Regular Article

Correlation between addictive behaviors and mental health in university students

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Aims: The present study aims to clarify the relationships of addictive behaviors and addiction overlap to stress, acceptance from others and purpose in life.

Methods: A survey was conducted on 691 students at eight universities. The Eating Attitude Test-20 was used to identify students with food addiction or food addictive tendencies. The Kurihama Alcoholism Screening Test was used to identify students with alcohol addiction or alcohol addictive tendencies. The Fagerström Test for Nicotine Dependence was used to identify students with nicotine addictive tendencies or nicotine addiction. The Visual Analog Scale was used to assess stress and acceptance from others. The Purpose in Life Test was used to measure meaning and purpose in life. Results were compared between students with addictive behaviors, with addictive tendencies and without addictive behaviors.

Results: Significant differences among the three groups were observed for stress, acceptance from others, and Purpose in Life scores for students with food and nicotine addiction, but no significant differences existed in relation to alcohol addiction. In addition, 28.8% of students displayed addictive behaviors in one of the three areas (food, alcohol or nicotine), 8.5% displayed addictive behaviors in two of the three areas, and 0.4% had addictive behaviors in all three areas. Significant differences existed in stress and acceptance from others among students with one addictive behavior, ≥two addictive behaviors and no addictive behaviors. However, no significant differences existed in Purpose in Life scores with respect to overlapping addictions.

Conclusion: The results suggest a relationship between mental health, addictive behaviors and overlapping addiction among university students.

Key words: acceptance from others, addictive behavior, mental health, purpose in life test, stress.

In recent years various addictive behaviors involving not only alcohol and drugs, but also gambling and work, have become social issues. Schaef reported that, irrespective of the clinical diagnosis of addiction, people could become addicted to any substance or process.¹ She found that all addictions basically function in the same way and bring about the same results, and that most people with addictions exhibit various addictive behaviors. Schaef documented the necessity of spirituality in the recovery from addictive behaviors.¹ In self-help groups such as Alcoholics Anonymous (AA), recovery from alcoholism emphasizes spirituality in a 12-step recovery.² According to Frankl, an existential analyst, people do not question the meaning of life, but rather a transcendent being questions the meaning of people's lives, and correlations of meaning in life to suicide, crime and drug dependency have been investigated.³ Shean and Fechtmann used the

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Purpose in Life test (PIL), based on Frankl's concept, to compare university students who used drugs and those who did not, finding significantly lower PIL scores for drug users. In Japan, Kondo et al. investigated spirituality and recovery in drug addicts, and reported that scores (calculated using a transcendental acceptance scale based on a 12-step program) were higher for drug addicts with a long period of drug abstinence than for drug addicts with a short period of drug abstinence.

Addictive behaviors also reportedly correlate to stressful life events, social support, meaning and purpose in life, family relationship and self-esteem. Newcomb and Harlow investigated relationships of stress to meaning of life and substance use in more than 1000 university students and reported that uncontrollable stressful life events led to meaninglessness due to loss of control, in turn leading to drug use.

Other studies have documented that addictions involving alcohol, drugs, food and gambling tend to coexist or overlap. Overlapping addictive behaviors have been referred to as 'cross-addictions', 'overlapping addictions' or 'multiple addictive behaviors'. Schaef reported that addictions rarely overlap and lead to another. Common examples include a former alcoholic depending instead on sweet food, and a drug addict having a dependency on sex and women, which in turn may trigger further drug abuse. Because these overlapping and shifting addictive behaviors are mutually related, viewing addictive behaviors as a whole rather than as individual behaviors is important. While many studies have examined relationships of a single addictive behavior to spirituality or stress, few have investigated relationships of overlapping addictive behaviors to stress, interpersonal relationship, meaning and purpose in life, spirituality and mental health.

