals living together at home is 3±1.1 (1-6).

Table 2 shows the evaluation of elderly in terms of malnutrition. Accordingly, 60.8% of elderly are malnourished, 34.2% are at risk for malnutrition and 5.0% are classified as normal nutritional status.

According to Table 3, 49.2% of elderly with malnutrition now have skin sensitization or pressure sores; in 54.8% of elderly, at least once, skin sensitization or pressure sore was previously
occurred.

All elderly who are at risk of malnutrition and show normal nutritional status are fed orally (p <0.001). 54.8% of elderly malnourished, 78.0% of elderly at risk for malnutrition and all of elderly with normal nutritional status stated that they did not skip meals (p <0.001).

In Table 4, total MNA-SF scores of elderly were strongly positive correlated with hemoglobin, hematocrit and calf circumference; there was a strong negative correlation with CRP.

4. DISCUSSION

Nutritional status and screening and evaluation methods of elderly, who are considered as a very sensitive group in terms of malnutrition, help to diagnose the individuals at risk for malnutrition or malnourished, to identify the risk-forming factors and to treat them in early period as well as to solve the problems that occur due to malnutrition.16,20

Malnutrition is an important health problem in elderly. In the literature, many studies have been conducted on the evaluation of elderly in terms of malnutrition and different results have been obtained.

Hallaj (2015) found that 17.5% of elderly evaluated with MNA-SF in Syria were malnourished and 41.8% were at risk for malnutrition.21 Vanderwee et al. (2010) found that 33.0% of the elderly in Belgium are malnourished and approximately 43% are at risk for malnutrition.22 In the same study, malnutrition rates of males and females were found to be 34.5% and 32.3%, respectively; in addition, 29.6% of elderly aged 75-85 years and 37.4% of elderly aged 85 and older were reported to have malnutrition. While malnutrition rate was 27.5% in hospitalized elderly, it was 58.6% in elderly in nursing homes. Hospitalization and nursing home status affects the nutritional status of elderly and also poses a risk for malnutrition.

Lobo et al. (2009) found that 45.9% of elderly who were hospitalized in a hospital in Spain for more than

### Table 2. Evaluation of elderly according to MNA-SF score

<table>
<thead>
<tr>
<th></th>
<th>Male (n:40)</th>
<th>Female (n:80)</th>
<th>Total (n:120)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Malnutrition status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malnourished (0-7 points)</td>
<td>24 60.0</td>
<td>49 61.3</td>
<td>73 60.8</td>
</tr>
<tr>
<td>At risk of malnutrition (8-11 points)</td>
<td>15 37.5</td>
<td>26 32.5</td>
<td>41 34.2</td>
</tr>
<tr>
<td>Normal nutritional status (12-14 points)</td>
<td>1 2.5</td>
<td>5 6.2</td>
<td>6 5.0</td>
</tr>
<tr>
<td>( \chi^2 = 0.952 )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( p = 0.651 )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3. Evaluation of malnutrition status of elderly according to skin sensitivity/wounding and feeding type

<table>
<thead>
<tr>
<th></th>
<th>Malnourished (n:73)</th>
<th>At risk of malnutrition (n:41)</th>
<th>Normal nutritional status (n:6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of sensitivity/pressure sores on skin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>36 49.2</td>
<td>2 4.9</td>
<td>- -</td>
</tr>
<tr>
<td>No</td>
<td>37 50.8</td>
<td>39 95.1</td>
<td>6 100.0</td>
</tr>
</tbody>
</table>

| Previous skin sensitivity/pressure sores |            |               |               |
| Yes | 40 54.8 | 4 9.8 | - - | \( \chi^2 = 26.590 \) |
| No | 33 45.2 | 37 90.2 | 6 100.0 | \( p = 0.000^{**} \) |

| Meal skipping |            |               |               |
| Yes | 33 45.2 | 9 22.0 | - - | \( \chi^2 = 9.641 \) |
| No | 40 54.8 | 32 78.0 | 6 100.0 | \( p = 0.000^{**} \) |

| Feeding type |            |               |               |
| Azizdan | 56 76.7 | 41 100.0 | 6 100.0 | \( \chi^2 = 12.752 \) |
| Enteral (PEG+NG) | 17 23.3 | - - | - - | \( p = 0.000^{**} \) |

| Oral feeding method (n: 56) |            |               |               |
| Fluid | 28 50.0 | 4 9.8 | - - | \( \chi^2 = 21.383 \) |
| Puree | 2 3.6 | 2 4.9 | - - | \( p = 0.000^{**} \) |
| Solid | 26 46.4 | 35 85.3 | 6 100.0 | \( p = 0.000^{**} \) |

