Association of intrinsic and extrinsic motivating factors with physician burnout and job satisfaction: a nationwide cross-sectional survey in Taiwan

Yu-Chi Tung, Ying-Yi Chou, Yu-Hsuan Chang, Kuo-Piao Chung

ABSTRACT

Objective The aim of this study was to systematically and simultaneously examine the association of intrinsic and extrinsic motivating factors with physician burnout and job dissatisfaction.

Design A nationally representative survey was fielded from September to November 2017.

Setting Hospitals and clinics throughout Taiwan.

Participants A total of 6674 physicians.

Main exposure measure The main exposure measures were intrinsic motivators (sense of calling, personally rewarding hours per day and meaningful, long-term relationships with patients) and extrinsic motivators (income, work hours, autonomy, and pay-for-performance (P4P) and bundled payment initiatives).

Main outcome measures The main outcome measures were physician burnout and job dissatisfaction.

Results A total of 1152 physicians returned the surveys. More sense of calling and personally rewarding hours per day were associated with less physician burnout (OR 0.16, 95% CI 0.10 to 0.26 and OR 0.25, 95% CI 0.13 to 0.47, respectively) and job dissatisfaction (OR 0.35, 95% CI 0.21 to 0.57 and OR 0.46, 95% CI 0.26 to 0.83, respectively). Longer work hours were associated with more physician burnout (OR 2.67, 95% CI 1.54 to 4.63) and job dissatisfaction (OR 1.71, 95% CI 1.05 to 2.79). Not receiving P4P bonuses from their organisations was associated with less physician burnout (OR 1.56, 95% CI 1.02 to 2.38). Not sharing the losses from caring for patients included in the bundled payment system was associated with less physician burnout (OR 0.59, 95% CI 0.36 to 0.97).

Conclusions Fostering a healthcare work environment that supports intrinsic motivation and improves work hours may reduce physician burnout and job dissatisfaction. Rewarding physicians fairly and equitably may prevent them from feeling burned out. Value-based care delivery and payment model innovations, such as bundled payments, may encourage healthcare professionals to coordinate care through the standardisation of care to decrease burnout.

INTRODUCTION

The Triple Aim of improving the health of the population, enhancing the patient experience of care and reducing the per capita cost of healthcare is widely accepted as a compass by which to optimise health system performance. Nevertheless, physicians report burnout and dissatisfaction. Physician burnout is a growing concern around the world, such as in the USA and other countries in the Organisation for Economic Co-operation and Development and in Taiwan.

Based on national surveys, the burnout rate in a 2011 US national physician sample was 45.5%, and that in a 2011 Japan national neurosurgeon and neurologist survey was 21.6%. In Taiwan, there has been no national survey, but one study found that the physician burnout rate in 2012 in a Taiwan regional hospital was 38.6%.

Recent studies have suggested that the Triple Aim be expanded to the Quadruple Aim by adding the goal of improving the work life (burnout and dissatisfaction) of physicians and other healthcare workers. Physician burnout is associated with self-reported medical errors or suboptimal care.

Strengths and limitations of this study

This study used a nationwide physician survey to examine the association of intrinsic motivators (sense of calling, personally rewarding hours per day and meaningful, long-term relationships with patients) and extrinsic motivators (income, work hours, autonomy, and pay-for-performance and bundled payment initiatives) with physician burnout and job dissatisfaction. Case sampling weights were calculated from relevant physician characteristics in the final data set to adjust for non-response bias. The data were cross sectional, so the results reflect the association of intrinsic and extrinsic motivating factors with physician burnout and job satisfaction, but causality could not be determined.
quality. Physicist job dissatisfaction is associated with less patient satisfaction. Understanding the factors that affect physician burnout and job satisfaction is important for developing effective initiatives to improve physician work life. To the best of our knowledge, few studies have used a nationwide physician survey to systematically and simultaneously examine the association of intrinsic and extrinsic motivating factors with physician burnout and job dissatisfaction.

The organismic integration theory of behavioural science proposes that individuals are intrinsically motivated and integrate intrinsic and extrinsic motivating factors while they pursue well-being. Intrinsic motivation refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation refers to doing something because it leads to a dividable outcome. Extrinsic motivation is further divided into four regulatory styles, called external regulation, introjection, identification and integration. One previous study using subjective measures of intrinsic and extrinsic motivation found that intrinsic motivation and extrinsic motivation (integrated regulation and introjected regulation) were associated with physician burnout and job satisfaction. Another prior study found that intrinsic motivators (sense of calling and personally rewarding hours per day) and extrinsic motivators (income) were associated with physician job satisfaction. Prior studies that did not adjust for intrinsic motivators found that long work hours were associated with physician job dissatisfaction, and that value-based payments were associated with less physician burnout. However, thus far, no research has simultaneously examined the association of intrinsic motivators and extrinsic motivators (income, work hours and value-based payments) with physician burnout and job satisfaction.

Taiwan’s National Health Insurance (NHI) system has been implemented since March 1995. The National Health Insurance Administration (NHIA) is the sole insurer. Each enrollee pays a premium to enjoy comprehensive benefits and a low copayment that enable them to go freely to any hospital or clinic, with lower copayments for visits with a referral. Almost all providers have contracts with the NHIA. Physicians are classified as being either hospital physicians or clinic physicians. Hospital physicians are employed by hospitals and treat both outpatients and inpatients. Clinic physicians are owners or employees of the clinics and only treat outpatients. Physician salaries that are paid by their employers include fixed and variable components to encourage physicians to strive for higher levels of performance. The NHIA reimburses providers mainly on a fee-for-service basis, and partially implements value-based payments, including pay-for-performance (P4P) for several diseases and bundled payments for several inpatient medical conditions. Some clinics/hospitals treating P4P patients do not pay their individual physician bonuses from the P4P programme. Most hospitals adopt clinical pathways and gainsharing plans in response to bundled payments. Regarding gainsharing plans, some hospitals require physicians to share the losses incurred in the bundled payment system. Therefore, their physicians might think their performance and efforts are not rewarded fairly and equitably, and this may cause them to feel burned out and dissatisfied based on the organismic integration theory.

