



# Psychological aspects of rehabilitation nutrition: A position paper by the Japanese Association of Rehabilitation Nutrition (secondary publication)

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## Abstract

Psychological aspects of rehabilitation nutrition affect physical, cognitive, and social rehabilitation nutrition. When depression is recognized, not only pharmacotherapy and psychotherapy, but also non-pharmacological therapies such as exercise, nutrition, psychosocial, and other interventions can be expected to improve depression. Therefore, accurate diagnosis and intervention without overlooking depression is important. Psychological aspects of preventive rehabilitation nutrition is also important because depression can be partially prevented by appropriate exercise and nutritional management. Even in the absence of psychological negatives, increasing more psychological positives from a positive psychology perspective can be useful for both patients and healthcare professionals. Positive rehabilitation nutrition interventions can increase more psychological positives, such as well-being, through cognitive-behavioral therapy and mindfulness on their own, as well as through interventions on environmental factors. Consequently, physical, cognitive, and social positives are also expected to be enhanced.

## KEYWORDS

cognitive behavioral therapy, depression, mindfulness, positive psychology, well-being

## 1 | INTRODUCTION

Psychological problems affect physical, cognitive, and social aspects, so their assessment and response are important in rehabilitation nutrition. Psychological problems include depression,

anxiety, obsessive-compulsive disorder, neurodevelopmental disorders, schizophrenia, personality disorders, post-traumatic stress disorder (PTSD), and eating disorders. Depression is of particular importance in rehabilitation nutrition for older people and people with disabilities who require rehabilitation, as well as for healthcare

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professionals, because it is often recognized in these individuals. In older people, depression occurs in 28.4%–35.1% of patients.<sup>1,2</sup> Post-stroke depression occurs in 27% of stroke patients, mainly within 3 months of stroke onset.<sup>3</sup> Depression is present in 23% of elderly patients with proximal femur fractures<sup>4</sup> and in 27.1% of patients with chronic obstructive pulmonary disease.<sup>5</sup> Despite this high prevalence, depression is easily overlooked in older people.<sup>6</sup>

Depression is common among healthcare professionals. A meta-analysis examining the rates of depression, anxiety, and PTSD among healthcare professionals during the COVID-19 pandemic found depression in 21.7%, anxiety in 22.1%, and PTSD in 21.5%.<sup>7</sup> A meta-analysis of ICU nurses and residents found depression and depressive symptoms in 25% of nurses and 28.8% of residents,<sup>8,9</sup> respectively. Thus, although depression is often recognized in healthcare professionals, symptoms may go unnoticed until they become severe.

Depression has negative physical, cognitive, and social consequences. In stroke and traumatic brain injury, apathy and depression are negatively associated with activities of daily living (ADL).<sup>10</sup> Factors contributing to age-related loss of appetite include depression, dementia, medications, oral health conditions, poverty, and loneliness as well as physical factors.<sup>11</sup> Diabetics with depression have lower executive function, language, memory, and overall cognitive function than those without depression.<sup>12</sup> Depression is significantly associated with loneliness<sup>13</sup> and loneliness has a moderate effect on depression.<sup>14</sup> No clear consensus exists on the definition of psychological frailty, however depression and anxiety are the most commonly used definitions.<sup>15</sup> Psychological frailty was associated with physical frailty, and the determinants of psychological robustness were physical, cognitive, and social robustness.<sup>16</sup> Therefore, if depression can be improved, not only psychological but also physical, cognitive, and social robustness can be expected.

Even if one does not identify negative psychological aspects, such as depression, enhancing positive psychological aspects is still important. Positive psychology is the science of enhancing happiness and well-being. Positive rehabilitation nutrition, which applies positive psychology to rehabilitation nutrition, has the potential to enhance psychological positives, such as well-being, through cognitive-behavioral therapy and mindfulness by themselves and through interventions in environmental factors.<sup>17</sup> Consequently, the physical, cognitive, and social positives of patients and healthcare professionals are also expected to be enhanced. In this case, pursuing the causes of psychological positives and negatives is important.