### Table 4. Correlation of some biochemical results of elderly with MNA-SF score and calf circumference

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Hemoglobin</th>
<th>Hematocrit</th>
<th>CRP</th>
<th>Creatinine</th>
<th>Calf circumference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation coefficient (( r ))</td>
<td>-0.132</td>
<td>0.348**</td>
<td>0.317**</td>
<td>-0.290**</td>
<td>-0.030</td>
<td>0.766**</td>
</tr>
<tr>
<td>Age</td>
<td>0.049</td>
<td>0.002</td>
<td>0.015</td>
<td>0.102</td>
<td>-0.157</td>
<td></td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>0.896**</td>
<td>-0.376**</td>
<td>-0.275**</td>
<td>0.294**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hematocrit</td>
<td>-0.396**</td>
<td>-0.292**</td>
<td>0.222*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRP</td>
<td>0.031</td>
<td>-0.155</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creatinine</td>
<td></td>
<td>-0.118</td>
<td></td>
<td></td>
<td></td>
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</table>

Notes: *p <0.05; **p<0.001
5 days were malnourished; 23 Ranhoff et al. (2005), in a study in Norway, where the nutritional status of elderly who were staying in a hospital for more than 3 days was evaluated by MNA-SF, 30.0% of elderly were malnourished; 74.0% were at risk for malnutrition. 24 Kuzuya et al. (2005) conducted a study in Japan with 226 elderly who staying in their home; remaining in a nursing home; admitted to geriatric clinic, found that 19.9% of elderly was malnourished and 58.0% were at risk for malnutrition. 25

Nieuwenhuizen et al. (2010) reported that the prevalence of malnutrition reached 5-25% in elderly living in their own homes, approximately 5-37% in elderly in hospital, and 85% in elderly in a nursing home. 26 Lamb et al. (2009) reported that approximately 44% of elderly in UK had malnutrition, 32% had a high risk of malnutrition and about 12% had a moderate risk; 27 Pressoir et al. (2010) found that 30.9% of elderly in France had malnutrition (18.6% had moderate and 12.3% had severe malnutrition). 28 The prevalence of malnutrition is higher in elderly who stay in nursing homes or hospitals compared to those staying at home; this situation positively affects the nutritional status of home environment where elderly live with their families without leaving the habitual environment and draws attention to the importance of home health services.

In a study conducted in Turkey (Saka et al., 2010), it was found that 13.0% of elderly who applied to geriatrics clinic of the hospital had malnutrition and 31.0% were at risk for malnutrition. 29 These rates are lower than those of Lobo et al. (2009)23 and Ranhoff et al. (2005)26; this is thought to be due to the fact that majority of the study sample consisted of outpatients in Saka et al. Nutritional status is adversely affected as the length of hospital stay of elderly increases; and this poses a risk for malnutrition.

In this study, the nutritional status of elderly receiving home health care was evaluated by MNA-SF, 60.8% of elderly had malnutrition, 34.2% were at risk for malnutrition and 5.0% had normal nutritional status (Table 2). In this study, the high rate of malnutrition in elderly; can be explained for reasons such as 97.5% of elderly included in study had at least one diagnosed disease and dependence on the bed that develops accordingly, presence of skin sensitivity or pressure sores.

In another study conducted in our country (Ayraler et al., 2013), it was found that 73.6% of elderly who applied to home health service were malnourished; this rate is higher than our study. 30

Malnutrition rates are likely to be higher than those reported in literature, as those in need of home health care and those who apply most are older people with poor overall health. Elderly receiving home health services have serious health problems, in addition to high prevalence of chronic disease, nutritional problems, taste, odor, decreased appetite, skipping meals, use of prosthetic teeth, bed dependence and skin sensitization or pressure sores adversely affect nutritional status in geriatric age group and it is known that this may result in malnutrition, which is inevitable for this age group. For this reason, the nutritional status of individuals receiving home health care must be evaluated by dieticians and nutritional support should be provided to individuals with malnutrition or at risk.

In this study, 49.2% of elderly with malnutrition had skin sensitization or pressure sores, 95.1% of elderly at risk of malnutrition and all elderly with normal nutritional status had no skin sensitivity or pressure sores (p < 0.001). In 54.8% of elderly with malnutrition, skin sensitization or pressure sores occurred previously; 90.2% of elderly at risk of malnutrition and all of elderly with normal nutritional status had no previous skin sensitization or pressure sores (p < 0.001) (Table 3).

