博士論文

The association of workplace social capital

with psychological distress:

A prospective study

（職場のソーシャル・キャピタルと心理的スト

レス反応の関連：前向き縦断研究）

安藤絵美子

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前向き縦断研究

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CONTENTS

1 **ABSTRACT**

2 **Introduction:**

3 The aim of this study is to investigate the multilevel and longitudinal association of unit level

4 workplace social capital with psychological distress among employees in Japan.

5 **Methods:**

6 A self-administered questionnaire with scales of workplace social capital, other psychosocial

7 job characteristics (job demands and job control), and psychological distress was given to

8 employees in a social medical corporation with 20 facilities and 58 units, at baseline (2013),

9 and two follow-up occasions (2014 and 2015). Unit-level aggregated scores of workplace

10 social capital at baseline survey (Wave 1) were associated with scores of psychological

11 distress of individual employees after one and two year(s), by using a multilevel generalized

12 linear regression model with random-intercept. Psychological distress score at Wave 1,

13 demographic and occupational variables at baseline at Wave 1, psychosocial job

14 characteristics, and individual perception of workplace social capital were adjusted step by

15 step. A cross-level interaction term was added to examine the unit contextual effect of

16 workplace social capital in the final model.

17 **Results:**

1   The analyses were conducted for 313 respondents nested within 45 units (one-year follow up

2   samples) and 281 respondents within 45 units (two-year follow-up samples) without any

3   missing data. Unit level workplace social capital was adversely but not statistically associated

4   with psychological distress after adjusting for all the covariates, both for the one-year interval

5   ([B] = 0.183, [β] = 0.014, $p = 0.061$) and the two-year interval ([B] = 0.198, [β] = 0.016, $p =$

6   0.295). Regarding subscale analysis, unit-level bonding workplace social capital was

7   adversely associated with psychological distress in longer follow-up duration ([B] = 0.168,

8   [β] = 0.015, $p = 0.043$). However, in all the analyses, cross-level interaction terms were not

9   statistically significant.

10   **Conclusions:** Contrary to common belief, unit-level workplace social capital may not have an

11   effect of lowering employee distress. Quite to the contrary, bonding type of workplace social

12   capital may have slightly adverse effect on employees. Workplace social capital featuring a

13   heterogeneous context should be carefully promoted in a collective society like Japan.

14

15

1   **1 INTRODUCTION**

2   **Mental Ill-being and Job Resources in the Worksite**

3   Mental disorders, especially common mental disorders including depression, have been

4   counted as one of the leading public health issues among the working-age population

5   (Oortwijn et al., 2011; Organization of Economic Co-operation and Development, 2010).

6   These disorders were reported as the leading cause of Disability-Adjusted Life Years over the

7   world, contributing to about 37% of healthy years lost from Non-Communicable Diseases

8   （World Health Organization, 2011). Mental disorders lead to work disability such as

9   long-term sickness absence (Harvey et al., 2009; Mathers et al., 2006) and a substantial

10   burden on the economy (Henderson et al., 2011; Insel, 2011). Depression accounts for

11   roughly one-third of all cases of mental illness (World Health Organization, 2008). Thus,

12   primary prevention for depression is a crucial issue (Brenner et al., 2010; Jacka et al., 2012).

13   During the past three decades, two major models have attracted occupational health

14   researchers as useful tools in explaining the mechanisms of job stressors and related physical

15   or psychological reactions: the demand-control model (Karasek, 1979) and the effort-reward

16   imbalance model (Siegrist et al., 1996). These two models posit that the stress response of an

17   individual is the result of an imbalance between the job stressors to which employees are

1   exposed and the job resources (e.g., job control, social support in the workplace, rewards at

2   work) employees have. In a new theoretical model called the job-demand resources model,

3   these job resources are found to have expanded functions: achieving work goals; reducing the

4   negative effects of job demands and their related physiological, social, and psychological

5   costs; and finally stimulating personal growth, learning, and development (Bakker et al.,

6   2007).

7   Previous literature mainly paid attention to the buffering effect of job resources in relation

8   to job stressors and stress responses (reducing job demand impact; Bakker et al., 2016；Hino

9   et al., 2015; Van de Ven et al., 2013). However, the role of resources as a direct effect of

10   reducing job-stress and related psychological costs seems to be neglected. In addition to the

11   task-level resources mentioned above, macro-level job resources, that is, "what workplace and

12   its members should be," have been garnering attention (Sapp et al., 2010) as a protective

13   factor for mental illness (Bronkhorst et al., 2015). For example, the following two

14   workplace-level job resources have been established. One is organizational climate, including

15   the perceptions of social and interpersonal aspect of leadership, supervision group behavior,

16   relationship, communication, and participation (Gershon et al., 2004). A systematic review

17   concluded that perceptions of good organizational climate have the benefit of decreasing

4

1   burnout, depression, and anxiety in healthcare organizations (Bronkhorst et al., 2015). The

2   other macro-level job resource is organizational justice. A literature review of prospective

3   cohort studies reported that lack of procedural or relational justice was adversely associated

4   with psychiatric morbidity including depressive symptoms among a variety of workplace or

5   occupational characteristics (Ndjaboue et al., 2012). In addition, a less-studied concept that

6   needs more research to understand its effects on the workplace is *social capital,* which is

7   regarded as another resource of workplace human relationship and networks in the workplace

8   social context (Driller et al., 2010; Oksanen et al., 2013).