This position paper clarifies our position, as the Japanese Association of Rehabilitation Nutrition, on rehabilitation nutrition for depression and positive rehabilitation nutrition based on the available evidence. Mainly umbrella reviews, meta-analyses, and systematic reviews were searched and cited. Although depressive state as a syndrome of depressed mood and depression as a disease are two different concepts, it has been difficult to understand the clear difference between depressive state and depression from the English word “depression”. Therefore, in this position paper, the

Japanese translation of depression is “うつ” and the Japanese translation of depressive symptoms is “うつ症状”.

## 2 | REHABILITATION NUTRITION FOR DEPRESSION

### 2.1 | Screening

Screening for depression is important not only for detecting depression but also for reducing the incidence of depressive symptoms 6–12 months later (odds ratio 0.60, 95% confidence interval 0.50–0.73).<sup>18</sup> The sensitivity and specificity of the patient health questionnaire-9 (PHQ-9) was 0.8518. In a meta-analysis of the patient health questionnaire-2 (PHQ-2), the sensitivity and specificity of the PHQ-2 were 0.91 and 0.67 for a score of 2 or higher, and 0.72 and 0.85 for a score of 3 or higher.<sup>19</sup> The PHQ-2 was used to answer the two questions “Little interest or pleasure in doing things” and “Feeling down, depressed or hopeless” in the past 2 weeks with the following frequencies: not at all: 0 points, several days: 1 point, more than half the days: 2 points, and nearly every day: 3 points.<sup>20</sup> The Japanese Society of mood disorders guidelines for diagnosis and treatment of depression in older adults include points for differentiating depression from bipolar disorder, dementia, delirium, and apathy, as well as depressive state from depression caused by physical diseases, organic brain diseases, and drugs.<sup>21</sup> In cases of severe depression, such as the presence of suicidal ideation, specialized treatment is required, including pharmacotherapy by psychiatrists and psychological therapy by certified public psychologists.

### 2.2 | Risk factors

Risk factors for depression include a variety of factors such as diet and physical activity. In a review examining risk factors for depression in older adults, risk factors included age 80 years or older, sleep disturbance, hearing impairment, vision impairment, and heart disease.<sup>22</sup> Diabetes and metabolic syndrome are risk factors for depression.<sup>23,24</sup> Obesity is a risk factor for depression.<sup>25</sup> Underweight and sarcopenia are also risk factors for depression.<sup>26,27</sup> Excessive alcohol consumption is a risk factor for depression.<sup>28</sup> Consumption of ultra-processed foods (processed foods high in sugar, salt, and fat, produced by industrial processes using additives such as hydrogenated oils, added sugars, flavors, emulsifiers, and preservatives) is associated with depression and depressive symptoms.<sup>29</sup> In adolescents, consumption of junk food (foods high in energy, salt, and fat, with an imbalance of nutrients) is associated with depression, stress, anxiety, and sleep dissatisfaction.<sup>30</sup> Food insecurity is associated with depression, anxiety, and sleep disturbances.<sup>31</sup> The risk of depression is higher with longer sitting time and television viewing time.<sup>32</sup> A nighttime lifestyle is associated with a higher risk of depression than a morning

lifestyle.<sup>33</sup> Skipping breakfast and eating alone are risk factors for depression.<sup>34,35</sup> Patients with dysphagia are at higher risk for depression.<sup>36</sup> Oral problems such as edentulous and periodontal disease increase the risk of depression.<sup>37</sup> Oral diseases have psychosocial consequences.<sup>38,39</sup> Sleeping too little or too much compared to 7 h is a risk factor for depression.<sup>40,41</sup> Older adults are at higher risk of depression if they have not traveled within a year.<sup>42</sup> There was insufficient evidence that working 41–48, 48–54, or 55 h or more per week worsens depression.<sup>43</sup> However, Japanese obstetricians and gynecologists who work more than 100 h per week have an increased risk of depression and suicidal ideation<sup>44</sup> and should avoid working long hours.