The objective of the present study was to clarify relationships of addictive behaviors and addiction overlap to stress, acceptance from others, meaning and purpose in life (mental health) and quality of life (QOL). The study was conducted on university students because the ultimate goal of the study was to prevent addictive behaviors. Food, alcohol and nicotine were selected as addictive behaviors in the present study. These substances are prevalent in the daily lives of university students, and may easily shift from daily habits to substances of addiction.

METHODS

Subjects

A survey was conducted on 763 students attending eight private and public universities. The recovery rate was 92.4% (n = 705), and the valid response rate was 90.6% (n = 691). Subjects consisted of 306 male students (mean age: 20.3 ± 1.5 years) and 385 female students (mean age: 20.3 ± 1.7 years). The mean age of the 691 students was 20.3 ± 1.6 years.

Scales

Addictive behavior-related scales

The present study examined the following three forms of addictive behaviors: food addiction; alcohol addiction; and nicotine addiction.

The Eating Attitude Test-20 (EAT-20) was used to assess food addiction, because the scale is used to assess eating attitudes. EAT-20 is a 20-item scale on eating attitudes in which responses to questions on factors such as sense of guilt after eating and calorie calculation are graded on a 7-point scale from 'not at all (1 point)' to 'always (7 points)'. A total score ≥60 indicates tendencies toward eating disorder, and scores ≥65 indicate eating disorders. In the present study students with scores of 60–64 were classified as having addictive tendencies and those with scores ≥65 were categorized as displaying food addiction.

The Kurihama Alcoholism Screening Test (KAST) was used to assess addictive behaviors toward alcohol. The KAST is a 14-item scale in which scores are allocated based on the level of problems such as interpersonal problems and memory loss that are caused by drinking. Total score ≥0 indicates drinking problems, and scores ≥2 show severe drinking problems. In the present study students with scores ≥0 were classified as having addictive tendencies and those with scores ≥2 as having alcohol addiction.

The Fagerström Test for Nicotine Dependence (FTND) was used to assess nicotine dependency. The FTND is a six-item scale in which scores are allocated based on factors such as the time to first cigarette after awakening and the number of cigarettes smoked daily. Total scores of 0–5 indicate mild nicotine dependency, and scores of 6–10 indicate severe nicotine dependency in Japan. In the present study, students with scores of 0–5 were classified as...
having addictive tendencies and those with scores of 6–10 as having nicotine addiction.

**Mental health-related scales**

Subjective stress, acceptance from others and spirituality were examined as mental health indicators related to the aforementioned addictive behaviors. Studies have documented relationships of addictive behaviors to stress, self-esteem, meaning and purpose in life and spirituality.4,6–10,21–24

In the present study, the PIL25 was used to measure spirituality. The PIL has three parts (A, B and C) to measure experiences with goals and meanings in life. Only Part A is quantitative, and Parts B and C are sentence-completion scales that are used to obtain clinical findings regarding the subject based on written content. Part A was used in the present study.

The PIL(-A) is a 20-item attitude scale designed to measure Frankl’s concept of ‘existential vacuum’: failure to find meaning and purpose in life. A typical item was ‘My life is...’. Response anchors on the 7-point scale were ‘empty, filled with despair’ and ‘running over with exciting and good things’. Higher scores indicate that the subject has meaning and purpose in life, while lower scores indicate a sense of meaninglessness in life.

The Visual Analog Scale (VAS)26 was used to assess the intensity of routine subjective stress and level of acceptance from others. The VAS is an assessment scale in which the subject is instructed to subjectively indicate level of stress along a 10-cm vertical line from 0% (no stress) to 100% (extreme stress). Acceptance from others represents an important element in the 12-step recovery used in AA meetings. In the present study the VAS was used to subjectively ascertain the level of acceptance by others. Subjects were instructed to mark a point along a line from 0% (no acceptance) to 100% (high acceptance) in order to determine the level of their perceived acceptance from others.

Background information such as gender, age, grade, living environment and extracurricular activities was also gathered.