9

10   **Concepts of Social Capital**

11   Here, I briefly summarize and marshal the concept of social capital. Although the definition

12   and concept of social capital are still controversial, Kawachi and his colleagues (2008)

13   classify the theories into two groups: social cohesion theory and network theory. Social

14   cohesion theory regards social capital as group-level resources that are available for

15   individuals within the group. The representative concept is Putnam's "features of social

16   organizations, such as networks, norms and trust that facilitate action and cooperation for

17   mutual benefit" (Putnam, 1993). On the other hand, scholars supporting network theory have

1   insisted that social capital is the resource born in network between individuals. (e.g., Lin or

2   Granovetter). Coleman's concept sometimes seems ignored in this arguement, but Coleman

3   conceived that social capital is embedded within the structure constructed and that it

4   facilitates certain actions of the member individuals. So far, the most commonly adopted

5   description of social capital in epidemiology seems based on Putnam's theory, that is that

6   social capital is a group-level resource. These features, such as the norm of reciprocity and

7   trust in others, facilitate cooperation and people's interaction for mutual benefit, improve

8   individuals' health-related behavior, and facilitate access to health-enhancing resources,

9   thereby affecting individual health outcomes (Kawachi et al., 1997; Kawachi and Berkman,

10   2014).

11   Social capital has another distinction based on type of network: bonding, bridging (Putnam,

12   2000), or linking. Bonding social capital describes trusting norms and co-operative relations

13   within homogeneous groups or networks (e.g., between employees within the same unit;

14   Szreter et al., 2004). In contrast, bridging social capital refers to relations of respect and

15   mutuality between people who know that they are not alike in social identity and power (e.g.,

16   colleagues; Szreter et al., 2004). The concept of linking social capital is a spin-off of the

17   concept of bridging social capital and can be defined as norms with respect and networks with

1   trusting relationships between people in authority positions (Kawachi et al., 2013; Szreter et

2   al., 2004;).

3   There are three types of methods for measuring the impact of social capital on health by

4   level of exposure variable and outcome (i.e., individual level or group level): ecological study,

5   traditional risk factor study, and contextual study (Kawachi et al., 2008). An ecological study

6   enables one to examine the association of group-level social capital and group-level health

7   status. By contrast, a traditional risk factor approach is useful if researchers want to observe

8   the individual level relationship between social capital and health-related outcome (Kawachi

9   et al., 2008). These two methods mentioned above have produced important insights on the

10   issue. However, if social capital is treated as a higher level, or group-level factor, then a

11   contextual study with multi-level modeling that allows one to explore the relationship of

12   group-level social capital on individual-level outcomes is necessary (Diez-Roux AV, 2003:

13   Kawachi et al., 2008; Murayama et al., 2012). Actually, some previous studies conducted in

14   community settings have indicated that community-level social capital has a contextual effect

15   on mental illness among community dwellers (Lofors et al., 2007). Social capital has gained

16   the attention of many epidemiologists, public health researchers, and practitioners in the last

17   two decades (Kawachi, 2008). Recently, the concept of social capital has expanded to other

7

1 social contexts.

2

3 **Workplace Social Capital**

4 The workplace has been identified as an important field for the examination of the association

5 of social capital with health (Murayama et al., 2012) for the working-age population, because

6 they spend a large amount of their daily lives in the workplace with colleagues and

7 supervisors (Kawachi, 1999). In addition, epidemiologists have identified trust, social

8 network and social cohesion as a series of core concepts of social capital that could be

9 predictors of health outcomes in the workplace as well as other fields of study (Kawachi,

10 1999). Moreover, job stress researchers have considered the potential of social capital in line

11 with the job-stress control support model or the job-demand resource model, as a higher-level

12 resource. In fact, some researchers have treated social capital as a group level job-resource

13 (Oksanen et al., 2013; Sapp et al., 2010). As in other social contexts, so in the worksite, social

14 capital is controversial' however, in this study, I propose that workplace social capital should

15 be described in line with social cohesion theory based on Putnam's concept, not network

16 theory. Compared to other workplace social context concepts, workplace social capital can

17 assess more basic elements of the social structure where these characteristics are operating

1   (Sapp et al., 2010). Workplace social capital can also promote the factors of organizational

2   climate, leadership and communication (Bronkhorst et al., 2015).

3   In early research on workplace social capital, work support and help from colleagues and

4   supervisors frequently were used as indicators of workplace social capital (Liukkonen et al.,

5   2004). However, employing these items is controversial. Some scholars have argued that

6   support and trust were nothing more than antecedents or results of social capital (McKenzie et

7   al., 2002; Szreter et al., 2004; Ziersch et al., 2005). In addition, social capital is a collective

8   property in organizations, whereas social support is an individual-level attribute (Tsuboya et

9   al., 2015). Social support between coworkers can be argued to be the *result* of mutual respect

10   (Reknes et al., 2014), not social capital itself.