## 2.3 | Clinical practice guideline

Guidelines for the treatment of depression in older adults describe the effectiveness of non-pharmacological therapies such as problem-solving therapy, reminiscence/life review therapy, psychotherapy such as behavioral activation therapy, exercise therapy, high-intensity light therapy, and dietary therapy.<sup>21</sup> An umbrella review of clinical practice guidelines for depression in children also recommends diet, sleep, and exercise.<sup>45</sup> Lifestyle modifications such as nutrition and exercise can improve depression.<sup>46</sup> Therefore, appropriate rehabilitation nutrition as well as pharmacotherapy and psychotherapy are important in the treatment of depression.

## 2.4 | Exercise therapy and physical activity

Exercise therapy is useful in the prevention and treatment of depression. An umbrella review of the effects of exercise interventions for the prevention of depression found that exercise was beneficial for depression in a wide range of age groups, and suggested that low-impact exercise was as effective as high-impact exercise.<sup>47</sup> An umbrella review of the effects of exercise on perimenopausal women also found that exercise was beneficial for the prevention of depression.<sup>48</sup> A network meta-analysis of the effects of different types of exercise on the treatment and prevention of depression in adolescents found that resistance training 3–4 days a week for 30–60 min per session for at least 6 weeks was most effective.<sup>49</sup> In institutionalized persons, chair resistance training was beneficial for depression.<sup>50</sup> In an exercise intervention for depression after stroke, exercise was effective in patients with mild stroke.<sup>51</sup> A yoga intervention reduced depressive symptoms in depressed patients.<sup>52</sup> Tai chi was useful in improving depression, anxiety, and general mental health.<sup>53</sup> In older adults, dance was helpful in improving depressive symptoms.<sup>54</sup> A network meta-analysis comparing exercise and pharmacotherapy for non-severe depression found that exercise had a higher dropout rate than pharmacotherapy, but was equally effective in reducing depressive symptoms.<sup>55</sup>

Physical activity is beneficial in the prevention and treatment of depression. Moderate to high levels of habitual physical activity reduced the incidence of depression and subclinical depressive symptoms in adults.<sup>56</sup> Internet-based self-help interventions to promote physical activity reduced depressive symptoms in people with depression.<sup>57</sup> Higher levels of physical activity, even below public health recommendations, were associated with a lower risk of depression.<sup>58</sup> Physical activity interventions for people with type 2 diabetes and depression improved depressive symptoms.<sup>59</sup> Leisure-time physical activity reduced the risk of depression at low to moderate levels, however, increased the risk of depression at high levels.<sup>60</sup> Participation in sports during adolescence reduced symptoms of anxiety and depression.<sup>61</sup>

Pulmonary and cardiac rehabilitation may be useful in improving depressive symptoms. Pulmonary rehabilitation for chronic obstructive pulmonary disease (COPD) improved symptoms of depression and anxiety.<sup>62</sup> Exercise-based cardiac rehabilitation for patients with myocardial infarction improved symptoms of depression and anxiety.<sup>63</sup>

