ABSTRACT

Background. Old ages are associated with physiologic deteriorations of all organs and tissues, such as involution of thymus and decreased function of gastrointestinal tract which lead to malnutrition. Involution of thymus will caused reduction of T cell subset for instance T cell CD4+. Prevalence of nutrient deficiency in old age was high, according to a survey that 35% of subjects with age above 50 years old showed deficiency for one or more vitamins and trace-elements. Zinc as one of trace-elements has vital role for immune system.

Aim. Aims of this study are to know the mean of zinc serum level, proportions of zinc deficiency in elderly and correlation between zinc and CD4+ count.

Methods and Subjects. Design of this study is cross sectional, with study subjects including healthy elderly women from Aisyiah elderly club at Kota Gede Yogyakarta. Elderly who were eligible with study criteria were measured height, weight, zinc serum level, and CD4+ count. Correlation test was performed to know correlation between ages, weight, body mass index (BMI), and zinc serum level with CD4+ count. Significant variables will be tested with multiple linear regressions. Level of significance is p < 0.05.

Results. A total healthy elderly women subjects were 60 persons with median of age 63.5 years old. Median zinc serum level was 5.47 umol/L with range between 3.25-7.95 umol/L. Zinc deficiency (zinc serum level < 7.65 umol/L) occurred in 95% of subjects. Mean of CD4+ count was 767.22±32.95 count/mm³. There were correlations between age, weight, and zinc serum level with CD4+ count (r = -0.296; 0.345; 0.324; 0.792, respectively). Results from linear regression model showed zinc serum level was the only variable that affect to CD4+ count (adjusted R² = 0.622).

Conclusion. Ninety five percent of healthy elderly women at elderly club Aisyiah Kota Gede Yogyakarta suffer from zinc deficiencies, and there is strong correlation between zinc serum level and CD4+ count.

Keyword: zinc serum, CD4+ count, elderly

INTRODUCTION

Elderly population is increasing all over the world. In Indonesia according to national survey in 1985 number of elderly increased 3.09%/years, and people who are 70 years of age or above increased higher than 5.65%/years.

The immune system changes during the lifespan of man. Many described changes in the immune system of the elderly were dependent on illness or chronic diseases. Increased of age will decreased all organ function and tissues physiologically, like involution of thymus, and changes of gastrointestinal function which increases risk of malnutrition.

Thymus is vital for acquired cellular immune response, where the differentiations and proliferation of lymphocyte T (T cell) takes place. The involution of thymus will cause reduction of T cell subset for instance T cell CD4+ (T cell helper 1 [Th1] and T cell helper 2 [Th2]).

Elderly tends to have a high prevalence of nutrient deficiencies. Based on surveys it has been estimated that as many as 35% of persons who are 50 years of age or above have a demonstrable deficiency of one or more vitamins and trace elements. Zinc as one of trace elements have vital
METHODS AND SUBJECTS

Design of this study is cross sectional. The subjects were healthy elderly (60 years of age or above). Subjects are from Aisyiah elderly club at Kota Gede Yogyakarta. All members are women. Inclusion criteria were (1) elderly (2) willing to participate. Exclusion criteria were (1) consumption of immunosuppressant drugs within one month (2) suffered from metabolic diseases or infection that causes impairment in immune system (diabetes mellitus (DM), tuberculosis, malignancy, renal failure, and chronic liver disease) (3) chronic gastrointestinal disease.

Zinc serum level and CD4+ count were measured at biochemistry laboratory in Faculty of medicine Gadjah Mada University. Normal zinc serum level is 7.65 - 22.95 umol/L. Elderly is person who are 60 years old or above according to birth of date. Immunosuppressant drugs are corticosteroid. Healthy criteria were based on anamnesis and physical examination, to exclude. DM there should be no sign of polyphagia, polydipsia, polyuria as well as history of diabetes mellitus (DM), tuberculosis, malignancy, renal failure, and chronic liver disease (3) chronic gastrointestinal disease. Exclusion of malignancy was based on no history of operation, radiation or chemotherapy. Renal impairment was confirmed by no history of renal disease. Chronic liver disease is confirmed from anamnesis of no history of chronic jaundice. Chronic gastrointestinal disease is excluded when there is no sign of diarrhea more than 15 days.

Aims of this study are to know level of zinc serum, proportions of zinc deficiency in elderly and correlation between zinc and CD4+ count.

STATISTICAL ANALYSIS

Normality test was performed to know distribution of data. Correlation between zinc serum level, age, weight, body mass index and CD4+ count was analyzed with Pearson correlation test. Significance variables will be tested with multiple linear regressions. Data analyses used computer software with level of significance of p < 0.05.