11   After these criticisms, researchers reviewed again the original concept of social capital

12   developed by Putnam, Coleman, or Bourdieu and tried to fit it into a workplace context. More

13   recently, workplace social capital has been seen as a more diverse aspect of human

14   relationship and connections, referring for example to the extent to which people trust

15   mutually (between employees or with supervisor) and have commitment to an organization

16   (Oksanen et al., 2013). These items have mostly been measured as a worksite condition from

17   the employees' point of view. That is, workplace social capital may be a cognitive and social

1   cohesive resource relative to Putnam's concept.

2   Previous studies have reported that social capital in the workplace was significantly

3   associated with a broad range of physical health outcomes, such as self-rated health

4   (Kouvonen et al., 2006; Liukkonen et al., 2004; Oksanen et al., 2008; Suzuki et al., 2009;

5   Suzuki et al., 2010a),all-cause mortality (Oksanen et al., 2011), hypertension (Fujino et al.,

6   2012; Oksanen et al., 2012), and sleep quality (Takahashi et al., 2013) as well as a series of

7   health behaviors (Väänänen et al., 2009) such as smoking (Sapp et al.. 2010; Suzuki et al..

8   2010b), hazardous drinking (Gao et al., 2014), and lack of adherence to hypertension

9   treatment (Oksanen et al., 2011).

10   As well as in a community, a social capital perspective in the workplace can be considered

11   as one of many structural features based on relationships. In community settings, bonding

12   social capital refers to the relationship among homogeneous groups. In a workplace context, it

13   could be interpreted as the features shared with colleagues with the same occupation, within

14   the same unit, or with the same job title (Oksanen et al., 2013). In the workplace, bonding

15   workplace social capital could foster the following four components: affiliation, solidarity,

16   shared purpose, and link to resources (Hofmeyer, et al., 2008). Bridging social capital in the

17   workplace can be generated between employees who identify dissimilarly with each other, for

1   example business collaborators in/out of the unit or company (Oksanen et al., 2013). These

2   external networks might have potential to provide new opportunities and assets regarding

3   business, for example knowledge (Dudwick et al., 2006; Szreter et al., 2008). Linking social

4   capital in the workplace could indicate vertical interactions between individuals and their

5   leader or supervisor beyond various power structures (Oksanen et al., 2013). Rich linking

6   social capital provides the benefit of access to resources or knowledge, or seeking new job

7   opportunities (Hofmeyer et al., 2008).

8   Although studies of workplace social capital are still sparse compared to community social

9   capital, the variety of concepts of workplace social capital has led to the development and use

10   of various scales. Among previous studies, *trust* is frequently used as a social capital indicator,

11   and an important component to reinforce cooperation. In fact, it was indicated that

12   company-level mistrust of colleagues had a contextual effect on current smoking habits

13   (Suzuki et al., 2010a) and poor self-rated health (Suzuki et al., 2010b). Workplace support

14   sometimes is employed as a general indicator of workplace social capital. Although individual

15   perseption of support from coworkers was not associated with psychological distress among

16   Finnish employees (Liukkonen et al., 2004), supervisor and coworker support had inverse and

17   contextual effects on systolic blood pressure (Fujino et al., 2012). However, as mentioned

11

1 above, these indicators seemed not to be ues to social capital itself, but the cause or product of

2 social capital (McKenzie et al., 2002; Szreter et al., 2004; Ziersch et al., 2005). In addition,

3 social capital is a multi-dimensional concept that a single-item question cannot adequately

4 measure to cover the full picture of the link between personnel and the organization. To

5 address the limitations of previous measurement and characteristics of workplace social

6 capital, at least three psychometric questionnaires with multi and comprehensive components

7 of workplace social capital were developed and frequently employed. The "Social capital in

8 Organizations scale" (Jung et al., 2012)is a six-item scale that measures individual perception

9 of horizontal (bonding and bridging) social capital indicators, for example common value,

10 support collectivity, trustworthiness. However, vertical types of social capital, that is social

11 capital beyond the power structure, cannot be assessed with this scale. In Denmark, a 12-item

12 workplace social capital scale was developed and recommended by the Danish Working

13 environmental council. The COPSOQ-Ⅱ study targeted over 8,000 Danish residents; seven

14 items for examining trust, justice, and collaboration were extracted and used. A study

15 conducted by Ruglies and his colleagues indicated that higher workplace social capital scores

16 might reduce the risk of sickness absence (Ruglies et al., 2016). Finally, the eight-item scale

17 was developed from the Finnish Public Health Sector Study (Kouvonen et al., 2006). To the

1 best of my knowledge, this scale was translated to various languages including Japanese and

2 employed to measure its impact on various health outcomes. Validation tests justified using

3 an eight-item scale. However, three items were prepared for assessing vertical workplace

4 social capital, and five items for horizontal. Recently, it has been suggested that this scale was

5 confounded by three sub-concepts of workplace social capital (Oksanen et al., 2013). A

6 confirmatory factor analysis was conducted with the Japanese healthcare staffs, which found

7 that a three-factor model was better (Fujita et al., 2016).