Arslan Özkul (2014) found that approximately 32% of malnourished elderly receiving home care had skin sensitization or pressure sores and 83% and 92% of those at risk for malnutrition and normal nutritional status had no skin sensitization or pressure sores, respectively. 31 Ayraler et al. (2013) found that approximately 28% of malnourished elderly aged 65 years and older who demanded home health care had skin sensitization or pressure sores; 91.2% and 100.0% of elderly at risk of malnutrition or those with normal nutritional status had no skin sensitization or pressure sores, respectively; 30 Valentini et al. (2009) found that 45.0% of 197 elderly malnourished elderly living in nursing homes in Austria and Germany developed contracture or tenderness in skin, and 8.0% of malnourished elderly had two or more pressure sores. 32

Studies in literature support the results of this study. 30-32 Sensitization of the skin or pressure sores is an important problem frequently encountered in elderly receiving home health care; in addition, hygiene and skin care, change of position, adequate and balanced nutrition are very important in reducing this problem.

While all the elderly at risk of malnutrition and those with normal nutritional status are fed orally, 76.6% of the elderly with malnutrition are fed orally and 23.3% are fed entarally. Half of the malnourished elderly are fed by mouth in liquid form, 46.4% are fed in solid form. 85.4% of elderly at risk of malnutrition and all of elderly with normal nutritional status are fed solid orally (p < 0.001). 54.8% of elderly with malnutrition, 78.0% of elderly at risk of malnutrition and all of the elderly with normal nutritional status stated that they did not skip meals (p < 0.05) (Table 3).
Volkert et al. (2011), in a study conducted with 350 elderly in different nursing homes in Germany and receiving long-term care, found that 57.7% of elderly fed enteral were malnourished and 42.3% were at risk for malnutrition; 24.1% of elderly fed orally were malnourished and 53.7% were at risk for malnutrition ($p < 0.01$).33 Oliveira et al. (2009) in a study conducted with 240 elderly aged 60 years and older who stayed in hospitals in Brazil for at least one day; 32.8% of elderly with malnutrition are fed enteral; 96.6% and 97.5% of elderly who were at risk of malnutrition and showed normal nutritional status were fed orally; respectively ($p < 0.01$).34 Oliveira et al. (2009) shows similarity with this study (Table 3). This situation shows that the prevalence of malnutrition is significant in elderly and necessary precautions should be taken for individuals at risk for malnutrition and right medical nutrition treatment should be applied for malnourished individuals.

In this study, it was found that total MNA-SF score of elderly was strongly positive correlated with hemoglobin, hematocrit and calf circumference; strong negative correlated with CRP (Table 4). In addition, almost all of the elderly with malnutrition (98.6%) have low hemoglobin (g/dL) and (93.2%) hematocrit (%); CRP (mg/L) of 86.3% was found to be significantly high ($p<0.001$).

Ayraler et al. (2013) found that hemoglobin values of 40.5% and hematocrit values of 47.6% malnourished elderly were low ($p>0.05$); CRP values of 73.8% of elderly with malnutrition were found to have high CRP values; hemoglobin values of 76.3% were found to be significantly low ($p<0.01$).30 Çevik et al. (2014), 67.8% of elderly with malnutrition were found to have high CRP ($p<0.01$); CRP values of 73.8% elderly were low ($p>0.05$); in the same study, the CRP values of elderly with malnutrition were lower than the elderly with malnutrition risk and normal nutritional status ($p>0.05$); in the same study, the CRP values of elderly with malnutrition were found to be significantly higher than the elderly with malnutrition risk and normal nutritional status ($p<0.01$).35

Malnutrition in elderly brings bad clinical results such as, changes in body composition and weight decrease, loss of physiological functions, increased risk of complications, inflammation and protein catabolism. The decrease in physical and mental functions also occurs in proportion to the risk of malnutrition or malnutrition; changes in gastrointestinal and immune system and skeletal and cardiac muscles can be seen. In addition to these changes, factors such as age, gender, and stress may result in anomaly in biochemical values of older individuals. The increase in severity of malnutrition with advancing age leads to a decrease in level of certain serum proteins such as total protein and albumin in elderly. The elderly do not consume enough nutrients containing vitamins and minerals such as folic acid, B2 and iron; factors such as chronic diseases, smoking, alcohol and the use of certain drugs may cause a decrease in blood hemoglobin level and hematocrit rate; factors such as cardiovascular diseases, presence of infection in body, burns and injuries, surgical interventions, sedentary life and stress may cause an increase in CRP. In addition, the diet does not contain enough protein; diabetes and liver diseases, surgical interventions, and the presence of infections can cause an increase in urea levels; malnutrition, sarcopenia and advanced age can lead to a decrease in creatinine level in elderly.34,37-40

The biochemical parameters such as albumin, which is an important indicator of nutritional status that will contribute to research, are not routinely evaluated by the hospital; inability to measure body weight/height because most elderly were bedridden; were limitations of this research.

**CONFLICTS OF INTEREST**

None.

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