RESULTS

Total member of Aisyiah elderly club were 108 female. Sixty persons fulfilled research criteria. Baseline characteristics of study subject are shown in table 1. Lowest age of the study subjects was 60 years old and the highest 71 years old with median 63.5 years. Median of weight was 52.5 kg with lowest weight 33.5 kg and highest weight was 102 kg. Median of height was 151 cm with lowest height 142 cm and highest height 160 cm. Median of body mass index (BMI) was 22.66 kg/m² with lowest 15.5 kg/m² and highest 45.94 kg/m². Median of zinc serum level was 5.47 umol/L with lowest zinc serum level was 3.25 umol/L and highest zinc serum level was 7.95 umol/L. Mean of CD4+ count was 767.22 with standard deviation 232.95 count/mm³.

Table 1. Baseline Characteristics Elderly Subjects at Aisyiah Elderly Club Kota Gede

<table>
<thead>
<tr>
<th>Variable</th>
<th>Median</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>63.5</td>
<td>60-71</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>52.5</td>
<td>33.5-102</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>151</td>
<td>142-160</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>22.66</td>
<td>15.5-45.94</td>
</tr>
<tr>
<td>Zinc serum level (umol/L)</td>
<td>5.47</td>
<td>3.25-7.95</td>
</tr>
<tr>
<td>CD4+ (count/mm³)</td>
<td>767.22±232.95</td>
<td>707.04-827.39</td>
</tr>
</tbody>
</table>

Note: *: mean ± standard deviation. § 95% confidence interval (CI)

Table 2 showed the result of Zinc deficiency (<7.65umol/L). Fifty seven elderly (95%) of study subjects were suffered zinc deficiency.

Table 2. Zinc Serum Level of Elderly at Aisyiah Elderly Club Kota Gede

<table>
<thead>
<tr>
<th>Variable</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc serum level &lt; 7.65 umol/L</td>
<td>57 (95)</td>
</tr>
<tr>
<td>Zinc serum level &gt; 7.65 umol/L</td>
<td>3 (5)</td>
</tr>
</tbody>
</table>

Note: n = number of patients

Table 3. Correlations between Age, Weight, Body Mass Index, and Zinc Serum Level with CD4+ Count

<table>
<thead>
<tr>
<th>Variable</th>
<th>r</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.296</td>
<td>0.033</td>
<td>0.000-0.079</td>
</tr>
<tr>
<td>Weight</td>
<td>0.345</td>
<td>0.000</td>
<td>0.000-0.049</td>
</tr>
<tr>
<td>BMI</td>
<td>0.324</td>
<td>0.033</td>
<td>0.000-0.049</td>
</tr>
<tr>
<td>Zinc serum level</td>
<td>0.792</td>
<td>0.000</td>
<td>0.000-0.049</td>
</tr>
</tbody>
</table>

Note: r = correlation coefficient. CI confidence interval. Tested with Pearson correlation

Significant variables like age, weight, BMI, and zinc serum level were tested again with multiple linear regressions. Result from multiple linear regressions (table 4) showed constantance value -363.724, and from four significances variables zinc serum level was the only variable that affect to CD4+ count (Beta = 146.334. p = 0.000. 95% CI = 109.538-183.129). Regression equation can be defined as stated below:

\[ \text{CD4}^+ \text{ count} = -363.724 + 146.334 \times (\text{zinc serum level}) \]

Constantance value -363.724 means if there was no zinc serum level, CD4+ count will show a value of -363.724. Regression coefficient value 146.334 showed that every addition of 1 umol/L zinc serum level increased CD4+ count 146.334 count/mm³. Adjusted R square from multiple linear regressions is 0.622, meaning that 62.2% CD4+ count can be explained by zinc serum level and the rest (100%-62.2% = 37.8%) are caused by other factors.
Association Between Zinc Serum Level and CD4+

There are decreasing of total T cell CD3, decreasing protection and changes of homeostasis T cell memory differentiation; decreasing of T cell system were strongly correlated with involution of thymus. Decreasing activity of Zn-dependent thymulin also happened in man that suffered zinc deficiency. Thymulin is 9-opeptide hormone which is secreted by thymus epithelial cell. Thymulin induced several marker of T cell, and precipitate T cell function include allogenic cytotoxicity, suppressor function, and production of IL-2.

This study used cross sectional design that owned limitation to prove caused-effects, therefore further research with cohort design or clinical trial will be needed. Further studies that involved elderly men also need to be done. This study only draw sample from one elderly club and cannot be generalized for elderly population.

Results from this study showed 95% elderly women in elderly club Assiayah Kota Gede Yogyakarta suffered zinc deficiencies, and there is positive correlation between zinc serum level and CD4+ count.

DISCUSSION

Old ages are risk factors for malnutrition/nutrient deficiencies. Nutrient deficiencies consist of one or more vitamins and trace elements. Results from other reports that stated zinc deficiency between 25-30%.