**Procedures**

The survey was undertaken using anonymous self-administered questionnaires by the snowballing method. Subjects filled out the questionnaire while attending a class or at home. The study was conducted in November and December 2000. Study objectives were explained to all subjects prior to participation in the study.

Cooperation in the survey was requested following oral explanations regarding survey contents, the time required for the survey, the fact that participation in the study was voluntary and could be withdrawn during the survey, protection and anonymity of personal information, questions on the survey, contact information, and other matters. The survey was conducted only on individuals who provided verbal consent. Parental consent was not obtained because the subjects were university students ≥18 years of age and were thus considered capable of self-determination.

SPSS version 12.0 (SPSS Japan, Tokyo, Japan) was used for data analysis. When comparing age and scores among the three groups, the Kruskal–Wallis test and one-way analysis of variance (ANOVA) was used first, followed by Tukey’s multiple comparison test. Other data were subjected to Fisher’s direct probability test.

**RESULTS**

**Frequency and overlap of addictive behaviors**

According to eat-20, 26 of 691 students (3.8%) had addictive tendencies and 45 of 691 students (6.5%) had food addiction. According to KAST, 44 of 691 students (6.4%) had addictive tendencies and 104 of 691 students (15.1%) had alcohol addiction. In addition, 114 of 691 students (16.5%) smoked, and according to FTND, 102 of 691 students (14.8%) had addictive tendencies and 12 of 691 students (1.7%) had nicotine addiction. Figure 1 shows the overlapping of addictive behaviors.

As a result, 117 of 691 students (16.9%) were found to have addictive behaviors in one of the three areas (food, alcohol and nicotine), while 18 of 691 students (2.6%) had addictive behaviors in two of three areas, and one of the 691 students (0.1%) had addictive behaviors in all three areas. The remaining 530 of 691 students (76.7%) displayed no addictive behaviors.

In the present study one-third of students with food addiction also displayed alcohol addiction, while more than half of students with nicotine addiction also showed alcohol addiction. In terms of gender distributions, 63% of male students with food addiction showed alcohol addiction, while 23% of
female students with food addiction exhibited alcohol addiction. In addition, 50% of male students with nicotine addiction had alcohol addiction, and 100% of female students with nicotine addiction also had alcohol addiction. However, 80% of students with alcohol addiction did not have any other addiction, suggesting that university students with alcohol addiction do not necessarily have other addictions. In terms of gender distribution, 9% of male students with alcohol addiction had nicotine addiction and 9% of male students with alcohol addiction had food addiction. Also, 4% of female students with alcohol addiction had nicotine addiction and 17% of female students with alcohol addiction had food addiction.

Comparison of the severity of addictive behaviors

Relationship of severity of food addiction to stress, acceptance from others and PIL scores

Students with food addiction included significantly more women than men ($\chi^2(2) = 25.46, P < 0.01$; Table 1). Mean age differed significantly among the three groups ($F_{2,669} = 4.75, P < 0.01$), and Tukey’s multiple comparison test showed a significant difference between students with addictive tendencies and students without addictive behaviors. Scores for acceptance from others differed significantly among the three groups ($F_{2,663} = 4.64, P < 0.01$), and Tukey’s multiple comparison test showed significant differences between students with food addiction and students without addictive behaviors and between students with addictive tendencies and students with food addiction. PIL score significantly differed among the three groups ($F_{2,655} = 6.03, P < 0.01$), and Tukey’s multiple comparison test showed a significant difference between students without addictive behaviors and students with food addiction.

Relationship of severity of alcohol addiction to stress, acceptance from others and PIL scores

Students with alcohol addiction included significantly more men than women ($\chi^2(2) = 6.18, P < 0.05$). Alcohol addiction was more common among students who lived alone or with friends ($\chi^2(4) = 16.78, P < 0.01$), and was more common among students who participated in sports-related activities ($\chi^2(4) = 18.84, P < 0.01$). No significant differences were seen for stress, acceptance from others or PIL scores.

