

Coffee consumption and psychological wellbeing among Japanese auto factory workers

Tomoyuki Kawada

Department of Hygiene and Public Health, Nippon Medical School, 1-1-5 Sendagi, Bunkyo-Ku, Tokyo 113-8602, Japan

Tel.: +81 3 3822 2131; Fax: +81 3 5685 3065; E-mail: kawada@nms.ac.jp.

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Abstract.

BACKGROUND: Health habits are sometimes closely related to physical and mental health status.

OBJECTIVE: The relationship between coffee consumption and psychological wellbeing was evaluated by considering confounding factors.

METHODS: A total of 5,256 men, aged 35 to 60 years, from a workplace in Japan participated in this study conducted in 2018. Psychological wellbeing was evaluated using the General Health Questionnaire (GHQ) 12-item version and multivariate logistic regression analysis was used for the analysis.

RESULTS: Positive GHQ12 score was significantly associated with average daily sleeping time < 4 h, lack of regular exercise and younger age. In contrast, there was no significant association between positive GHQ12 score and coffee consumption. Coffee consumption and smoking status was not significantly related to psychological wellbeing as measured using the GHQ questionnaire. In contrast, aging, regular exercise and sleeping time were related to psychological wellbeing.

CONCLUSION: Coffee consumption was not significantly related to psychological wellbeing, and casual association might be confirmed by a prospective study.

Keywords: Coffee consumption, psychological wellbeing, workers

1. Introduction

Several factors are related to psychological ill health in workers. Maintaining good health strongly affects quality of life, and a good life can be continued by mental and physical good health. Coffee is a popular beverage frequently consumed worldwide. The health effects of coffee consumption have been widely evaluated as promoting good physical and mental health [1]. Epidemiological evidence has suggested that coffee consumption is associated with reductions in blood pressure [2], glucose metabolism [3], metabolic syndrome [4], and chronic kidney disease [5].

Studies have shown that caffeine induces a sedative feeling, and that the chlorogenic acids in coffee have positive effects on sleep [6]. Meta-analyses support an inverse relationship between coffee consumption and depression [7] and have yielded a dose-response relationship [8].

The present study examined the relationship between coffee consumption and psychological wellbeing in male workers by adjusting several lifestyle factors. In addition, the dose-response relationship was also evaluated. I intended to specify whether certain levels of coffee consumption were related to better psychological wellbeing, because better psychological wellbeing might be related to improvement of working behavior and performance.

2. Methods

2.1. Study population

The study was conducted among workers at a car-manufacturing company in a local city in Japan. A cross-sectional study was performed in 2019 and a total of 5,256 males aged 35–60 years were recruited.

2.2. Measurements

A self-administered questionnaire on coffee consumption was established according to four categories (less than 1 cup per week, 1–6 cups per week, 1–2 cups per day, and more than 2 cups per day). In addition, psychological wellbeing was assessed using a Japanese version of the 12-item General Health Questionnaire (GHQ12). Although GHQ12 can be used as a screening tool to detect depression [9], it was originally developed to evaluate psychological wellbeing [10–12].

The GHQ12 is often used in general practice as a screening tool to assess mental ill-health. The rating scale is a behaviorally anchored scale consisting of four options: Better than usual, Same as usual, Worse than usual, and Much worse than usual. A Likert-style scoring procedure can be applied to this four-point scale, with Better than usual scored 1 point and Much worse than usual 4 points, where higher scores correspond to poorer health. In the present study, however, the authors utilized the “GHQ-scoring” method, in which the first two anchors, Better than usual and Same as usual, which indicate the non-presentation of symptoms, were scored 0 and the last two anchors, Worse than usual and Much worse than usual, indicating symptoms, were scored 1. That is, responses to each item were coded 0-0-1-1. The GHQ12 score is obtained by summing the scores for all items, which results in an integer from 0 to 12.

The cut-off for the GHQ12 is ordinarily set as 2/3. Goldberg et al. reported that the cut-off point can be changed without causing any problems and should be selected according to the characteristics of the target population [12]. In our study, a positive GHQ12 score was defined as ≥ 4 . Namely, poor psychological wellbeing is deemed to be indicated when GHQ12 score is equal to or greater than 4.