8

9 **Systematic review for the relationship between workplace social capital and mental**

10 **ill-being**

11   In community settings, social capital has been known as a protective factor for mental health

12 impairments, (De Silva et al.., 2005; Ehsan et al., 2015) as well as other health outcomes.

13 However, to my knowledge, findings regarding the association of workplace social capital

14 with mental illness have not been reviewed or summarized. To review the evidence expanding

15 these findings to the work settings, I conducted a systematic literature search in December

16 2016. The intention of this review was to determine the already accumulated knowledge and

17 evidence of whether or not and to what degree workplace social capital has an effect on

1   organizational-level functions to improve individual-level depression. A particular focus was

2   made on its contextual effect, because workplace social capital is conceptualized as an

3   organizational level resource (Kawachi et al., 2013).

4   I employed an online research database (PubMed). The search formula was composed as

5   follows: ((workplace social capital) OR (organizational social capital) OR (social capital at

6   work) OR (social capital AND "in" AND workplace)) AND ((depress*) OR (mental problem)

7   OR (mental health) OR (mental well-being) OR (general health) OR distress)) AND

8   (("0001/01/01"[PDat] : "2017/04/30"[PDat])) AND English[lang]. After initial search, 372

9   cites from PubMed were extracted. For the literature review, I included articles satisfying the

10   following criteria: original research article, written in English, quantitative and observational

11   research regarding the association of social capital. regarding workplace and mental health

12   outcome, and peer-reviewed. The studies measuring social capital outside the workplace

13   (community settings or school) were excluded.

14   After screening and excluding duplication, title, and abstract, 13 studies satisfied the review

15   criteria. In the 13 studies, only three studies examined the contextual effect of workplace

16   social capital, whereas the other 10 studies focused on only individual-level perceptions. The

17   results of three studies examining the effect of contextual effect of workplace social capital

1   were mixed.

2   Regarding the contextual effect of workplace social capital, two cross-sectional studies

3   conducted in Belgium (De Clercq et al., 2013) and China (Gao et al., 2014) partially support

4   my idea. In the Belgian study, company-level supervisor concern was inversely associated

5   with depression after adjusting for individual level perceptions, but company-level supervisor

6   help was not. These findings indicated that individual perception was inversely associated

7   with depression after adjusting for company-level workplace social capital, but the effect was

8   smaller compared to the company level (De Clercq et al., 2013). In the China study, it was

9   found that using a combined scale of the three dimensions of social capital, mid-levels of

10 workplace social capital were associated with prevalence of depression. This study also

11 adjusted for individual perceptions of workplace social capital. The contextual effect was

12 independent, but the effect on prevalence of depression became smaller after adjusting for the

13 individual level (Gao et al., 2014). Regarding longitudinal associations, the work-unit-level of

14 workplace social capital at baseline survey was not associated with new onset of depression at

15 follow-up study, although the individual level was inversely associated (Kouvonen et al.,

16 2008). Regarding the type of workplace social capital, two studies (Gao et al., 2014;

17 Kouvonen et al., 2008) employed the total scale, and the association was only seen in a

1   cross-sectional study (Gao et al., 2014). Another study assessed linking social capital and

2   bonding social capital separately and only supervisor concern was associated (De Clercq et al.,

3   2013).

4   Looking at the other nine studies focusing on individual perceptions of workplace social

5   capital, results indicated that higher individual level workplace social capital was inversely

6   associated with depression in cross-sectional studies directly (Jung et al., 2012) and indirectly

7   through low job stress (Pattussi et al., 2016) or favorable occupational safety climate (Tang et

8   al., 2014). Regarding longitudinal associations, two studies supported an inverse effect of

9   workplace social capital on depression (Oksanen et al., 2010; Read et al., 2015; Tsuboya et al.,

10   2015) but one study did not (Liukkonen et al., 2004). In the study by Oksanen and her

11   colleagues, workplace social capital was divided into vertical (linking) and horizontal,

12   (bonding and bridging) and inversely associated with new onset of depression respectively.

13   Two cross-sectional studies and one longitudinal analysis indicated that individual

14   perceptions of workplace social capital might partially moderate the adverse effect of job

15   stressor (job-demand control, effort-reward impairment; Oshio et al., 2014; Tsuboya et al.,

16   2015) or job insecurity (Inoue et al., 2016). Another 3-year prospective study in Japan

17   indicated that individual low perception of workplace social capital may be a predictor of

1   onset of major depression disorder, but the graph for this relationship was U-shaped

2   (Sakuraya et al., 2017) . These four studies employed bonding workplace social capital,

3   mutual understanding, and acceptance.