On the other hand, if hospitals do not require physicians to share the losses, physicians might report less burnout because the clinical pathways are effective interventions for improving teamwork and increasing the organizational level of care processes, which then decreases the risk of physician burnout.

This study uses data from a nationally representative survey of Taiwanese physicians to systematically investigate the association of intrinsic motivators and extrinsic motivators (income, work hours and value-based payments) with physician burnout and job dissatisfaction.

METHODS
Data source
An anonymous, self-administered questionnaire was mailed to 6674 practising physicians who were randomly sampled from the physician population (n=43969) practising under the NHI system. To achieve a 95% confidence level and a 3% margin of error (ie, generally accepted levels for a random population study), the minimum required survey respondents were calculated to be 1042 using the standard formula: 

$$Z^2_p \left(1-p\right) / N Z^2_p \left(1-p\right) \left(N-1\right) e^2$$

where Z is the statistical Z-score that corresponds to the confidence level, p is 0.5, N is the population size and e is margin of error. The survey was conducted between September and November 2017.

A total of 1152 physicians returned the surveys, for a response rate of 17.3%. Based on the physician population, the results are confident to ±2.85% margin of error at the 95% confidence level. Case sampling weights were calculated from relevant physician characteristics in the final data set to adjust for non-response bias. The respondent sample was weighted to the physician population in terms of gender, age, practice region and practice site. These variables were chosen because national data on their joint distribution in the study population were available. After the weighting, a comparison of the respondent characteristics (gender, age, practice region and practice site) with those of the study population showed no significant difference.

The survey questionnaire was used to examine the association of intrinsic and extrinsic motivators with physician burnout and job dissatisfaction, after adjusting for attitudes towards the NHI and sociodemographic characteristics. The content validity was based on results from a review of the literature, an expert panel examination and feedback, and pilot testing.

Variables
Dependent variables
The dependent variables were physician burnout and job satisfaction. Physician burnout was assessed with a validated short form of the Maslach Burnout Inventory
(MBI), using the following two questions answered on a seven-point Likert scale:4 30 31 33. “I feel burned out from my work” (MBI emotional exhaustion) and “I have become more callous toward people since I took this job” (MBI depersonalisation). Each item was recoded into a binary variable: no (never, a few times a year, once a month or less, a few times a month) versus yes (once a week, a few times a week, every day). Overall burnout was defined as high burnout, defined as a yes answer for one or both of the items documented by other studies in the literature.4 4 30 31 33 35 36 Although the current standard for burnout assessment is the MBI, a well-validated instrument consisting of 22 items answered on a seven-point Likert scale, the full length of the MBI limits the feasibility of its use in large physician surveys addressing multiple content areas within space constraints.30 31 33 Therefore, large physician surveys have used single-item burnout assessment tools.4 31 Job satisfaction was measured with an item measuring overall satisfaction that has been used in previous studies.4 15 25 27 34 This instrument uses a five-point Likert scale that ranges from ‘very dissatisfied’ to ‘very satisfied.’

Independent variables

The independent variables were intrinsic and extrinsic motivating factors. The intrinsic motivators included sense of calling, personally rewarding hours per day and having meaningful, long-term relationships with patients.4 A sense of calling was measured through a single-item measure that has been used in previous studies: “For me, the practice of medicine is a calling.”29 The instrument used a five-point Likert scale that ranges from ‘strongly agree’ to ‘strongly disagree.’ Personally rewarding hours per day was estimated in response to the following prompt: “Please estimate how many hours you spend in a typical day at work on activities that you find personally rewarding.”4 4 The responses were divided into <2.5, 2.5–5.0, 5.0–7.5 and ≥7.5 hours. The frequency of long-term relationships with patients was assessed with the following question: “With respect to your patients, with how many do you have a meaningful, long-term relationship?”4 Responses included none, a few, many and most.

The extrinsic motivators included monthly income (<New Taiwan (NT) NT$200 000, NT$200 000–299 999, ≥NT$300 000 (NT$32–US$1)), number of work hours a week (≤40, 41–59, ≥60), professional autonomy and value-based payments. Physicians’ autonomy was measured by the perceptions of their ability to provide needed outpatient/inpatient services to their patients.25 27 The instrument used a five-point Likert scale that ranged from strongly agree to strongly disagree. The value-based payments included P4P and bundled payments. The P4P exposure was measured as whether the respondents treated P4P patients and whether the respondents who reported that they cared for patients included in the bundled payment system were required to share the losses.

Covariates

The covariates were attitudes toward the NHI and demographic characteristics. The attitudes toward the NHI included attitudes toward community value as identified regulation and personal benefit as integrated regulation. The identified regulation under NHI was measured with the following question: “The NHI is necessary for public health”; the integrated regulation was measured with the following question: “The NHI is a favorable system to me.”26 The instrument used a five-point Likert scale that ranged from strongly agree to strongly disagree. Based on the organismic integration theory, the identified regulation and integrated regulation are subtypes of extrinsic motivation. A form of extrinsic motivation is regulation through identification. Integration occurs when identified regulations have been fully assimilated to the self. This occurs through self-examination and bringing new regulations into congruence with one’s other values and needs.12 The demographic characteristics included gender, age, education level, practice site, specialty, years in practice and practice location.

Statistical analysis

Multivariate binary logistic regression was used to analyse the association of intrinsic motivators and extrinsic motivators with physician burnout and job dissatisfaction, after adjusting for attitudes towards the NHI and demographic characteristics. A small amount of missing data (0.2%–3.2% of each survey item) was imputed using multiple imputation methods.4 37 For physician burnout, the responses were dichotomised by treating burnout as one group (coded 1) and non-burnout as the other group (coded 0). For job dissatisfaction, the responses were dichotomised by treating ‘very dissatisfied and dissatisfied’ as one group (coded 1) and the remaining responses as the other group (coded 0). SAS software, V.9.4 (SAS Institute), was adopted for the analysis. All statistical tests were two-tailed and used a type I error rate of 0.05.