Increasing of age will cause changes in sensation and perception for food intake. Zinc deficiency in elderly can be caused by decrease intake of zinc lower than recommended daily allowance, and impairment of absorption.

Zinc deficiency is more prevalent in Indonesia due to less consumption of animal source like meat, milk, liver, and egg. Increasing of age is in opposite with CD4+ count. These phenomena showed decreasing of immune function in elderly. Changes of immune system were strongly correlated with involution of thymus. Effects from involution of thymus are disorders of T cell that consist of decreasing quantity and quality of T cell; decreasing of T cell memory differentiation; decreasing of T cell protection and changes of homeostasis T cell. Reports from study on elderly in Germany showed there are decreasing of total T cell CD3, decreasing of T cell CD8 that is higher than CD4, decreasing of T cell naïf (CD45RA), and increasing of T cell memory (CD45RO).

Zinc has several functions on cellular specific immune system (T cell). Thymus is a vital organ for development of lymphocyte T, requires functioning zinc. Studies on animal proved that zinc deficiency will decrease size and thymus cellularity, as well as apoptosis from thymocyte (T cell in thymus). Decreasing activity of Zn-dependent thymulin also happened in man that suffered zinc deficiency. Thymulin is 9-opeptide hormone which is secreted by thymus epithelial cell. Thymulin induced several marker of T cell, and precipitate T cell function include allogenic cytotoxicity, suppressor function, and production of IL-2.

This study used cross sectional design that owned limitation to prove caused-effects, therefore further research with cohort design or clinical trial will be needed. Further studies that involved elderly men also need to be done. This study only draw sample from one elderly club and cannot be generalized for elderly population.

Results from this study showed 95% elderly women in elderly club Assiayah Kota Gede Yogyakarta suffered zinc deficiencies, and there is positive correlation between zinc serum level and CD4+ count.

REFERENCES


Table 4.
Multiple linear regressions of Age, Weight, Body Mass Index and Zinc Serum Level to CD4+ Count

<table>
<thead>
<tr>
<th>Variables</th>
<th>Unstandardized Coefficient</th>
<th>Standardized Coefficient</th>
<th>t</th>
<th>p</th>
<th>Lower CI</th>
<th>Higher CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constance</td>
<td>-363.724</td>
<td>518.691</td>
<td>-0.701</td>
<td>0.486</td>
<td>-1403.205</td>
<td>675.757</td>
</tr>
<tr>
<td>Age</td>
<td>2.641</td>
<td>7.487</td>
<td>0.034</td>
<td>0.353</td>
<td>0.726</td>
<td>-12.363</td>
</tr>
<tr>
<td>Weight</td>
<td>8.145</td>
<td>5.974</td>
<td>0.383</td>
<td>1.363</td>
<td>0.178</td>
<td>-3.828</td>
</tr>
<tr>
<td>BMI</td>
<td>-13.464</td>
<td>13.835</td>
<td>-0.270</td>
<td>0.973</td>
<td>0.335</td>
<td>-41.189</td>
</tr>
<tr>
<td>Zinc</td>
<td>146.334</td>
<td>18.361</td>
<td>0.780</td>
<td>7.970</td>
<td>0.000</td>
<td>109.538</td>
</tr>
</tbody>
</table>

Notes: SE: standard error. p: significances. CI confidence interval.
ABSTRACT

Background. Symptoms of depression and sexual problems that occur among breast cancer patients are rarely detected and get good handling. Therefore, an early detection for any psychological problems that may affect the sexual life of patients with breast cancer is needed so that the patients can have better life.

Aim. This study aims to assess the correlation between symptoms of depression and sexual function in women with breast cancer who undergo chemotherapy at Dr. Sardjito Hospital.

Method and Subjects. Research design was cross-sectional. The study recruited 38 breast cancer patients in Tulip outpatients Cancer Clinic in Dr. Sardjito Hospital. Assessment of depressive symptoms used Beck Depression Inventory questionnaire and Female Sexual Function Index to assess sexual function.

Result. The results showed that the proportion of subjects aged 46-55 years at 55.2% followed by 36-45 years of age at 39.5% and aged 26-35 years by 5.3%. The mean age of subjects was 45.4 ± 6.5 years. Correlation between symptoms of depression and sexual function among participants was r=-0.30 with significance p=0.068. Correlation between symptoms of depression with the domains of sexual function at domain of desire (r=-0.296, p=0.072), stimulation (r=-0.470, p=0.005), lubrication (r=-0.355, p=0.030), orgasm (r=-0.223, p=0.179), satisfaction (r=-0.233, p=0.158), and pain (r=-0.186, p=0.262).

Conclusion. The conclusion is that there is no correlation between symptoms of depression with sexual function.

Keywords: Depression symptoms, Breast Cancer, Sexual Dysfunction