Relationship of severity of nicotine addiction to stress, acceptance from others and PIL scores

Students with nicotine addiction included significantly more men than women ($\chi^2(2) = 25.09, P < 0.01$). Intensity of routine stress differed significantly among the three groups ($F_{2,663} = 6.59, P < 0.01$), and Tukey’s multiple comparison test indicated a significant difference between students with nicotine addiction and those without addictive behaviors. Acceptance from others differed significantly among the three groups ($F_{2,678} = 11.9, P < 0.01$), and Tukey’s multiple comparison test showed significant differences between students with nicotine addiction and students without addictive behaviors and between students with nicotine addiction and students with addictive tendencies. PIL score differed significantly among the three groups ($F_{2,670} = 10.67, P < 0.01$), and Tukey’s multiple comparison test showed significant differences between students without addictive behaviors and students with addictive tendencies.
Table 1. Addictive behaviors and tendencies in university students

<table>
<thead>
<tr>
<th></th>
<th>EAT-20</th>
<th>KAST</th>
<th>FTND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No addictive behaviors (n = 602)</td>
<td>Food addictive tendencies (n = 26)</td>
<td>Food addiction (n = 45)</td>
</tr>
<tr>
<td>Gender (%)</td>
<td>Male</td>
<td>47.0</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>53.0</td>
<td>88.5</td>
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<tr>
<td>Living environment (%)</td>
<td>Live with parents</td>
<td>20.2</td>
<td>23.1</td>
</tr>
<tr>
<td></td>
<td>Live alone</td>
<td>56.6</td>
<td>69.2</td>
</tr>
<tr>
<td></td>
<td>Live with friends</td>
<td>5.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>18.2</td>
<td>7.7</td>
</tr>
<tr>
<td>Extracurricular activities (%)</td>
<td>Sports</td>
<td>41.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>Arts</td>
<td>12.7</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>7.4</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>38.9</td>
<td>38.5</td>
</tr>
<tr>
<td>Age (years)</td>
<td>20.3 ± 1.6</td>
<td>21.2 ± 2.3</td>
<td>20.1 ± 1.7**</td>
</tr>
<tr>
<td>Routine stress</td>
<td>52.4 ± 23.9</td>
<td>63.8 ± 20.7</td>
<td>60.0 ± 24.5**</td>
</tr>
<tr>
<td>Acceptance from others</td>
<td>64.6 ± 19.1</td>
<td>70.5 ± 18.3</td>
<td>56.8 ± 23.7**</td>
</tr>
<tr>
<td>PIL</td>
<td>91.2 ± 17.8</td>
<td>84.4 ± 17.9</td>
<td>82.7 ± 19.7**</td>
</tr>
</tbody>
</table>

*P < 0.05; **P < 0.01.

ANOVA was used to analyze age and scores, while Fisher’s direct probability test was used for all other analyses.

EAT, Eating Attitude Test; FTND, Fagerström Test for Nicotine Dependence; KAST, Kurihama Alcoholism Screening Test; n.s., not significant; PIL, Purpose in Life test.
Correlation between overlapping addictive behaviors and mental health

The intensity of routine stress was highest for students with higher numbers of addictive behaviors \((F_{3,660} = 3.77, \ P < 0.01; \text{ Table 2}).\) Tukey's multiple comparison test showed a significant difference between students without addictive behaviors and students with \(\geq 2\) addictive behaviors. Mean stress score was \(59.9 \pm 23.9\) for students with food addiction alone, \(54.4 \pm 26.2\) for alcohol addiction alone, \(62.4 \pm 24.9\) for nicotine addiction alone, \(58.0 \pm 27.0\) for food and alcohol addictions, and \(80.5 \pm 16.0\) for alcohol and nicotine addictions.