Patient and public involvement

No patients were involved in this study. The public has not been involved in the development of the research or in the study design. The study results will be disseminated to respondents via newsletters and publications.

RESULTS

Table 1 presents the physicians’ demographics, job characteristics, burnout and job satisfaction. More than half (79.4%) of the physicians were male, 63.3% were 40 years old or above, 34.8% worked at clinics, 21.8% had an internal medicine certificate and 45.1% had at least 20 years in practice. Medical practice was perceived to be a calling by 71.3% of the physicians, and 89.8% of the
Table 1  Physician characteristics, burnout and job satisfaction (n=1152)

| Variables                                      | n   | %   |
|------------------------------------------------|-----|-----|
| **Demographic characteristics**                |     |     |
| Gender                                         |     |     |
| Male                                           | 915 | 79.4|
| Female                                         | 237 | 20.6|
| Age, years                                     |     |     |
| <30                                            | 97  | 8.4 |
| 30–39                                          | 326 | 28.3|
| 40–49                                          | 274 | 23.8|
| 50–59                                          | 255 | 22.1|
| ≥60                                            | 200 | 17.4|
| **Practice site**                              |     |     |
| Clinic                                         | 401 | 34.8|
| District hospital                              | 121 | 10.5|
| Regional hospital                             | 274 | 23.8|
| Academic medical centre                       | 356 | 30.9|
| **Specialties**                                |     |     |
| Internal medicine                             | 251 | 21.8|
| Surgery                                       | 131 | 11.4|
| Obstetrics and gynaecology                    | 77  | 6.7 |
| Paediatrics                                   | 127 | 11.0|
| **Years in practice**                         |     |     |
| <10                                           | 308 | 26.7|
| 10–19                                         | 325 | 28.2|
| ≥20                                           | 519 | 45.1|
| **Practice location**                         |     |     |
| Taipei                                        | 432 | 37.5|
| Northern                                      | 140 | 12.1|
| Central                                       | 217 | 18.8|
| Southern                                      | 147 | 12.8|
| Kao-Ping                                      | 191 | 16.6|
| Eastern                                       | 25  | 2.2 |
| **Attitudes towards the NHI**                  |     |     |
| The NHI is necessary for public health        |     |     |
| Strongly agree or agree                       | 817 | 70.9|
| Neutral                                       | 204 | 17.7|
| Strongly disagree or disagree                 | 131 | 11.4|
| The NHI is a favourable system to me          |     |     |
| Strongly agree or agree                       | 622 | 54.0|
| Neutral                                       | 329 | 28.6|
| Strongly disagree or disagree                 | 201 | 17.4|
| **Intrinsic motivators**                      |     |     |
| Practice of medicine is a calling             |     |     |
| Strongly agree or agree                       | 822 | 71.3|
| Neutral                                       | 206 | 17.9|
| Strongly disagree or disagree                 | 124 | 10.8|
| **Extrinsic motivators**                      |     |     |
| Monthly income, NT$                           |     |     |
| <200,000                                      | 568 | 49.3|
| 200,000–299,999                               | 321 | 27.9|
| ≥300,000                                      | 263 | 22.8|
| Work hours a week                             |     |     |
| ≤40                                           | 209 | 18.1|
| 41–59                                         | 501 | 43.5|
| ≥60                                           | 442 | 38.4|
| **Am able to provide needed outpatient services** |     |     |
| Strongly agree or agree                       | 999 | 86.7|
| Neutral                                       | 131 | 11.4|
| Strongly disagree or disagree                 | 22  | 1.9 |
| **Am able to provide needed inpatient services** |     |     |
| Strongly agree or agree                       | 609 | 52.9|
| Neutral                                       | 93  | 8.1 |
| Strongly disagree or disagree                 | 20  | 1.7 |
| Not applicable                                | 430 | 37.3|
| **Under pay-for-performance**                 |     |     |
| No                                            | 841 | 73.0|
| Yes                                           | 311 | 27.0|
| **Receive bonus**                             |     |     |
| Do not receive bonus                          | 175 | 56.3|
| Missing                                       | 13  | 4.2 |
| **Under bundled payments**                    |     |     |
| No                                            | 861 | 74.7|
| Yes                                           | 291 | 25.3|
| **Am required to share losses**               |     |     |
| Yes                                           | 123 | 42.3|
| Am not required to share losses                | 168 | 57.7|
| **Burnout**                                   |     |     |
| Yes                                           | 330 | 28.6|
| No                                            | 822 | 71.4|
| **Job dissatisfaction**                       |     |     |
| Yes                                           | 414 | 35.9|
| No                                            | 738 | 64.1|

NT$32 equaled $1 in 2017.
NHI, National Health Insurance; NT, New Taiwan.
Table 2  Physician burnout and job dissatisfaction by physician characteristics (n=1152)