## 2.5 | Nutrition therapy

Some nutritional therapies are useful in the prevention and treatment of depression. In an umbrella review examining the relationship between psychotherapy, the mediterranean diet and the dietary inflammatory index and depression, higher adherence to the mediterranean diet and lower scores on the dietary inflammatory index were associated with a lower risk of depression.<sup>64</sup> A review examining the relationship between diet and the prevention and treatment of depression found that a healthy diet, fish, coffee, dietary zinc, and light to moderate alcohol (<40 g/day) were negatively associated with incident depression.<sup>65</sup> On the other hand, sugar-sweetened beverages were positively associated with incident depression. The use of probiotics, omega-3 polyunsaturated fatty acids, and L-carnitine has been helpful in the treatment of depression.<sup>65</sup> Coffee and tea consumption have been shown to reduce the risk of depression.<sup>66</sup> A diet that increases the intake of fresh vegetables, whole grains, low-fat dairy products, and lean protein and decreases the intake of processed and high-fat foods is desirable in the treatment of depression.<sup>67</sup> In a review of the association between vitamin D and depressive symptoms, vitamin D intake significantly reduced depressive symptoms.<sup>68</sup> In depressed patients taking antidepressants, supplementation with L-methylfolate reduced depressive symptoms.<sup>69</sup> Higher intake of dietary fiber was associated with less depression.<sup>70</sup> Higher intakes of copper, selenium, and magnesium were associated with less depression,<sup>71</sup> although the association between selenium and depression is controversial.<sup>72</sup> Low-carbohydrate diets did not significantly improve depression or anxiety.<sup>73</sup> Whether vegetarian or vegan diets improve or worsen depression is controversial.<sup>74</sup> Combining pharmacotherapy with dietary supplements or herbal remedies may increase the effectiveness of drug therapy and decrease adverse effects.<sup>75</sup>

A systematic review of intentional weight loss and changes in depressive symptoms in obese patients found a decrease in depressive symptoms with weight loss.<sup>76</sup> Depression improved postoperatively in obese patients who underwent bariatric surgery.<sup>77</sup> Intermittent fasting improved depressive symptoms but not anxiety or mood.<sup>78</sup> Energy restriction improved depressive symptoms.<sup>79</sup> However, energy restriction is indicated in cases of obesity and should not be used in cases of undernutrition.

## 2.6 | Psychosocial aspects

Psychotherapy and social coping are useful in the prevention and treatment of depression. Cognitive behavioral therapy and mindfulness were equally useful in treating depression.<sup>80</sup> Cognitive behavioral therapy was also useful in preventing recurrence of depression.<sup>81</sup> Acceptance and commitment therapy (ACT) reduced depressive symptoms.<sup>82</sup> Mindfulness cognitive therapy and ACT were helpful in reducing symptoms of depression.<sup>83</sup> Self-compassion was helpful in preventing depression and anxiety in young adults.<sup>84</sup> In a network meta-analysis of psychotherapy using digital devices for depression and anxiety, cognitive behavioral therapy using digital devices was most effective for depression and anxiety.<sup>85</sup> In older adults, the use of social networking services (SNS) was associated with reduced depression and loneliness.<sup>86</sup> However, excessive use of SNS should be discouraged. In a meta-analysis examining the effect of social support on community-dwelling older adults with depression, those with social support, social participation, and social connections were less depressed.<sup>87</sup> Those who lived alone were at higher risk for depression.<sup>88</sup> In non-pharmacological treatment of social participation in depressed people, the most effective intervention programs were occupation-based or cognitive-behavioral interventions.<sup>89</sup> Social support was also useful in preventing depression.<sup>90</sup> Occupational therapy interventions aimed at returning to work were useful in improving depressive symptoms.<sup>91</sup> Greater income inequality was associated with a higher risk of depression.<sup>92</sup>

## 2.7 | Other interventions

Gardening, forest bathing, music therapy, art therapy, laughter, and humor may be useful in improving depressive symptoms. Group gardening can increase well-being and improve depressive symptoms.<sup>93</sup> Forest bathing improved depression.<sup>94</sup> Sunbathing is recommended to prevent depression by preventing vitamin D deficiency.<sup>95</sup> In music therapy, intervention by a music therapist for 60min or more per week was most effective in reducing depression in older adults, however listening to one's own favorite music for 60min or more per week was also helpful.<sup>96</sup> Art therapy was helpful in improving depressive symptoms in older adults.<sup>97</sup> Art therapy (music therapy and painting therapy) for people with diabetes was helpful for depression,