Level of acceptance from others was low for students with higher numbers of addictive behaviors \((F_{3,656} = 4.08, \ P < 0.01).\) Tukey's multiple comparison test confirmed a significant difference between students without addictive behaviors and students with one addictive behavior and students with \(\geq 2\) addictive behaviors. Mean score for acceptance was \(58.9 \pm 22.2\) for students with only food addiction, \(65.1 \pm 19.7\) for only alcohol addiction, \(43.8 \pm 10.7\) for only nicotine addiction, \(57.8 \pm 24.9\) for food and alcohol addictions and \(40.2 \pm 22.0\) for alcohol and nicotine addictions.

PIL scores tended to be low for students with higher numbers of addictive behaviors, but no significant differences were identified. Mean PIL score was \(84.3 \pm 20.2\) for students with only food addiction, \(93.9 \pm 16.8\) for only alcohol addiction, \(81.8 \pm 18.8\) for only nicotine addiction, \(81.3 \pm 19.4\) for food and alcohol addictions, and \(86.7 \pm 21.9\) for alcohol and nicotine addictions.

DISCUSSION

Relationship between addictive behaviors and mental health

Relationship between food addiction and mental health

Significant differences existed in stress, acceptance from others and PIL scores with respect to addictive behaviors toward food. The present study confirmed that addictive behaviors toward food correlate with stress, acceptance from others and meaning and purpose in life.

Studies have documented that stressful life events occasionally precede eating disorders and low self-esteem is a well-recognized factor associated with eating disorders. Garrett studied recovery in 32 anorexia patients with different recovery processes.
and documented that many participants used the word ‘spirituality’ in their recovery from anorexia, suggesting spirituality as an important factor for recovery.27 Like past studies, the present study showed a correlation between addictive behaviors toward food and mental health in university students.

In the present study students with addictive tendencies toward food had the highest stress scores. This group also had the highest scores for acceptance from others. This high level of perceived acceptance from others was paradoxical considering the group’s high stress levels.

These results may have been due to the fact that the VAS used to measure acceptance from others involved simply indicating the level of acceptance by others along a 10-cm line, and may thus have measured only superficial levels of acceptance from others, rather than actual levels. Considering that 90% of students with addictive tendencies toward food were women, the excessively high level of acceptance from others may have been a result of the constant and stressful efforts of women to gain acceptance from others and society.

Tukey’s multiple comparison test showed no significant differences in routine stress between students with food addiction and students without addictive behaviors. In addition, students with food addiction had a lower level of acceptance from others than students without addictive behaviors and students with addictive tendencies. This may be due to the fact that individuals with a legitimate food addiction become highly self-conscious and therefore have reduced interpersonal stress due to a strong relationship with food. However, this could not be verified given the cross-sectional nature of the present study.

In addition, some students with addictive tendencies toward food may have been false-positive individuals who were actually healthy. However, none of these possible explanations could be confirmed based on the present results. Further research on a greater number of subjects is warranted.

**Relationship between alcohol addiction and mental health**

Addictive behaviors toward alcohol had no significant correlation with stress, acceptance from others or PIL.

Leigh et al. used the Spirituality Assessment Scale (SAS) and the Spiritual Transcendence Index (STI) to ascertain relationships between spirituality, nicotine and alcohol dependency in 196 university students.28

Compared to smokers, STI score for non-smokers was significantly higher, and compared to heavy drinkers, STI score for non-drinkers was significantly higher. However, no correlation to nicotine or alcohol was identified in terms of SAS scores.

