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研究科専攻	医学系研究科 (保健学専攻)
学位論文題名	Effects of oral function and depressive tendencies on nutritional status in older adults requiring support or low-level care : An investigation through path analysis (要支援・軽度要介護高齢者における口腔機能, うつ傾向の栄養状態への影響:パス解析による分析)
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## 論文内容の要旨

### Purpose

The number of people, requiring support, with Long-term Care Need Certification is steadily increasing in Japan, and the percentage of those certified as mild (support care 1 to nursing care 2) is increasing annually<sup>1)</sup>. Frailty is the primary cause for needing support care/nursing care, and the proportion of frailty related cases is high among those with mild nursing care certification<sup>2)</sup>. Undernutrition is a factor involved in the progression of frailty<sup>3)</sup> and is also a cause of increased mortality in older adults<sup>4)</sup>. It is important to detect the risk and signs of exacerbated undernutrition and conduct an intervention early at the stage of support care or mild nursing care by clarifying the factors that affect undernutrition. There are reports of the relationship between the nutritional status of older adults and oral function and depression, among others. However, the relationship and the causal relationship between the factors are yet to be uncovered, and there are only a handful of reports on older adults requiring support care and mild nursing care.

This study aimed to identify the effects of oral function and depressive tendencies on nutritional status in older adults requiring support or low-level care using path analysis.

## Methods

This study comprised 106 older adults residing in care homes or private geriatric nursing homes or participating in community preventive care activities. Participants' nutritional status was assessed using the Mini Nutritional Assessment-Short Form (MNA<sup>®</sup>-SF)<sup>5)</sup>. Moreover, participants' oral function was assessed using oral diadochokinesis (ODK), tongue pressure, and repetitive saliva swallowing test (RSST). Additionally, participants were further assessed using the 15-item Geriatric Depression Scale, Diet-Related Quality of Life Scale-Short Form (DRQOL-SF), and Functional Independence Measure (FIM). Participants' basic information, including cognitive function, was also evaluated.

We performed hierarchical multiple regression analysis with MNA as the dependent variable, followed by path analysis using factors for which an association with MNA was found.

## Results

Correlation analysis revealed positive correlations between MNA and RSST, ODK, tongue pressure, FIM, and DRQOL and a negative correlation between MNA and GDS. Hierarchical multiple regression with MNA as the dependent variable revealed associations with tongue pressure, GDS, FIM, DRQOL, and sex. Path analysis confirmed significant paths from tongue pressure to MNA, from tongue pressure to FIM, and from FIM to MNA ( $p < 0.001$ ). Significant paths were also confirmed from GDS to MNA ( $p < 0.01$ ), from DRQOL to MNA ( $p < 0.05$ ), and from sex to MNA ( $p < 0.01$ ).

## Discussion

This study identified factors affecting nutritional status in older adults requiring support or low-level care and their structure using path analysis. The path model demonstrated that nutritional status was directly affected by tongue pressure, GDS, FIM, DRQOL, and sex; that nutritional status was most affected by tongue pressure; and that tongue pressure also had an indirect effect through FIM. Decline in tongue pressure interferes with mastication and deglutition and causes inadequate nutrient intake to deteriorate into malnutrition. Furthermore, decline in tongue pressure may result in malnutrition via decline in functional capacity, suggesting that maintaining tongue pressure will lead to prevention of decline in functional capacity and malnutrition. The suggestions we have obtained on the factors that affect nutritional status and their relationships can be regarded as new findings that go one step beyond the factors, which have been reported in previous studies. It was suggested that a depressive tendency is a direct factor of undernutrition and is an index for predicting it. To the best of our knowledge, this

is also the first study to report the effects of diet-related quality of life (QOL) on nutritional status. Poor diet-related QOL, such as the inability to ingest various foods due to poor masticatory function, cooking/shopping problems, and the inability to enjoy the food's mouthfeel is suspected to lead to a reduced appetite and inadequate nutrition, causing malnutrition.

The results of this study can be utilized to develop effective nutritional care by understanding oral function, food intake, and psychological conditions, such as depressive tendency, which may lead to the discovery of undernutrition risk, and by working to improve the diet-related QOL as a result of the evaluation of dietary satisfaction.

Predicting causes of undernutrition through path analysis in this study enables intervention in these causes.

## Conclusion

In the present study, tongue pressure, GDS, FIM, DRQOL, and sex were identified as factors directly affecting MNA. Tongue pressure had the greatest effect and also affected MNA indirectly via FIM.

## References

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## 論文審査結果の要旨

要旨：本論文は要支援・軽度要介護高齢者106名を対象とし、Mini Nutritional Assessment-Short Form (MNA<sup>®</sup>-SF) を評価指標とした栄養状態に影響する複数の要因とその関係性を明らかにしたものである。対象者の栄養状態には、舌圧、うつ傾向 (GDS)、生活機能 (FIM)、食事関連 QOL、性別が直接的に影響し、舌圧が最も強く栄養状態に影響すること、舌圧は FIM を介して間接的にも影響することを示した。本論文の斬新さ、重要性、研究方法の正確性、表現の明瞭性は以下の通りである。

斬新さ：高齢者の栄養状態への影響要因として、これまでの研究は自立・入院中の高齢者を対象とした報告が多く、要支援・軽度要介護高齢者を対象とした報告は極めて少ない。またその多くが単変量解析による報告である。本研究では要支援・軽度要介護高齢者の栄養状態に影響する複数の要因とその関係性を示しており、本視点での報告はこれまでになく斬新である。また、食事関連 QOL の栄養状態への影響は初めての報告であり独自性がある。

重要性：高齢者の低栄養予防は重要な健康上の課題である。本研究結果により低栄養の原因に対する早期の介入が可能となることは意義のある成果である。要支援・軽度要介護高齢者の食生活の質的充足感を重視するといった看護の基本の重要性を示したことも本研究の貴重な成果といえる。

研究方法の正確性：研究デザイン及びデータ収集における技術は正確であり、倫理的にも十分配慮されていた。一連の統計処理は正確で、信頼できる結果であった。

表現の明瞭性：論文は論理的かつ簡潔明瞭に記述されていた。文献も適切に引用され、十分に説得力のある論文となっている。

以上から、本論文は博士の学位を授与するのに十分値すると評価された。