however, not significantly for anxiety.<sup>98</sup> Laughter (laughter therapy, laughter yoga) and humor interventions have been useful in improving depression, anxiety, and sleep quality.<sup>99,100</sup> Aromatherapy for cancer patients was useful in improving anxiety, but its effects on depression are controversial.<sup>101,102</sup> Lavender was useful for depression and anxiety.<sup>103</sup> A video game intervention was useful for improving depressive symptoms.<sup>104</sup> Acupuncture was useful for depression in older adults with and without antidepressants.<sup>105</sup> Religion and spirituality reduced depression.<sup>61</sup> Rehabilitation nutrition for psychological aspects should include these therapies as well as exercise and nutritional therapies.

## 3 | POSITIVE PSYCHOLOGY AND REHABILITATION NUTRITION

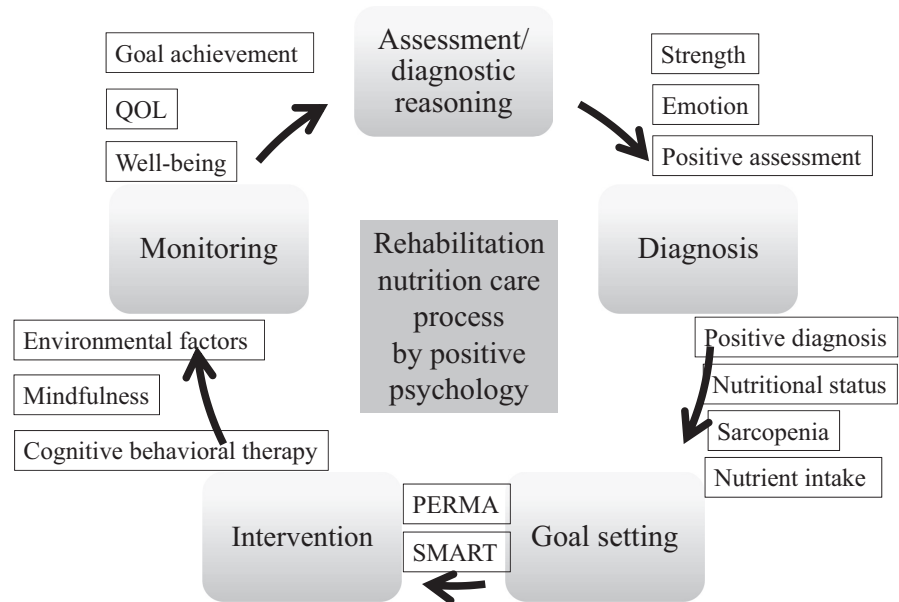
### 3.1 | Positive psychology

Positive psychology was proposed by Martin Seligman as the scientific pursuit of well-being.<sup>17</sup> Conventional psychology has been concerned with how to reduce depression, anxiety, and other psychological negatives to as close to zero as possible. On the other hand, positive psychology strives to increase the psychological positives from the absence of psychological negatives. Positive psychology has the potential to be useful to both healthcare professionals and patients.

The areas in which strengths are assessed and developed are very compatible with rehabilitation and rehabilitation nutrition. For example, a person's nutritional status may be suboptimal even if the person is not undernourished or obese. A weight that allows for optimal functioning may be the goal of rehabilitation nutrition. Even if a person does not have sarcopenia, muscle mass, strength, and physical function may be suboptimal. Muscle mass, strength, and physical function can be improved. Even if a person is not functionally impaired, it is possible that function is suboptimal and could be improved. Thus, wellness can be further enhanced.