Morita et al. divided drug addicts attending a self-help group into the following three groups with respect to the duration of drug sobriety: group A, <2 months; group B, 2–9 months; and group C, ≥9 months.29 They then measured spirituality using the PIL, and did not document any significant differences in PIL scores with respect to duration of sobriety. This contrasts with the results obtained by Kondo et al., who used a transcendental acceptance scale designed on a 12-step program.5

The results obtained by Leigh et al. and Morita et al. also indicate that the correlation between meaning and purpose in life or spirituality and addiction cannot be assessed by all scales.28,29 The PIL may thus be unable to examine what the Kondo et al. scale examines,5 that is, answer the call of a transcendental being or, in other words, a transcendental aspect.30

Some studies have documented a positive relationship between PIL and extroverted personality.31 In the present study students with alcohol problems tended to be extroverts who participated in sports-related activities or lived with friends, suggesting that extroverted personality could have affected PIL scores for university students with addictive tendencies. PIL scores for university students with alcohol addiction may be comparable to those for university students without addiction because university students often socialize by drinking. Spirituality in a broad sense as assessed by the PIL differs from that in a narrow sense as used by AA, and not all aspects of spirituality may be assessed by the PIL. Further investigations are necessary to measure meaning and purpose in life using more appropriate scales.

**Relationship between nicotine addiction and mental health**

Significant differences existed in stress, acceptance from others and PIL scores with respect to nicotine addiction. The present study confirmed that addictive behaviors toward nicotine correlate with stress, acceptance from others and meaning and purpose in life.

Various studies have confirmed a relationship between stressful life events and drug use.6,7,10
Hourani et al. studied 9856 men and women in the US naval services and compared lifelong smokers, current smokers and non-smokers. They found that compared to non-smokers, current smokers displayed lower QOL, greater life and work stress, lower levels of social support, poorer marital relationship, higher past incidence of abuse, and higher current event scores. Also, compared to non-smokers, lifelong smokers had lower QOL, greater life and work stress, and higher past incidence of abuse, but no significant intergroup differences existed in social support, marital relationship or current life events. These findings suggest that current smoking is affected by current social support, interpersonal relationships such as the marital relationship, and life stress. The present results from university students also showed that addictive behaviors toward nicotine correlated with mental health in terms of stress, interpersonal relationships and PIL scores.

Relationship between overlapping addictive behaviors and mental health

In the present study, no students displayed both food and nicotine addictions. This finding does not indicate that food and nicotine addictions do not overlap. Gender differences exist in addictive behaviors, and while most food addicts are women, most nicotine addicts are men.

Schaef reported that most addicts displayed multiple addictions. In the present study the results did not clearly indicate overlapping addictions, but among students with food addiction and students with nicotine addiction, overlapping of alcohol addiction was relatively common, supporting Schaef’s theory.

Furthermore, Schaef believed that various addictions share common factors, and although patterns vary, spirituality is required for recovery from addictive behaviors. The present results do not support this theory because no correlation was seen between addictive behavior overlap and meaning and purpose in life as measured by the PIL. However, the present study included many students with addictive behaviors toward alcohol that had no correlation with PIL scores, and this could have affected the relationship between overlapping addictive behaviors and PIL scores. Further investigations involving more subjects are needed, because relationships between addictive behaviors and PIL scores could be more clearly elucidated by analyzing larger numbers of subjects with overlapping addictive behaviors.

Significant differences existed in stress and acceptance from others with respect to addictive behavior overlap. The present study thus confirmed the relationship of overlapping addictive behaviors to mental and QOL-related problems. In this regard, some common factors underlie addictive behaviors in university students. The aforementioned findings indicate the importance of mental health and QOL interventions in university students with overlapping addictive behaviors.

Study limitations

The present addictive behavior tests subjectively analyzed actions and attitudes, and because no objective tests were used, groups with actual addictive behaviors might not have been examined. In addition, because the present study did not involve clinical patients, relationships between mental health and groups with more severe addictive behavior might not have been fully analyzed. The PIL is a subjective scale for meaning and purpose in life, and the finer aspects of meaning and purpose in life might not have been objectively assessed. Comparison with clinical patients and healthy individuals and measurement of meaning and purpose in life using more appropriate scales is necessary.

REFERENCES