| Variables                        | Burnout | Job dissatisfaction |
|----------------------------------|---------|---------------------|
|                                  | Yes   | No     | Yes   | No     |
| Demographic characteristics      | %     | %      | %     | %      |
| Gender                           |        |        |        |        |
| Male                             | 27.3  | 72.7   | 35.1  | 64.9   |
| Female                           | 29.0  | 71.0   | 36.1  | 63.9   |
| Age, years                       |        |        |        |        |
| <30                              | 36.1  | 63.9***| 32.7  | 67.3*  |
| 30–39                            | 37.3  | 62.7   | 40.8  | 59.2   |
| 40–49                            | 30.9  | 69.1   | 40.7  | 59.3   |
| 50–59                            | 23.7  | 76.3   | 30.0  | 70.0   |
| ≥60                              | 14.2  | 85.8   | 30.5  | 69.5   |
| Practice site                    |        |        |        |        |
| Clinic                           | 27.4  | 72.6   | 36.5  | 63.5   |
| District hospital                | 31.7  | 68.3   | 40.8  | 59.2   |
| Regional hospital                | 34.1  | 65.9   | 38.5  | 61.5   |
| Academic medical centre          | 24.7  | 75.3   | 31.6  | 68.4   |
| specialties                      |        |        |        |        |
| Internal medicine                |        |        |        |        |
| No                               | 28.7  | 71.3   | 36.9  | 63.1   |
| Yes                              | 28.5  | 71.5   | 32.5  | 67.5   |
| Surgery                          |        |        |        |        |
| No                               | 29.9  | 70.1*  | 36.3  | 63.7   |
| Yes                              | 19.2  | 80.8   | 33.0  | 67.0   |
| Obstetrics and gynaecology       |        |        |        |        |
| No                               | 28.3  | 71.7   | 34.8  | 65.2** |
| Yes                              | 33.1  | 66.9   | 51.7  | 48.3   |
| Paediatrics                      |        |        |        |        |
| No                               | 29.6  | 70.4*  | 37.0  | 63.0*  |
| Yes                              | 20.8  | 79.2   | 27.1  | 72.9   |
| Years in practice                |        |        |        |        |
| <10                              | 34.1  | 65.9***| 35.6  | 64.4** |
| 10–19                            | 36.1  | 63.9   | 42.5  | 57.5   |
| ≥20                              | 20.7  | 79.3   | 32.0  | 68.0   |
| Practice location                |        |        |        |        |
| Taipei                           | 28.8  | 71.2   | 38.3  | 61.7   |
| Northern                         | 27.1  | 72.9   | 35.9  | 64.1   |
| Central                          | 25.2  | 74.8   | 27.7  | 72.3   |
| Southern                         | 30.9  | 69.1   | 38.6  | 61.4   |
| Kao-Ping                         | 32.0  | 68.0   | 39.0  | 61.0   |
| Eastern                          | 24.4  | 75.6   | 26.8  | 73.2   |
| Attitudes towards the NHI       |        |        |        |        |
| The NHI is necessary for public health |        |        |        |        |

Table 2  Continued

| Variables                        | Burnout | Job dissatisfaction |
|----------------------------------|---------|---------------------|
|                                  | %      | %      | %      | %      |
| Strongly agree or agree          | 23.5   | 76.5***| 26.9  | 73.1***|
| Neutral                          | 31.5   | 68.5   | 47.9  | 52.1   |
| Strongly disagree or disagree    | 56.2   | 43.8   | 73.6  | 26.4   |
| The NHI is a favourable system to me |        |        |        |        |
| Strongly agree or agree          | 21.3   | 78.7***| 22.1  | 77.9***|
| Neutral                          | 30.2   | 69.8   | 44.3  | 55.7   |
| Strongly disagree or disagree    | 48.7   | 51.3   | 65.1  | 34.9   |
| Intrinsic motivators             |         |        |        |        |
| Practice of medicine is a calling |        |        |        |        |
| Strongly agree or agree          | 18.8   | 81.2***| 29.1  | 70.9***|
| Neutral                          | 41.6   | 58.4   | 43.4  | 56.6   |
| Strongly disagree or disagree    | 72.0   | 28.0   | 68.6  | 31.4   |
| Personally rewarding hours per day |        |        |        |        |
| <2.5                             | 55.1   | 44.9***| 58.8  | 41.2***|
| 2.5–5.0                          | 33.6   | 66.4   | 39.6  | 60.4   |
| 5.0–7.5                          | 20.7   | 79.3   | 27.7  | 72.3   |
| ≥7.5                             | 17.5   | 82.5   | 30.4  | 69.6   |
| Meaningful, long-term relationships with patients |        |        |        |        |
| Most                             | 29.7   | 70.3***| 36.1  | 63.9   |
| Many                             | 23.9   | 76.1   | 34.5  | 65.5   |
| A few                            | 28.5   | 71.5   | 35.6  | 64.4   |
| None                             | 44.3   | 55.7   | 41.5  | 58.5   |
| Extrinsic motivators             |         |        |        |        |
| Monthly income, NT$              |         |        |        |        |
| <200 000                         | 31.9   | 68.1*  | 39.3  | 60.7*  |
| 200 000–299 999                   | 28.5   | 71.5   | 35.7  | 64.3   |
| ≥300 000                         | 21.8   | 78.2   | 28.9  | 71.1   |
| Work hours a week                |         |        |        |        |
| ≤40                              | 17.4   | 82.6***| 27.8  | 72.2*  |
| 41–59                            | 28.7   | 71.3   | 36.8  | 63.2   |
| ≥60                              | 33.9   | 66.1   | 38.8  | 61.2   |
| Am able to provide needed outpatient services |        |        |        |        |
| Strongly agree or agree          | 27.8   | 72.2   | 36.6  | 63.4   |
| Neutral                          | 33.4   | 66.6   | 29.4  | 70.6   |
| Strongly disagree or disagree    | 39.8   | 60.2   | 44.4  | 55.6   |
| Am able to provide needed inpatient services |        |        |        |        |

Continued
physicians experienced at least 2.5 personally rewarding hours a day. Eighty-eight per cent (88.4%) of the physicians had meaningful, long-term relationships with at least a few patients. Approximately half (50.7%) of the physicians earned a monthly income of at least NT$200 000, and 38.4% worked at least 60 hours a week. Twenty-seven physicians earned a monthly income of at least NT$200 000, a few patients. Approximately half (50.7%) of the physicians had meaningful, long-term relationships with at least hours a day. Eighty-eight per cent (88.4%) of the physicians experienced at least 2.5 personally rewarding hours per day. Sense of calling, personally rewarding hours per day, income and work hours were associated with physician job dissatisfaction. P4P patients, 56.3% did not receive bonuses. Approximately 25.3% of the physicians indicated that they cared for patients included in the bundled payment system. Among the physicians who treated P4P patients and not receiving bonuses had 56% higher odds of burnout compared with those not treating P4P patients (OR 1.56, 95% CI 1.02 to 2.38). The physicians caring for patients included in the bundled payment system and not sharing the losses had 41% lower odds of burnout compared with those not caring for the patients (OR 0.59, 95% CI 0.36 to 0.97). The physicians with a monthly income of less than NT$200 000 were more likely to report job dissatisfaction (OR 1.72, 95% CI 1.14 to 2.61).