4   To summarize my review, to date, only three studies have examined the contextual effect of

5   workplace social capital on depression, and the results varied depending on study design

6   (cross-sectional or longitudinal). Thus, I cannot conclude whether or not workplace social

7   capital has a contextual effect on depression without building additional evidence, especially

8   evidence based on a longitudinal design. In addition, as mentioned above, social capital has

9   been regarded as an aggregated attribute by a number of studies in community settings. For

10   occupational mental health, however, examining the contextual effects of social capital may

11   give new insights and implications into how to design the workplace or promote health.

12   In addition, the effect of psychosocial job characteristics (i.e., job strain by job demand, job

13   control), which have been related to workplace social capital (Sapp et al., 2010) and mental

14   health (Karasek, 1979), were not simultaneously examined in two studies (Kovounen et al.,

15   2008; Oksanen et al., 2010). Previous studies have pointed out that job strain was associated

16   with both social capital (Lindström, 2008) and mental health (De Silva et al., 2010; Stansfeld

17   et al., 2006). Several studies adjusted for psychosocial job demand components and

1   associated workplace social capital with depression independently from job stressors,

2   regardless of the level of social capital (individual or aggregated level; Gao et al., 2014; Jung

3   et al., 2012; Tsuboya et al., 2015). However, the amount of evidence is not enough to

4   conclude that job stressors are not major confounders. If a series of job stressors are

5   confounders of the relationship between workplace social capital and depression, the effect of

6   workplace social capital could be overestimated.

7   Previous cross-sectional studies, as well as my own study, examined individual perceptions

8   and aggregated workplace social capital simultaneously, whereas the Finnish study tested

9   them separately. Several studies pointed out that separate models make it difficult to

10 distinguish between individual perceptions and workplace contextual effects (Diez-Roux et al.,

11 1998; Diez-Roux, 2002; Duncan et al., 1998).

12

13 **The purpose of the study**

14 Thus, the purpose of this study was to investigate empirically the contextual effect of

15 workplace social capital on individual psychological distress and psychosocial job

16 characteristics.

17   In this study, I employed general psychological distress (depression or anxiety) as an

18

1   indicator of mental illness. Individuals with psychological distress experience not only

2   negative social functioning but also are at risk for mental disorders (Drapeau et al., 2012),

3   suicide (Ministry of Health, Labour and Welfare, 2016), decreased work productivity (Bender

4   et al., 2008), and life dissatisfaction (Sanderson et al., 2006). Monitoring the status of

5   psychological distress and detecting impairment in an early stage is crucial to minimize the

6   effect of these symptoms on employees' quality of life and the workplace.

7   I conducted two different time interval analyses for one-year and two-year follow-up to

8   confirm whether the trend of association was stable or not.

9   As a study sample, I employed a social medical corporation in Japan in which about 70% of

10   the employees were healthcare staff or related specialists. In a broad range of occupations,

11   healthcare and relevant sector workers may be one of the populations exposed to higher risk

12   of high levels of job-stress and resulting in depression and anxiety (Tennant, 2001; Weinberg,

13   2000).

14

1   **2 METHODS**

2   **Study settings and data collecting**

3   The data for this study were obtained from employees working with a social medical

4   corporation with 20 facilities and 58 units in Japan. A self-administered questionnaire

5   (See Appendix), which included variables to measure workplace social capital,

6   psychological distress, and demographic characteristics, was distributed to the

7   employees. Inclusion criteria were workers who had a minimum age of 20 and were free

8   from developmental/intellectual disorders. Medical doctors registered as temporary staff

9   in the hospital were also excluded from the sample, because they might have had

10   another main workplace; as such their answers regarding work-related questions might

11   have been influenced at least in part by a separate workplace situation. The survey with

12   the same questionnaire items was administered annually from the years 2013 to 2015.

13   After each survey, the Stress-check sheet based on the result of the Brief Job Stress

14   Questionnaire (Shimomitsu et al., 2000) was delivered to each respondent. Also, the

15   research team reported the unit level results to managers through a briefing session and

16   written report following every survey administration. The number of sample

17   participants at baseline was 666 individuals. For analysis, respondents with at least one

1 missing data entry for analytic variables or who had transferred to another unit were

2 excluded. Thus, the present study was based on complete-case analysis. I conformed to

3 the STROBE checklist for cohort study in this study.

4

5 **Outcome variable**

6   The Japanese version of K6 (Furukawa TA, et al.. 2008; Kessler et al., 2002) was

7 adopted to measure frequency of occurrence of non-specific psychological distress

8 (depression and anxiety) for the past 30 days using a 5-point Likert scale (score range

9 from 0: *none of the time* to 4: *all of the time*), and its internal reliability and validity

10 have been confirmed. In our samples, the Cronbach alpha coefficient for K6 at baseline

11 survey was 0.90.

12

13 **Predictor variable**

14   The Japanese version of the workplace social capital scale (Kouvonen et al., 2006;

15 Odagiri et al., 2010; Oksanen et al., 2013) was adopted for measuring workplace social

16 capital. The scale items were based on social cohesion theory.