The Ethics Committee approved the present study. The responses to the questionnaires were kept confidential from the management of the company. Written informed consent was obtained from all the

participants prior to their completion of the survey questionnaire.

2.3. Statistical analyses

Statistical analysis was performed using IBM SPSS version 21.0.0.0 (SPSS Corporation, USA) [13]. A p -value < 0.05 was considered statistically significant. The independent contribution of coffee consumption to the absence (< 4 GHQ12) or presence (≥ 4 GHQ12) of poor psychological wellbeing was estimated by multivariate logistic regression. Adjusted odds ratios (OR) and 95% confidence intervals (CI) were calculated to indicate the protective or risk effects on psychological wellbeing.

3. Results

3.1. Coffee consumption and mental health status

The mean age of subjects was 44.9 years ($SD = 6.9$ years). Percentages of coffee consumption of less than 1 cup per week, 1–6 cups per week, 1–2 cups per day, and more than 2 cups per day were 12.6%, 22.1%, 48.2%, and 17.0%, respectively. In addition, the prevalence of mental ill-health, judged by positive GHQ12 scale score ≥ 4 , was 47.1%. Furthermore, percentages of positive GHQ12 score in subjects aged 35–39, 40–44, 45–49, 50–54, and 55–60 were 47.5%, 48.8%, 47.9%, 47.2%, and 41.9%, respectively.

3.2. Relationship between coffee consumption, GHQ12 score, and smoking status

Percentages of GHQ12 score ≥ 4 stratified by the four categories of coffee consumption are presented in Table 1. The percentage of GHQ12 score ≥ 4 in subjects drinking more than 2 cups per day was significantly higher than in those drinking less than 1 cup per week.

There was also a close relationship between coffee consumption and smoking habit. Percentages of current smoking stratified by the four categories of coffee consumption are presented in Table 2. As the coffee consumption increases, the percentage of current smoking also increases. When the number of daily tobacco smoking > 20 was adopted, an increasing trend was also recognized.

Table 1
Percentages of positive General Health Questionnaire 12 scores (≥ 4) by level of coffee consumption

Coffee consumption			
< 1 cup/week	1–6 cups/week	1–2 cups/day	> 2 cups/day
45.2% (300/663)	45.9% (534/1164)	46.7% (460/2534)	51.4% (460/895)*

Dunnett's multiple comparison was applied to compare each group against subjects < 1 cup/week of coffee consumption. * $p < 0.05$.

Table 2
Percentages of current smoking by level of coffee consumption

Coffee consumption			
< 1 cup/week	1–6 cups/week	1–2 cups/day	> 2 cups/day
30.3% (201/663)	39.4% (459/1164) [†]	48.8% (1237/2534) [†]	55.1% (493/895) [†]
Percentage in subjects with the number of daily tobacco smoking > 20			
8.6% (57/663)	12.5% (146/1164)	19.1% (484/2534) [†]	28.0% (251/895) [†]

Dunnett's multiple comparison was applied to compare each group against subjects < 1 cup/week of coffee consumption. [†] $p < 0.001$.

Table 3
Adjusted odds ratios and 95% confidence intervals for positive General Health Questionnaire 12 scores (≥ 4)

Independent variables	Adjusted odds ratio (95% confidence interval)
Coffee consumption	
< 1 cup per week (control)	
1–6 cups per week	0.995 (0.817–1.21)
1–2 cups per day	1.06 (0.889–1.27)
> 2 cups per day	1.23 (0.995–1.51)
Age	0.989 (0.981–0.997)**
Smoking status	
No (control)	
Past	1.02 (0.875–1.18)
Current < 20 per day	0.924 (0.795–1.07)
Current ≥ 20 per day	1.02 (0.857–1.21)
Regular exercise	0.791 (0.707–0.886) [†]
Average sleeping time	
< 4 hour/day (control)	
4–5 hour/day	0.527 (0.330–0.842)**
5–6 hour/day	0.288 (0.182–0.456) [†]
≥ 6 hour/day	0.189 (0.119–0.301) [†]

Logistic regression analysis was adopted. ** $p < 0.01$, [†] $p < 0.001$.