**DISCUSSION**

This national survey of physicians investigated the association of intrinsic and extrinsic motivators with physician burnout and job dissatisfaction. After adjusting for attitudes towards the NHI and demographic characteristics, there were significant associations of intrinsic and extrinsic motivators with physician burnout and job dissatisfaction. The physicians with a strong sense of calling were more likely to report less burnout (OR 0.16, 95% CI 0.10 to 0.26) and job dissatisfaction (OR 0.35, 95% CI 0.21 to 0.57). Having 5–7.5 or ≥7.5 personally rewarding hours each day was strongly associated with less physician burnout (OR 0.34, 95% CI 0.20 to 0.58 and OR 0.25, 95% CI 0.13 to 0.47, respectively) and job dissatisfaction (OR 0.41, 95% CI 0.24 to 0.68 and OR 0.46, 95% CI 0.26 to 0.83, respectively).

The physicians with more than 60 work hours per week were most likely to report burnout (OR 2.67, 95% CI 1.54 to 4.63) and job dissatisfaction (OR 1.71, 95% CI 1.05 to 2.79). The physicians treating P4P patients and not receiving bonuses had 56% higher odds of burnout compared with those not treating P4P patients (OR 1.56, 95% CI 1.02 to 2.38). The physicians caring for patients included in the bundled payment system and not sharing the losses had 41% lower odds of burnout compared with those not caring for the patients (OR 0.59, 95% CI 0.36 to 0.97). The physicians with a monthly income of less than NT$200 000 were more likely to report job dissatisfaction (OR 1.72, 95% CI 1.14 to 2.61).

**Table 2 continued**

| Variables | Burnout | Job dissatisfaction |
|-----------|---------|---------------------|
|           | Yes     | No                  | Yes     | No                  |
| Strongly agree or agree | 27.2     | 72.8                | 34.5     | 65.5                |
| Neutral   | 39.5     | 60.5                | 36.7     | 63.3                |
| Strongly disagree or disagree | 31.3     | 68.7                | 51.5     | 48.5                |
| Not applicable | 28.2     | 71.8                | 37.1     | 62.9                |
| Under pay-for-performance |           |                     |          |                     |
| No        | 28.4     | 71.6*               | 37.0     | 63.0                |
| Yes, receive bonus | 21.9     | 78.1                | 27.9     | 72.1                |
| Yes, do not receive bonus | 35.3     | 64.7                | 35.7     | 64.3                |
| Yes, missing | 17.0     | 83.0                | 45.9     | 54.1                |
| Under bundled payments |           |                     |          |                     |
| No        | 30.4     | 69.6                | 36.1     | 63.9                |
| Yes, be required to share losses | 24.5     | 75.5                | 40.9     | 59.1                |
| Yes, be not required to share losses | 22.9     | 77.1                | 31.6     | 68.5                |

NT$32 equaled $1 in 2017.
*p<0.05; **p<0.01; ***p<0.001.
NHI, National Health Insurance; NT, New Taiwan.

In the univariable analysis (table 2), a χ² analysis showed a significant association of intrinsic and extrinsic motivators with physician burnout and job satisfaction (p<0.05). Sense of calling, personally rewarding hours per day, long-term relationships with patients, income, work hours and P4P payments were associated with physician burnout. Sense of calling, personally rewarding hours per day, income and work hours were associated with physician job dissatisfaction.
Table 3 Factors associated with physician burnout and job dissatisfaction (n=1152)