17 This scale is composed of the following eight items divided into three subscales (i.e.,

1   bonding workplace social capital, bridging workplace social capital, and linking

2   workplace social capital; Kobayashi et al., 2014) using a 5-point Likert scale (scale

3   range from 1 = *strongly disagree* to 5 = *strongly agree*):

4   1.   "*We have a 'we are together' attitudes.*" (bonding)

5   *2.   "People feel understood and accepted by each other."*(bonding)

6   3.   "*People keep each other informed about work-related issues in the work unit.*"

7   (bonding)

8   4.   "*People in the work unit cooperate in order to help develop and apply new*

9   *ideas.*"(bridging)

10   5.   "*Members of the work unit build on each other's ideas in order to achieve the best*

11   *possible outcome.*" (bridging)

12   6.   "*Our supervisor treats us with kindness and consideration.*" (linking)

13   *7.   "We can trust our supervisor."*(linking)

14   8.   "*Our supervisor shows concern for our rights as an employee.*" (linking)

15   In this study, the total score of eight items was adopted as the score of workplace

16   social capital. The original scale was translated into Japanese and then back-translated

17   with permission from the author of the original version. The reliability and validity of

1   the Japanese version were reported to be statistically acceptable (Odagiri et al. 2010). In

2   this study, Cronbach alpha coefficients for the total and the three subscales at baseline

3   survey were 0.93(total scale), 0.90 (bonding), 0.89 (bridging) and 0.85 (linking),

4   respectively.

5   Demographic information, including sex, age, years of education (i.e., 12 years or less

6   as reference, 13 to 15 years, or 16 years or more), marital status (i.e., single as reference,

7   married, divorced/widowed), occupation (i.e., healthcare staff as reference, welfare staff,

8   or others), shift-work or not (reference), employment contract (i.e., regular as reference

9   or part-time) were gathered via a self-administered questionnaire and personnel records

10   of the corporation. The association between psychosocial work characteristics (i.e, job

11   demand and job control), mental health and social capital has been previously suggested

12   (Lindström, 2008). In this study, a three-item scale for job demand and a three-item

13   scale for job control were measured by two subscales from the Brief Job Stress

14   Questionnaire (the BJSQ) with a 4-point Likert scale (1:*Very much so*, 2:Moderately so,

15   3:*Somewhat*, 4:*Not at all*) (Shimomitsu *et al.*, 2000). The score range of each scale was

16   from 1 to 4, and the calculation procedure was based on the new version of BJSQ

17   (Inoue et al., 2014), such that a higher score signifies lower job demand and higher job

1 control, respectively. Among this study sample, Cronbach alpha coefficients as

2 indicator for reliability were 0.74 for job demand and 0.68 for job control, respectively.

3

4 **Statistical analysis**

5 The longitudinal association between unit-level workplace social capital at baseline

6 survey and individuals' psychological distress at follow-up survey for one year and for

7 two years was estimated, respectively. Both unit-level workplace social capital and

8 individual psychological distress were entered to the model as continuous variables. The

9 average of unit-level workplace social capital score (total scale and three subscales) was

10 calculated by unit with two or more respondents for both baseline and follow-up

11 surveys. The individual workplace social capital score was centered with the unit-mean

12 score (i.e., group-mean centered). Unit-level workplace social capital was centered with

13 the mean score of all analytic samples (i.e., grand-mean centered). For estimating the

14 association, a generalized linear mixed model with random-intercept and random slope

15 model was used. I employed this linear hierarchical regression approach for assuming

16 an abnormal distribution for the outcome. A multilevel approach, especially hierarchical

17 linear regression, can address dispersion by modeling for variance for group-level and

1   individual level respectively. With this approach, adequate group-level variance can be

2   estimated in case indifference for variance cannot be hypothesized (Shimizu, 2014).

3   First of all, the internal correlation coefficient (ICC) was calculated with the null model.

4   After that, the crude effect of unit-level workplace social capital was estimated as

5   Model 1. In Model 2, unit-level workplace social capital at baseline survey,

6   psychological distress score at baseline survey, and demographic or occupational

7   characteristics were added simultaneously. Individual job demand and job control at

8   baseline survey were added into Model 2 (to form Model 3. In Model 4, individual-level

9   change in workplace social capital was adjusted to Model 3. As a final model, I added a

10   cross-level interaction term to examine whether the intercept for psychological distress

11   was explained by unit-level workplace social capital and the slopes of individual

12   perception of workplace social capital. (Diez-Roux, 2002; Feaster et al., 2011). When

13   the cross-level interaction term was confirmed to be statistically significant, I conducted

14   stratified analysis using +1 standard deviation or -1 standard deviation of unit-level

15   workplace social capital. This method enables to explore the effect modification of

16   higher-level variables (unit-level workplace social capital in this study) of the effects of

17   lower level variables (individual level workplace social capital in this study) on

1 individual level outcome. (Diez-Roux, 2002)

2   In addition, the association of each subscale in workplace social capital (i.e., bonding,

3 bridging, and linking) with psychological distress was also examined with the same

4 sequence of analytic models. The same centering methods with total scale of workplace

5 social capital were adopted for these three subscales.

