

Fruit and Vegetable Intake and Mental Health in Adults

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Contributor: Dominika Głąbska

High total intake of fruits and vegetables, and some of their specific subgroups including berries, citrus, and green leafy vegetables, may promote higher levels of optimism and self-efficacy, as well as reduce the level of psychological distress, ambiguity, and cancer fatalism, and protect against depressive symptoms. The general recommendation to consume at least 5 portions of fruit and vegetables a day may be beneficial also for mental health.

Keywords: fruits ; vegetables ; juices ; intake ; mental health ; mental disorders ; depression ; anxiety ; well-being ; quality of life

1. Introduction

The role of a properly balanced diet in the prevention and treatment of mental disorders has been suggested, while vegetables and fruits have a high content of nutrients that may be of importance in the case of depressive disorders. The aim of the study was to conduct a systematic review of the observational studies analyzing association between fruit and vegetable intake and mental health in adults. The search adhered to the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), and the review was registered in the International Prospective Register of Systematic Reviews (PROSPERO) database (CRD42019138148). A search for peer-reviewed observational studies published until June 2019 was performed in PubMed and Web of Science databases, followed by an additional manual search for publications conducted via analyzing the references of the found studies. With respect to the intake of fruit and/or vegetable, studies that assessed the intake of fruits and/or vegetables, or their processed products (e.g., juices), as a measure expressed in grams or as the number of portions were included. Those studies that assessed the general dietary patterns were not included in the present analysis. With respect to mental health, studies that assessed all the aspects of mental health in both healthy participants and subjects with physical health problems were included, but those conducted in groups of patients with intellectual disabilities, dementia, and eating disorders were excluded. To assess bias, the Newcastle–Ottawa Scale (NOS) was applied. A total of 5911 studies were independently extracted by 2 researchers and verified if they met the inclusion criteria using a 2-stage procedure (based on the title, based on the abstract). After reviewing the full text, a total of 61 studies were selected. A narrative synthesis of the findings from the included studies was performed, which was structured around the type of outcome.

The studies included mainly focused on depression and depressive symptoms, but also other characteristics ranging from general and mental well-being, quality of life, sleep quality, life satisfaction, flourishing, mood, self-efficacy, curiosity, creativity, optimism, self-esteem, stress, nervousness, or happiness, to anxiety, minor psychiatric disorders, distress, or attempted suicide, were analyzed. Moreover, the indicated effect was studied and stated not only for fresh fruits and vegetables but also for fruit and vegetable products, such as juices, dried, and canned fruits and vegetables, salads, soups, or ketchup, and even for potatoes in some studies that included it to the total intake of fruits and vegetables. This corresponds to the general conclusions of some studies that not only the intake of fruit and vegetable should be increased, but also at least 5 portions of fruits or vegetables must be taken daily as recommended to observe a positive influence on the general mental health.

The reason behind promoting the consumption of 5 portions of fruits or vegetables daily is that the Food and Agriculture Organization of the United Nations (FAO) and WHO have recommended to consume a minimum of 400 g of fruits and vegetables per day, excluding potatoes and other starchy tubers, with an estimated serving size of 80 g. This recommendation is also supported by a number of prominent experts, boards, and associations, such as the National Health Service (NHS) in Great Britain, American Heart Association (AHA), Centers for Disease Control and Prevention (CDC), and Office of Disease Prevention and Health Promotion (ODPHP) in the United States of America. Moreover, not only the role of raw fruits and vegetables but also that of the processed fruits and vegetables, including frozen, canned, or cooked ones, as well as juices, is emphasized to meet the recommended intake.

2. Effects of Increasing Consumption of Fruits and Vegetables

Increasing the intake of fruits and vegetables to the recommended level may result in a noticeable and measurable effect, as was stated in some included studies. An increase in the consumption of fruits and vegetables by one portion a day leads to a 0.133-unit improvement in the mental well-being assessed by GHQ-12 scale, while the consumption of 7–8 servings a day leads to meaningful changes in positive affect and consumption of 8 portions a day leads to a 0.24-unit increase in life satisfaction (equivalent to the psychological gain of moving from unemployed status to employed). However in general, any increase in the consumption of fruits and vegetables results in the improvement of well-being, enhances happiness, and decreases depressive symptoms, with the strongest effect observed for 6 servings a day, 7 servings a day, or more than 8 servings a day (combined with breakfast every day and 3 meals in addition to 1–2 snacks per day), depending on the studied group.

It must be indicated that among the included studies, some highlighted not only the general effect of fruits and vegetables but also the influence of specific types, such as citrus, berries, green leafy vegetables, green salad, and tomatoes. Simultaneously, among the raw fruits and vegetables, the following were indicated as specially related to better mental health: Bananas, apples, citrus, berries, grapefruit, kiwifruit, carrots, lettuce, cucumber, and green leafy vegetables, particularly spinach. Authors of the indicated studies have no definite explanation why those fruits or vegetables may be especially valuable, similarly as the general mechanism of the influence on mental health is still unknown. However, it may be supposed that the positive influence should be attributed to a specific nutritional value, as a combination of high content of compounds positive for mental health and, at the same time, low content of those negative for mental health. However, such assumption does not take into account the potential interactions between nutrients in food product and between food products in the diet, so it must be also emphasized that in fact estimating the independent effect of only one type of food products (fruits and vegetables), or nutrients may be hard to conduct, due to other food products, or nutrients, that are interfering.

While presenting the results of the included studies analyzing the association between the intake of fruit and vegetable and mental health in adults, it must be emphasized that the risk of bias varied from very high to low (defined based on the commonly assumed criteria) as shown by the total NOS score. Taking this into account, the highest attention must be paid to those studies interpreted as having a low risk of bias and the highest quality. Within such studies, it was observed that high total intake of fruits and vegetables and some of their specific subgroups, including berries, might be associated with a high level of optimism, while this association is independent of interfering factors. High intake of fruits and vegetables was also associated with a higher level of self-efficacy, as well as a low level of psychological distress, ambiguity, and cancer fatalism. In addition, it was observed that high total intake of fruits and vegetables and some of their specific subgroups, including citrus and green leafy vegetables, might be associated with a lower risk of depression, but other health-related factors may also play a role in this association. Furthermore, it was highlighted that increasing physical activity may be necessary to benefit from the positive effect of the consumption of fruit and vegetable to protect against depressive symptoms.