| Factors                                                                 | Burnout                          | Job dissatisfaction     |
|------------------------------------------------------------------------|----------------------------------|-------------------------|
| **Intrinsic motivators**                                                |                                  |                         |
| Practice of medicine is a calling (ref: disagree)                       |                                  |                         |
| Agree                                                                  | 0.16 (0.10 to 0.26)***           | 0.35 (0.21 to 0.57)***  |
| Neutral                                                                | 0.39 (0.23 to 0.68)***           | 0.52 (0.30 to 0.90)*    |
| Personally rewarding hours per day (ref: <2.5)                         |                                  |                         |
| 2.5–5.0                                                                | 0.59 (0.36 to 0.99)*             | 0.67 (0.41 to 1.10)     |
| 5.0–7.5                                                                | 0.34 (0.20 to 0.58)***           | 0.41 (0.24 to 0.68)***  |
| ≥7.5                                                                   | 0.25 (0.13 to 0.47)***           | 0.46 (0.26 to 0.83)*    |
| Meaningful, long-term relationships with patients (ref: most)          |                                  |                         |
| Many                                                                   | 0.62 (0.32 to 1.22)              | 1.01 (0.54 to 1.89)     |
| A few                                                                  | 0.55 (0.28 to 1.08)              | 0.87 (0.46 to 1.62)     |
| None                                                                   | 0.79 (0.37 to 1.71)              | 0.80 (0.38 to 1.68)     |
| **Extrinsic motivators**                                                |                                  |                         |
| Monthly income, NT$ (ref: ≥300 000)                                     |                                  |                         |
| <200 000                                                               | 1.21 (0.77 to 1.91)              | 1.72 (1.14 to 2.61)*    |
| 200 000–299 999                                                         | 1.20 (0.76 to 1.88)              | 1.43 (0.95 to 2.17)     |
| Work hours a week (ref: ≤40)                                           |                                  |                         |
| 41–59                                                                  | 2.12 (1.30 to 3.47)***           | 1.57 (1.02 to 2.40)*    |
| 60+                                                                    | 2.67 (1.54 to 4.63)***           | 1.71 (1.05 to 2.79)*    |
| Am able to provide needed outpatient services (ref: disagree)          |                                  |                         |
| Agree                                                                  | 0.89 (0.29 to 2.71)              | 1.22 (0.40 to 3.76)     |
| Neutral                                                                | 0.74 (0.23 to 2.39)              | 0.54 (0.16 to 1.75)     |
| Am able to provide needed inpatient services (ref: disagree)           |                                  |                         |
| Agree                                                                  | 1.18 (0.34 to 4.15)              | 0.36 (0.13 to 1.02)     |
| Neutral                                                                | 1.15 (0.31 to 4.35)              | 0.42 (0.13 to 1.32)     |
| Not applicable                                                         | 2.08 (0.46 to 9.35)              | 0.55 (0.15 to 2.01)     |
| Pay-for-performance (ref: no)                                          |                                  |                         |
| Yes, receive bonus                                                      | 1.00 (0.58 to 1.71)              | 0.85 (0.52 to 1.39)     |
| Yes, do not receive bonus                                              | 1.56 (1.02 to 2.38)*             | 0.98 (0.65 to 1.48)     |
| Yes, missing                                                           | 0.76 (0.12 to 4.92)              | 1.96 (0.52 to 7.43)     |
| Bundled payments (ref: no)                                             |                                  |                         |
| Yes, be required to share losses                                       | 0.59 (0.33 to 1.05)              | 0.96 (0.58 to 1.61)     |
| Yes, be not required to share losses                                   | 0.59 (0.36 to 0.97)*             | 0.78 (0.49 to 1.23)     |
| Attitudes towards the NHI                                              |                                  |                         |
| The NHI is necessary for public health (ref: disagree)                 |                                  |                         |
| Agree                                                                  | 0.53 (0.31 to 0.91)*             | 0.29 (0.17 to 0.50)***  |
| Neutral                                                                | 0.42 (0.23 to 0.76)**            | 0.41 (0.23 to 0.74)**   |
| The NHI is a favourable system to me (ref: disagree)                   |                                  |                         |
| Agree                                                                  | 0.60 (0.37 to 0.97)*             | 0.29 (0.19 to 0.46)***  |
| Neutral                                                                | 0.72 (0.45 to 1.15)              | 0.61 (0.39 to 0.95)*    |
| Likelihood ratio test for model: χ²                                     | 290.11***                        | 283.69 ***              |
| C index                                                                | 0.80                             | 0.78                    |
| Hosmer and Lemeshow test: χ²                                            | 7.61                             | 10.89                   |

Regressions adjusted for physician gender, age, practice site, specialties, years in practice and practice location. NT$32 equaled $1 in 2017. *p<0.05; **p<0.01; ***p<0.001.

NHI, National Health Insurance; NT, New Taiwan.
The physicians’ professional values might lead to physician burnout and job dissatisfaction when the physicians spend more time doing non-professional work such as medical documentation and insurance paperwork. The finding of the association between low-income levels and physician job dissatisfaction is consistent with those of previous studies. Moreover, and more importantly, we found that income was not associated with physician burnout. The organismic integration theory is, compared with the motivation-hygiene theory, also known as Herzberg’s two-factor theory or Herzberg’s dual-factor theory. Intrinsic motivators are similar to motivating factors, while extrinsic motivators are similar to hygiene factors. Motivating factors can increase job satisfaction. Poor hygiene factors such as low income can lead to job dissatisfaction, while better hygiene factors cannot lead to higher job satisfaction.

The finding of the association between longer work hours and physician job dissatisfaction is consistent with the results of Landon et al. and Christopher et al. using nationally representative physician samples, and those of Leigh et al. using a nationally representative specialist sample. Moreover, and most importantly, the finding of the association between longer work hours and physician burnout is consistent with the result of Keeton et al. using a nationally representative sample of five specialists. Physicians with more than 60 work hours a week were most likely to report burnout and job dissatisfaction. Physicians with longer work hours feel burned out through their perceived overload.

This study found that the physicians who did not receive P4P bonuses from their organisations were more likely to feel burned out compared with those not treating P4P patients. This finding is consistent with those of Smets et al. One possible explanation is that the physicians think their performance is not rewarded properly, and this may cause them to feel burned out based on the organismic integration theory. Moreover, the perceived inequity in their relationship with the organisation can also contribute to burnout. In return for their investments, physicians may expect reasonable financial compensation from their organisations. If these rewards are not provided, physicians may develop a negative attitude towards their organisations, ultimately leading to burnout. The physicians who treat P4P patients make an effort to help them receive continuity of care; thus, the physicians expect that they will receive adequate rewards from their organisations.

This study found that the physicians who were not required to share the losses under bundled payments by their organisations were more likely to not feel burned out compared with those not treating bundled payment patients. The finding is similar to those of Reid et al. regarding patient-centred medical homes. Patient-centred medical homes embrace a health professional team orientation grounded in evidence-based medicine and quality improvement, therefore leading to less burnout. The implementation of bundled payments encourages hospitals and physicians to use evidenced-based clinical pathways. Prior research found that the adoption of clinical pathways decreased burnout because the primary focus of clinical pathways lies in redesigning work processes, reducing unnecessary variation and improving task-oriented coordination through the standardisation of care. Therefore, clinical pathways seem to be most effective for improving team-level taskwork and creating essential job resources that buffer the impact of increasing job demands in the current healthcare environment.