3.3. Multivariate analysis

A logistic regression analysis of GHQ12 score (≥ 4) in relation to coffee consumption is presented in Table 3. Age, smoking status, regular exercise, and average sleeping time were also used as independent variables. With coffee consumption of less than 1 cup per week set as the control, the adjusted odds ratios (OR) (95% confidence interval [CI]) of coffee consumption of 1–6 cups per week, 1–2 cups per day, and more than 2 cups per day for positive GHQ12 score were 0.995 (0.817–1.21), 1.06 (0.889–1.27), and 1.23 (0.995–1.51), respectively.

As aging was a protective factor for positive GHQ12 score, showing an adjusted OR (95% CI) of 0.989 (0.981–0.997), stratified analysis splitting the population at the age of 44/45 years was conducted (Table 4). Although there was no significant association between coffee consumption and positive GHQ12 score, preventive effects of regular exercise and longer sleeping time were greater in workers aged 45–60 years old than in younger workers.

4. Discussion

A cross-sectional study of occupational fields was conducted to examine the association between coffee consumption and psychological wellbeing. Although there was no significant association between coffee consumption and psychological wellbeing in male workers, subjects with coffee consumption of > 2 cups per day showed a trend of an increased percentage of positive GHQ12 score, which indicate poorer psychological wellbeing. Stratifying subjects by age showed that relatively older subjects present the same trend of association between coffee consumption and positive GHQ12 score, which indicate poorer psychological wellbeing. In addition, preventive effects of regular exercise and longer sleeping time were remarkable in older subjects aged 45–60 years.

Meta-analyses of past reports showed that coffee consumption was significantly associated with a decreased risk of depression [7, 8]. The present study addressed subclinical mental illness as evaluated by the GHQ12. Although there was no significant association, increased frequency of coffee consumption

Table 4
Adjusted odds ratios and 95% confidence intervals for positive General Health Questionnaire 12 scores (≥ 4), stratified by age

Independent variables	35–44 years old	45–60 years old
Coffee consumption		
< 1 cup per week (control)		
1–6 cups per week	1.15 (0.884–1.49)	0.824 (0.612–1.11)
1–2 cups per day	1.14 (0.902–1.45)	0.953 (0.729–1.25)
> 2 cups per day	1.30 (0.971–1.73)	1.11 (0.820–1.51)
Smoking status		
No (control)		
Past	0.949 (0.767–1.18)	1.08 (0.870–1.34)
Current < 20 per day	0.864 (0.710–1.05)	1.03 (0.813–1.30)
Current ≥ 20 per day	0.994 (0.786–1.26)	1.05 (0.815–1.34)
Regular exercise		
Average sleeping time	0.824 (0.709–0.959)*	0.759 (0.640–0.899)**
< 4 hour/day (control)		
4–5 hour/day	0.672 (0.374–1.21)	0.367 (0.166–0.812)*
5–6 hour/day	0.363 (0.205–0.644)**	0.201 (0.092–0.441) [†]
≥ 6 hour/day	0.231 (0.129–0.414) [†]	0.137 (0.062–0.303) [†]

Logistic regression analysis was adopted. * $p < 0.05$, ** $p < 0.01$, [†] $p < 0.001$.

had a tendency to accompany poor psychological wellbeing. Caffeine, a component in coffee, is known to lower psychological stress and maintain cognitive function [14]. In addition, coffee consumption is protective for cardiovascular risk [15]. These desirable effects for health should be validated with a dose-response relationship.

There are some study limitations. This study handled male works and sex difference could not be checked for the analysis. In addition, subjects over 60 years of age were not included, and job contents such as management work, office work and manufacturing work could not be specified. Furthermore, I suspect that there is a healthy workers' effect on the association. This study is a cross-sectional study with a specific Japanese working population, caution should be paid for the application of study outcomes to other populations.

5. Conclusions

This cross-sectional study showed no relationship between coffee consumption and psychological wellbeing. Further studies with a cohort design or interventional studies are recommended to determine the association between coffee consumption and psychological wellbeing.

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Conflict of interest

There is no conflict of interest related to this study.

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