

Purpose in life (ikigai) may improve obesity caused by stress: a proposal based on traits of neurotransmitters related to emotions

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Abstract—*This paper aims to propose a way to improve obesity using purpose in life (PIL/ikigai) in view of the chemical traits of neurotransmitters such as serotonin, dopamine, noradrenalin, and β -endorphin related to emotions. Any stress, such as troubles in human relationships, causes anxiety that may relate to an imbalanced secretion of neurotransmitters. Every person has a need to establish meaning in his/her life, i.e., PIL/ikigai, intrinsically. PIL/ikigai is a prefrontal lobe function developed through evolutionary processes. Therefore, PIL/ikigai is a natural and mentally healthy way to cope with stress and causes well-balanced secretion of neurotransmitters. Obesity causes serious diseases such as cardiovascular disease and diabetes and sometimes leads to death. One of factors influencing obesity is binge eating caused by stress, i.e., anxiety. Binge eating may be an alternative to PIL/ikigai in the secretion of neurotransmitters relating to pleasure and comfort. Therefore, PIL/ikigai may reduce binge eating and lead to decreasing obesity.*

Keywords—*Purpose in life (PIL)/ikigai, stress, emotion, neurotransmitters, obesity*

I. INTRODUCTION

All people need happiness, including pleasure, comfort, and decreased anxiety over a period of time [1, 2]. These emotions are indicators of continuous successful adaptation to the environment [3]. Any stress, such as trouble in human relationships, causes anxiety [e.g., 3] that is accompanied by changes in the autonomic nervous function controlling homeostasis, as stated by Cannon [4], and by dysfunction of the endocrine system [5, 6]. Anxiety is an indicator of unsuccessful adaptation to environments [3]. Variation of emotion depends on the secretion of neurotransmitters such as serotonin, dopamine, vasopressin, oxytocin, β -endorphin, and noradrenaline [7, 8]. People with anxiety attempt to search for pleasure and comfort. Eating [9, 10] and drinking alcohol [11] cause temporary pleasure and comfort because neurotransmitters related to pleasure and comfort are secreted [9-11]. Additionally, drinking alcohol increases appetite resulting in increasing food intake [12-14]. Binge eating is an important risk factor for obesity as is decreased exercise [10, 12, 15]. Genetic factors also cause obesity [16]. Obesity causes serious cardiovascular disease and diabetes and sometimes leads to death [17, 18]. Therefore, a fundamental treatment of obesity should be developed.

Every person has a need to establish a meaningful life [19, 20]. Recently it has been recognized that a meaningful life, i.e. purpose in life (PIL)/ikigai, is a natural and mentally healthy way to cope with stress in a stressful society [e.g., 3]. Additionally, PIL/ikigai may improve alcohol dependence often caused by stress, including anxiety [21]. This process causes well-balanced secretion of neurotransmitters relating to emotions [e.g., 3]. Therefore, we hypothesize that PIL/ikigai is an effective way to reduce binge eating and lead to decreasing obesity. In this paper, we discuss the correlation between PIL/ikigai and obesity based on previous studies including brain function, emotions, and neurotransmitters [7, 8, 22]

II. EMOTIONS AND NEUROTRANSMITTERS

In recent years, brain research on the relationships between emotion and neurotransmitters has been remarkably advanced [7, 8, 22]. Dopamine is a neurotransmitters related to motivation and pleasure [7, 8]. Noradrenaline relates to anxiety. β -endorphin relates to pleasure and comfort. Vasopressin and oxytocin are related to increasing warm-hearted human relationships. Serotonin is believed to function in the well-balanced secretion of these other neurotransmitters; this function leads to a stable emotion state, i.e., comfort. Understanding the correlation between emotions and neurotransmitters could provide a way to solve the obesity issue.