There are two limitations of the present study. First, because the data are cross sectional, the results reflect the association of intrinsic and extrinsic motivating factors with physician burnout and job satisfaction, but causality could not be determined. The cross-sectional nature of this study requires future confirmation to better establish causality and to test strategies to reduce physician burnout and job dissatisfaction. Second, in alignment with the response rates of other national physician surveys (17.0%–23.2%), the response rate in this study was only 17.3%. However, non-response bias is less of a concern in surveys of physicians than it is in general population surveys, perhaps because physicians as a group are more homogeneous than are the general public in terms of demographics, knowledge and attitudinal characteristics. Another factor contributing to the stability of the estimates may be the effectiveness of the non-response adjustment weightings for the sample of physician respondents. We constructed probability weights to adjust for potential bias.

Our national physician survey showed the association of intrinsic and extrinsic motivators with physician burnout and job satisfaction. Better intrinsic motivators (sense of calling and personally rewarding hours per day) are associated with not only decreased physician job dissatisfaction but also decreased burnout. Longer work hours are associated with physician burnout and job dissatisfaction. Not receiving P4P bonuses from their organisations is associated with more burnout. Not being required to share the losses under bundled payments is associated with less burnout. Fostering a healthcare work environment that supports intrinsic motivation and improves work hours may reduce physician burnout and job dissatisfaction, and benefit their patients. Additionally, healthcare delivery organisations that improve workflow processes and enhance the direct engagement with patients may contribute to less physician burnout and job dissatisfaction. Rewarding physicians fairly and equitably may prevent them from feeling burned out. Value-based care delivery and payment model innovations, such as bundled payments, may encourage healthcare professionals to coordinate care through the standardisation of care to decrease burnout.

Contributors. Y-CT and K-PC were responsible for the study concept and design. Y-CT, Y-YC and Y-HC were responsible for the acquisition, analysis and interpretation of data. Y-CT was responsible for the drafting of the manuscript. Y-CT, Y-YC, Y-HC, Y-LN, Y-LL and Y-CT were responsible for the acquisition, analysis and interpretation of data.
and K-PC were responsible for the critical revision of the manuscript for important intellectual content. Y-TC and Y-PC were responsible for the statistical analysis. Y-CT was responsible for obtained funding. Y-CT and K-PC were responsible for the administrative, technical and material support. K-PC carried out the study supervision. All the authors read and approved the final manuscript.

**Funding** The study was supported by grants from the Ministry of Science and Technology (MOST105-2410-H-002-220-MY2) and the National Health Insurance Administration (MOHW106-NHI-S-114-113014).

**Competing interests** None declared.

**Patient consent for publication** Not required.

**Ethics approval** The study was approved by the National Taiwan University Hospital Institutional Review Board.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** No data are available. The data were deidentified participant data and were not publicly available.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/.

---

**ORCID iD**
Yu-Chi Tung http://orcid.org/0000-0001-9031-8749

---

**REFERENCES**

1. Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff* 2008;27:759–69.

2. Rotenstein LS, Torre M, Ramos MA, et al. Prevalence of burnout among physicians: a systematic review. *JAMA* 2018;320:1131–50.

3. Eisenstein L, To Fight Burnout O. To fight burnout, organize. *N Engl J Med* 2018;379:509–11.

4. Tak HJ, Curgin FA, Yoon JD. Association of intrinsic motivating factors and markers of physician well-being: a national physician survey. *J Gen Intern Med* 2017;32:739–46.

5. Nishimura K, Nakamura F, Takegami M, et al. Cross-Sectional survey of workload and burnout among Japanese physicians working in stroke care: the nationwide survey of acute stroke care capacity for proper designation of comprehensive stroke center in Japan (U-ASPECT) study. *Circ Cardiovasc Qual Outcomes* 2014;7:414–22.

6. Chou LP, Li CY, Hu SC. Job stress and burnout in hospital employees: comparisons of different medical professions in a regional hospital in Taiwan. *BMJ Open* 2014;4:e001485.

7. Bodenheimer T, Sinsky C. From triple to quadruple aim: care of the patient requires care of the provider. *Ann Fam Med* 2014;12:573–6.

8. Sikka R, Morath JM, Leape L. The quadruple aim: care, health, cost and meaning in work. *BMJ Qual Saf* 2015;24:608–10.

9. West CP. Physician well-being: expanding the triple aim. *J Gen Intern Med* 2016;31:458–6.

10. Rathert C, Williams ES, Linhart H. Evidence for the quadruple aim: a systematic review of the literature on physician burnout and patient outcomes. *Med Care* 2018;56:976–84.

11. Haas JS, Cook EF, Puopolo AL, et al. Is the professional satisfaction of general internists associated with patient satisfaction? *J Gen Intern Med* 2000;15:122–6.

12. Ryan RM, Deci EL. Intrinsic and extrinsic motivations: classic definitions and new directions. *Contemp Educ Psychol* 2000;25:54–67.

13. Judson TJ, Voipio KG, Detsky AS. Harnessing the right combination of extrinsic and intrinsic motivation to change physician behavior. *JAMA* 2015;313:22–3.

14. Moller AC, Jager AJ, Williams GC, et al. US physicians’ work motivation and their occupational health: a national survey of practicing physicians. *Med Care* 2019;57:334–40.

15. Leigh JP, Tancredi DJ, Kravitz RL. Physician career satisfaction within specialties. *BMJ Health Serv Res* 2009;9:166.

16. Reid RJ, Coleman K, Johnson EA, et al. The group health medical home at year two: cost savings, higher patient satisfaction, and less burnout for providers. *Health Aff* 2010;29:835–43.

17. Tung YC, Chang HY, Chang GM. Impact of bundled payments on hip fracture outcomes: a nationwide population-based study. *Int J Qual Health Care* 2018;30:23–31.

18. Deneckere S, Eurevsa M, Lodewijckx C, et al. Better interprofessional teamwork, higher level of organized care, and lower risk of burnout in acute care health teams using care pathways: a cluster randomized controlled trial. *Med Care* 2013;51:99–107.