6   In all analyses, the unstandardized coefficient (B) and standardized coefficient (β)

7 were estimated. Statistical significance was defined using a two-tailed *p* value (< 0.05).

8 All statistical analyses were conducted using STATA 14.0 (Statacorp LP, Texas, USA).

9

10 **Ethical considerations**

11   The study purpose and procedures were explained to participants and a signed

12 informed consent sheet was obtained from participants. The study protocol was checked

13 and approved by the ethical committee of faculty of medicine, The University of Tokyo

14 (No.10125-(4)), Wakayama Medical University (No.1281), University of Occupational

15 and Environmental Health, Japan (No.H25-109), respectively. In all the study process,

16 the respondents were identified and tracked based on their name and personnel ID on

17 the questionnaire written by each respondent. To minimize risk of data breach,

1   respondents were also identified by unique random ID for this research. This research

2   ID, independent of irrelevant personal information (e.g., birthday, address, telephone

3   number) was used especially for data linkage of questionnaire and personnel record.

4   First, the respondent's name and staff ID were gained from a questionnaire (See

5   Appendix Ⅰ). Then, the research ID was added to each respondent and the list of name,

6   staff ID, and research ID was sent to the personnel office of the cooperation. Based on

7   the name and staff ID, personnel division staff linked occupational information (unit,

8   occupation and employment contract) to the list. After deleting name of respondent and

9   staff ID, the list with research ID and a series of occupational information was returned

10   to me. Finally, the questionnaire and occupational information were linked by research

11   ID.

12

1   **3 RESULTS**

2   **Characteristics for analytic or drop-out samples**

3   Figure 1 describes flow of sampling for one-year follow-up analysis and two-year follow-up

4   analysis, respectively. Overall, 599 (response rate: 89.9%) participants returned their

5   questionnaire for the baseline survey (Wave 1).   Among them, 401 participants participated

6   in the second survey (Wave 2; follow-up rate: 66.9%), and 340 (follow-up rate: 56.8%)

7   responded to the third survey (Wave 3). At Wave 2, 131 participants dropped out; and at

8   Wave 3,157 participants dropped out. Sixty-seven (Wave 2) and 102 (Wave 3) participants

9   transferred to different units between waves. Compared to the sample used in the analysis

10   analytic, the dropout samples were relatively young, had less education, included healthcare

11   staff, and were engaged in shift work. They also showed relatively higher scores for

12   psychological distress than the sample used in the analysis, whereas the score of workplace

13   social capital was almost the same as that of the analyzed samples (See Table 1.). After data

14   cleaning, a total of 80 samples with at least one missing value for analysis, and 8 samples

15   whose unit had no other participant to the survey (i.e, number of participant within unit was

16   one) were excluded from analysis. The same sequence of data cleaning was conducted on

17   respondents for Wave 3. Fifty-two samples with at least one missing variable for analysis, and

1   7 samples without other respondents within their unit were excluded from analysis. Finally,

2   313 samples nested within 45 units for one-year follow-up analysis, and 281 samples nested

3   45 units for two-year follow-up analysis were used for analysis, respectively.

4

5   Table 1 shows the score mean and the distribution of respondents and dropouts from each

6   follow-up survey at baseline survey for all the variables analyzed in the statistical models.

7   Over seventy percent of the sample participants were women, (76.7% for one-year follow-up

8   samples, and 77.2% for two-year follow-up samples) and higher educated (years of education:

9   13 years or more, 78.4% for one-year follow-up samples, 78.5% for two-year follow-up

10   samples). About seventy percent of participants were married (65.5% for one-year follow-up

11   samples, 67.7% for two-year follow-up samples). With respect to occupational characteristics,

12   around forty-five percent were healthcare staff (46.0% for one-year follow-up samples, 45.8%

13   for two-year follow-up samples). Regarding employment contract, half of the sample worked

14   as regular employees (59.0% for one-year follow-up samples, 56.9% for two-year follow-up

15   samples), and about 30% were engaged in shift work (29.7% for one-year follow-up samples,

16   27.8% for two-year follow-up samples). Regarding psychosocial work characteristics, the

17   score for job demand and job control at baseline was 2.9 (Standardized deviation: SD 0.7) and

1   2.5 (SD 0.6) for one-year follow-up samples and 2.9 (SD 0.6) and 2.5 (SD 0.7) for two-year

2   follow-up samples, respectively. The average of the total scale of workplace social capital

3   score and psychological distress score at baseline survey was 3.7 (SD 0.7) and 4.6 (SD 5.0)

4   among the samples for one-year follow-up analysis, and 3.7 (SD 0.8) and 4.4 (SD 4.5) for

5   two-year follow-up samples, respectively. The average score of each subscale of workplace

6   social capital among one-year follow up samples was 3.7 (SD 0.8, bonding), 3.6 (SD 0.9,

7   bridging), and 3.8 (SD 0.8, linking). Among the two-year follow-up sample, the average score

8   of each subscale were as follow: 3.7 (SD 0.9, bonding), 3.6 (SD 0.9, bridging), and 3.8 (SD

9   0.8, linking). The psychological distress score at baseline survey among dropouts was higher

10   compared to respondents of each follow-up (4.9±4.9 among one-year follow-up dropouts,

11   5.0±5.0 among two-year follow-up dropouts, respectively).