III. CHARACTER OF STRESS

Any stress, including ones such as trouble with human relationships, kaleidoscopic sound, and changes in temperature [5, 6], causes anxiety and decreases pleasure and comfort [e. g., 3]. Serious and continuous failure of coping with stress influences the autonomic nervous function controlling homeostasis [4] and the function of the endocrine system [5, 6], and sometimes results in mental and somatic disease accompanied by death [5, 6]. Anxiety causes an imbalanced secretion of neurotransmitters and leads people to attempt to change their state from uncomfortable to comfortable in various ways [3, 4, 5, 6]. One of the ways includes eating and alcohol-induced increased eating [14]. Binge eating, however, causes obesity [10, 12]. Drinking alcohol can sometimes cause alcohol dependence [23]. Other ways to reduce anxiety include moderate exercise [7] and conversation with familiar persons [24]: these ways are considered as good. A process of evolution provided the human psychological and physiological ability to adapt to environments intrinsically. Cannon [4] noted that, “only by understanding the wisdom of the body, shall we attain that mastery of disease and pain which will enable us to relieve the burden of mankind.” Recently, it has been recognized that purpose in life (PIL)/ikigai, which is used by “the wisdom of body” including prefrontal lobe function, is a natural and mentally healthy way to cope with stress [3].

IV. PURPOSE IN LIFE (PIL)/IKIGAI

The term “purpose in life” came from existential philosophy, which developed in Europe, while “ikigai” appeared in Japanese classical literature. Both PIL and ikigai have long histories and share a common core theme: “Everything changes and life is a one-time opportunity. Every person has a need for a meaningful life [18, 19].” PIL/ikigai relates to ambition, view of life, and mental integration of psychological events [e.g., 3]. The prefrontal lobe has evolved over a long period and has functions such as ambition, view of life, mental integration, and attitude toward stress [20]. Therefore PIL/ikigai could be based on prefrontal lobe function. Previous studies have showed that PIL/ikigai is an effective way to cope with stress. More specifically, persons with firm PIL/ikigai can better decrease anxiety, mental and somatic subjective symptoms and increase pleasure and comfort even in stressful situations and society compared with persons with weak PIL/ikigai [25]. Furthermore, persons with PIL/ikigai have distinct personality traits: having lower social desirability, which is an attitude based on the need for approval and an attempt to adapt excessively to expectation of their society; attaining their purpose with enthusiasm and patience and without impulse; respecting the personality of other persons; and having an more independent spirit [3, 21, 26, 27]. These personality traits show that they can satisfy their mind with pleasure and comfort based on intrinsic aspects of controlled secretion of neurotransmitters. Therefore PIL/ikigai may be an effective way to decrease binge eating caused by stress and lead to reducing obesity as well as alcohol dependence.

Persons with firm PIL/ikigai have positive experiences such as spending and playing sufficiently in beautiful nature including mountains, forests, rivers, and marshes; accepting warm hearted support without forcing directions from others, and being improved by persons and events [3, 24].

V. STUDY LIMITATIONS

These proposals for improvement of obesity are not based on experiments but on a hypothesis created by adding previous individual pieces of evidence. Additionally, more factors influencing obesity should be considered. Therefore, further studies relating PIL/ikigai to improvement in obesity should be performed.

VI. CONCLUSION

Successful coping with stress causes a well-balanced secretion of neurotransmitters related to emotions. Unsuccessful coping with stress causes an imbalanced secretion of these neurotransmitters. People with unsuccessful coping with stress, i.e. anxiety, sometimes show binge eating and over consumption of alcohol because both behaviors cause secretion of neurotransmitters related to pleasure and comfort. Binge eating and over consumption of alcohol may easily result in obesity and alcohol dependence accompanied by serious diseases. PIL/ikigai is a prefrontal lobe function that causes well-balanced secretion of neurotransmitters related to emotions during stressful situations. This indicates PIL/ikigai is a natural and mentally healthy way to cope with stress. Therefore, PIL/ikigai may be an effective way to decrease binge eating and thus reduce obesity.

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