19. Nishishiba M, Jones M, Kramer M. Research methods and statistics for public and nonprofit administrators: a practical guide. Los Angeles: SAGE, 2014.

20. Rea LM, Parker RA. Designing and conducting survey research: a comprehensive guide. San Francisco: Jossey-Bass, 2014.

21. Carea SS, Steinemann AC. A national population study of the prevalence of multiple chemical sensitivity. *Arch Environ Health* 2004;59:300–5.

22. Ahmad SS, Becker R, Chen AF, et al. EKA survey: diagnosis of prosthetic knee joint infection. *Knee Surg Sports Traumatol Arthrosc* 2016;24:3050–5.

23. Malhotra J, Wong E, Third A. Canadian family physician job satisfaction - is it changing in an evolving practice environment? An analysis of the 2013 National Physician Survey database. *BMC Fam Pract* 2018;19:100.

24. Konrad TR, Williams ES, Linzer M, et al. Measuring physician job satisfaction in a changing workplace and a challenging environment. *Med Care* 1999;37:1174–82.

25. Stoddard JJ, Hargraves JL, Reed M, et al. Managed care, professional autonomy, and income: effects on physician career satisfaction. *J Gen Intern Med* 2001;16:675–84.

26. Bergus GR, Randall CS, Winniford MD, et al. Job satisfaction and workplace characteristics of primary and specialty care physicians at a bimodal medical school. *Acad Med* 2001;76:1148–52.

27. Landon BE, Reschovsky J, Blumenthal D. Changes in career satisfaction among primary care and specialist physicians, 1997–2001. *JAMA* 2003;289:442–9.

28. Ozyurt A, Hayran O, Sur H. Predictors of burnout and job satisfaction among Turkish physicians. *QJM* 2006;99:161–9.

29. Lee SY, Suh NK, Song JK. Determinants of public satisfaction with the National health insurance in South Korea. *Int J Health Plan Manage* 2009;24:131–46.

30. West CP, Dyrbeye LN, Sloan JA, et al. Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals. *J Gen Intern Med* 2009;24:1318–21.

31. West CP, Shanafelt TD, Kolars JC. Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents. *JAMA* 2011;306:982–6.

32. Raisinski KA, Lawrence RE, Yoon JD, et al. A sense of calling and primary care physicians' satisfaction in treating smoking, alcoholism, and obesity. *Arch Intern Med* 2012;172:1423–4.

33. West CP, Dyrbeye LN, Satele DV, et al. Concurrent validity of single-item measures of emotional exhaustion and depersonalization in burnout assessment. *J Gen Intern Med* 2012;27:1445–52.

34. Allen T, Whittaker W, Sutton M. Does the proportion of pay linked to productivity affect performance affect the job satisfaction of general practitioners? *Soc Sci Med* 2017;173:9–17.

35. West CP, Halvorsen AJ, Swenson SL, et al. Burnout and distress among internal medicine program directors: results of a national survey. *J Gen Intern Med* 2013;28:1056–63.

36. West CP, Dyrbeye LN, Rabatin JT, et al. Intervention to promote physician well-being, job satisfaction, and professionalism: a randomized clinical trial. *JAMA Intern Med* 2014;174:527–33.

37. Little RJF. Statistical analysis with missing data. Hoboken, NJ: Wiley, 2002.

38. Menachemi N, Powers TL, Brooks RG. The role of information technology usage in physician practice satisfaction. *Health Care Manage Rev* 2004;29:384–71.

39. Leigh JP, Kravitz RL, Schembri M, et al. Physician career satisfaction across specialties. *Arch Intern Med* 2002;162:1577–84.

40. Herzberg F, Mausner B, Snyderman B. The motivation to work. Oxford, England: John Wiley, 1959.

41. Christopher AS, Smith CS, Tivis R, et al. Trends in United States physician work hours and career satisfaction. *Am J Med* 2014;127:674–80.

42. Keeton K, Fenner DE, Johnson TRB, et al. Predictors of physician career satisfaction, work-life balance, and burnout. *Obstet Gynecol* 2007;109:949–55.

43. Shirom A, Nirel N, Vinokur AD. Overload, autonomy, and burnout as predictors of physicians' quality of care. *J Occup Health Psychol* 2006;11:328–42.

44. Smets EMA, Visser MRM, Oort FJ, et al. Perceived Inequity: Does It Explain Burnout Among Medical Specialists?1. *J Appl Soc Psychol* 2003;34:1900–18.

45. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol* 2001;52:397–422.
46 Siddiqi A, White PB, Mistry JB, et al. Effect of bundled payments and health care reform as alternative payment models in total joint arthroplasty: a clinical review. *J Arthroplasty* 2017;32:2590–7.
47 Pronovost PJ, Berenholtz SM, Goeschel CA, et al. Creating high reliability in health care organizations. *Health Serv Res* 2006;41:1599–617.
48 Gittell JH. Coordinating mechanisms in care provider groups: relational coordination as a mediator and input uncertainty as a moderator of performance effects. *Manage Sci* 2002;48:1408–26.
49 Lee HY, Park SE, Park EC, et al. Job satisfaction and trust in health insurance review agency among Korean physicians. *Health Policy* 2008;87:249–57.
50 Shanafelt TD, Dyrbye LN, Sinsky C, et al. Relationship between clerical burden and characteristics of the electronic environment with physician burnout and professional satisfaction. *Mayo Clin Proc* 2016;91:836–48.
51 Kellerman SE, Herold J. Physician response to surveys. A review of the literature. *Am J Prev Med* 2001;20:61–7.
52 Field TS, Cadoret CA, Brown ML, et al. Surveying physicians: do components of the "Total Design Approach" to optimizing survey response rates apply to physicians? *Med Care* 2002;40:596–605.
53 Willis GB, Smith T, Lee HJ. Do additional recontacts to increase response rate improve physician survey data quality? *Med Care* 2013;51:945–8.