

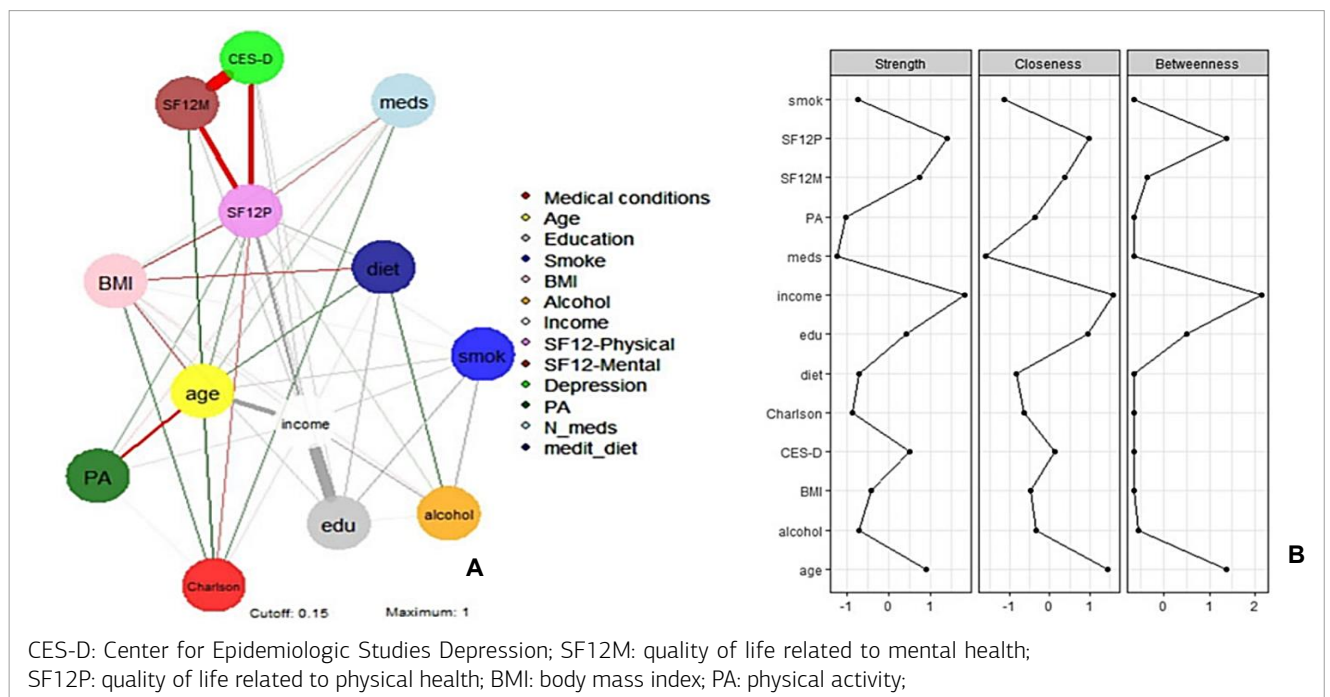
SUPPLEMENTARY MATERIAL

The purpose of this supplementary material is to help the reader to interpret the data in a network and to understand some methodological aspects mentioned in the article. Therefore, the main results of the network analysis of the study “Network analysis of the relationship between depressive symptoms, demographics, nutrition, quality of life, and medical condition factors in the Osteoarthritis Initiative database cohort of older people North-American adults with or at risk for osteoarthritis” will be presented.

The article in question examined the relationships between depressive symptoms, demographic, nutritional, and clinical variables, and quality of life in a population of 3,552 middle-aged and older adults (mean age 62 years). For this purpose, the authors selected 13 variables:

- age in years (continuous);
- body mass index (continuous);
- Charlson comorbidity index (continuous);
- number of medications (continuous);
- alcohol consumption, measured by the mean number of doses per week (continuous);
- level of education, dichotomized into 0 = completed higher education and 1 = did not complete higher education;
- smoking, classified as 0 = smokes or previously smoked and 1 = never smoked;
- income, categorized as 0 = income over \$ 50 thousand per year and 1 = income lower than \$ 50 thousand per year;
- depressive symptoms, using scores from the Center for Epidemiologic Studies Depression (CES-D), with scores ranging from 0 to 60 — the higher the score, the higher the depressive symptoms (continuous);
- adherence to the Mediterranean diet (continuous);
- level of physical activity (continuous);
- quality of life related to physical health, using the SF-12 instrument (continuous);
- quality of life related to mental health, using the SF-12 instrument (continuous).

The network analysis was performed in the RStudio statistical program, using the *mgm* function with Lasso penalty. To visualize the networks, the *qgraph* package with the



Supplementary Figure S1 Exemplification of weighted network via (A) Lasso and (B) centrality of measures, according to the study by Solmi et al.³⁵.

layout = “string” function was used, which corresponds to the Fruchterman-Reingold algorithm for approximation of variables. The Supplementary Figure S1A shows the structure of networks with 13 nodes, which represent the variables mentioned above, and edges, which connect the nodes. This is a weighted network, that is, the greater the thickness of the edges, the stronger the correlations. The red and green edges are, respectively, negative and positive correlations between the numerical variables. The grey edges show associations between categorical variables. The difference between the colors of the edges aims to represent the relation between variables with different distributions, which were elucidated in the topic “Mixed graphic models”.

Strong negative correlations are demonstrated between the variables depression (CES-D node) and quality of life related to physical and mental health (SF12p and SF12m nodes). Thus, the higher the scores for CES-D, the lower the scores for the SF instrument and vice versa. According to the authors, for this result, it is suggested that there is a worse quality of life in this population in the presence of depressive symptoms.

Another important finding is that the physical health-related quality of life and mental health-related quality of life were negatively associated (nodes SF12p and SF12m). The inverse relationships between these nodes suggest that the perception of quality of life in the physical dimension

does not always positively affect the perception of quality of life in the mental dimension and vice-versa.

The income (income node) was associated with age (node age) and level of education (education node), showing a strongly related subgroup of sociodemographic variables that can be named.

Moreover, the physical health-related quality of life (SF12p node) performs a mediating function between psychological variables such as depression (CES-D node) and mental health-related quality of life (SF12m node), and sociodemographic, clinical and lifestyle variables, such as age (age node), income (income node), level of education (edu node), comorbidity (Charlson node), body mass index (BMI node), Mediterranean diet (diet node), smoking (smoke node), alcohol consumption (alcohol node), and level of physical activity (PA node). (Supplementary Figure S1A).

The Supplementary Figure S1B shows the measures of centrality of the estimated network. The variables physical health-related quality of life (SF12p node), income (income node), and depression (CES-D node) obtained the highest measures of centrality in order to highlight the relevance of these variables in the statistical model adopted (Supplementary Figure S1B).

Supplementary Figure S1 shows the network analysis with the above variables and the strength, closeness, and betweenness measures of centrality.