Positive psychological interventions can be useful for both healthcare professionals and patients. Positive psychological interventions for healthcare professionals reduced symptoms of depression, anxiety, burnout, and stress, and improved well-being, work and life satisfaction, self-compassion, relaxation, and resilience.<sup>106</sup> Few studies using a positive psychology conceptual framework for physicians have found reduced burnout and improved well-being.<sup>107</sup> A comparison of positive psychology interventions for people with depression with other active psychological treatments found no statistically significant differences in improvements in depression or well-being.<sup>108</sup> Positive psychological interventions for patients with cardiovascular disease were useful in improving well-being and reducing distress.<sup>109</sup> Positive psychological interventions for patients with chronic pain were useful in improving well-being and reducing anxiety, although no significant differences were found for depression.<sup>110</sup>

**FIGURE 1** Rehabilitation nutrition care process by positive psychology. The rehabilitation nutrition care process includes assessment and diagnostic reasoning, diagnosis, goal setting, intervention, and monitoring. Both strengths and weaknesses are assessed and diagnosed; SMART refers to goals that are specific, measurable, achievable, relevant, and time-bound; PERMA refers to goals that fulfill positive emotions, engagement, relationships, meaning, and achievement/accomplishment.



### 3.2 | Positive psychology and rehabilitation nutrition care process

The rehabilitation nutrition care process from a positive psychology perspective is shown in Figure 1.<sup>17</sup> While the major components of assessment/diagnostic reasoning, diagnosis, goal setting, intervention, and monitoring remain the same, many of the subcomponents have been modified. In assessment/diagnostic reasoning and diagnosis, the terms positive assessment and positive diagnosis have been added. In goal setting, a PERMA goal was added, which summarizes the five concepts that support positive psychology (positive emotion, involvement, relationship, meaning, and achievement).<sup>111</sup> PERMA goals can also be set to further improve quality of life and well-being. Interventions include cognitive behavioral therapy, mindfulness, ACT, and environmental interventions. For example, yoga and mindfulness have been useful in improving the well-being of healthcare professionals.<sup>22</sup> Stress management and group cognitive behavioral therapy for nurses reduced burnout.<sup>112</sup> Environmental interventions include music, exercise/sports, painting, photography, lighting/colors, scents, gardening, learning opportunities, cafes, and animals. Monitoring includes not only goal attainment but also quality of life and well-being.

## 4 | CONCLUSION

Although sufficient evidence exists for rehabilitation nutrition in depression, exercise, nutrition, and other therapies are rarely optimally implemented in clinical practice. Evidence-based practices in rehabilitation nutrition, as well as pharmacotherapy and psychotherapy, are important for depression. A summary of nonpharmacologic therapies that can help prevent depression and improve well-being is provided in Table 1. Even in the absence of depression

**TABLE 1** Non-pharmacological therapies that are useful for preventing depression and improving well-being.

Exercise therapy and physical activity
Aerobic exercise, resistance training, sports, sarcopenia prevention, etc.
Nutritional therapy
Maintaining good nutritional status, weight loss in obesity, Mediterranean diet, low dietary inflammatory index, eating breakfast, adequate intake of fiber, vitamin D, and probiotics, low processed and ultra-processed foods, etc.
Psychotherapy
Cognitive behavioral therapy, mindfulness, acceptance and commitment therapy (ACT), positive psychological interventions, etc.
Social aspects
Social support, social participation, social connections, not eating alone, etc.
Other
Sleep about 7 h, gardening, forest bathing, music therapy, art therapy, laughter/humor, lavender, etc.

or other negative psychological conditions, rehabilitation nutrition interventions can be modified by incorporating a positive psychology perspective. Discussion with multiple professionals about the causes of depression and confirmation of the individual's values and intentions regarding nonpharmacologic therapy are important in this process. The psychological aspect is important for both the patient and the healthcare professionals because it affects the physical, cognitive, and social aspects of the person's life. Rehabilitation nutrition for both the psychological and physical aspects in clinical practice is expected to improve functioning, quality of life, and well-being.

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## CONFLICT OF INTEREST STATEMENT

Hidetaka Wakabayashi and Keisuke Maeda are Editorial Board members of *Journal of General and Family Medicine* and co-authors of this article. To minimize bias, they were excluded from all editorial decision-making related to the acceptance of this article for publication. The other authors have stated explicitly that there are no conflicts of interest in connection with this article.

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