12

13   **Multi-level association of unit-level workplace social capital at baseline and employee's**

14   **psychological distress at follow-up survey**

15   The average of workplace social capital score (total scale and three subscales) and

16   psychological distress score by unit is described in Table 2 for one-year follow-up samples

17   and in Table 3 for two-year follow-up samples, respectively. The average score of workplace

1   social capital of total scale, three subscales of workplace social capital at baseline survey, and

2   psychological distress score at follow-up survey were 3.7 (SD 0.7, total scale), 3.7 (SD 0.8,

3   bonding), 3.6 (SD 0.8, bridging), 3.8 (SD 0.8, linking), and 4.6 (SD 5.1, psychological

4   distress) among one-year follow-up samples, and 3.7 (SD 0.8, total scale), 3.7 (SD 0.9,

5   bonding), 3.6 (SD 0.9, bridging), 3.8 (SD 0.8, linking), and 4.8 (SD 4.9) among two-year

6   follow-up samples, respectively.

7   The series of ICC for workplace social capital at baseline data and psychological distress at

8   follow-up data for null model were 0.17 and 2.17e-14 for one-year prospective analysis, and

9   0.14 and 0.01 for two-year prospective analysis. With regard to each sub-scale of workplace

10   social capital, the ICC among one-year or two-year follow-up samples was 0.14 and 0.17

11   (bonding), 0.13 and 0.12 (bridging), and 0.14 and 0.12(linking), respectively (data not

12   shown).

13

14   **Multilevel analyses of the longitudinal association of workplace social capital with**

15   **psychological distress (total score)**

16   Table 4 describes the estimation of the multilevel association unit-level workplace social

17   capital (total score) at Wave 1, with psychological distress for Wave 2. Unit-level workplace

1   social capital at Wave 1 was inversely and statistically significantly associated with

2   psychological distress in the crude model ([B] = -0.360, [β] = -0.027, p = 0.006). However,

3   this association turned adverse but not statistically significant after adjusting for

4   psychological distress score, demographic or occupational characteristics ([B] = 0.757, [β] =

5   0.058, p = 0.074), and psychosocial job characteristics ([B] = 0.182, [β] = 0.014, p = 0.079) at

6   the baseline survey. This association did not change after adjusting for individual-level

7   workplace social capital at Wave 1 in Model 4 ([B] = 0.161, [β] = 0.012, p = 0.123), and after

8   adding a cross-level interaction term to the model, as a final model ([B] = 0.183, [β] = 0.014,

9   p = 0.061). The coefficient of the cross-level interaction term was not statistically significant

10   ([B] = -0.108, [β] = -0.006, p = 0.665).

11   Table 5 describes the result for two-year follow-up samples. Like the one-year follow-up

12   survey, the association of unit-level workplace social capital at Wave 1 with psychological

13   distress at Wave 3 was inverse but statistically not significant in the crude model ([B] =

14   -0.344, [β] = -0.028, p = 0.052). In addition, like the one-year follow-up analysis, this

15   association turned adverse but not statistically significant after adjusting for psychological

16   distress at baseline and demographic characteristics ([B] = 0.134, [β] = 0.011, p = 0.454 in

17   Model 2), and adjusting for psychosocial job characteristics ([B] = 0.143, [β] = 0.012, p =

1 0.429). This association was observed after adjusting for individual-level change in workplace

2 social capital ([B] = 0.198, [β] = 0.016, p = 0.295). In the final model, the cross-level

3 interaction term as not statistically significant ([B] = -0.322, [β] = -0.019, p = 0.247).

4

5 **Subscale analysis for the multilevel longitudinal association of**

6 **workplace social capital with psychological distress.**

7 A series of the analyses regarding the association of unit-level bonding workplace social

8 capital drew almost the same sequence with the analyses of total scale. However, in both

9 follow-up terms, this association was adversely and statistically significant in the final model

10 ([B] = 0.168, [β] = 0.015, p = 0.043, for one-year follow-up; as compared to [B] = 0.318, [β]

11 = 0.031, p = 0.038, for two-year follow-up). However, the cross-level interaction term was

12 not significant for either follow-up duration ([B] = -0.017, [β] = -0.006, p = 0.914, for the

13 one-year follow-up; and [B] = -0.058, [β] = -0.003, p = 0.765, for the two year follow-up

14 duration).

15   Regarding bridging workplace social capital, as well as other types of workplace social

16 capital, the association with psychological distress in on the one-year observational period

17 turned adverse and not statistically significant in Model 2 ([B] = 0.127, [β] = 0.011, p = 0.135

1 for one-year follow-up). This association stayed unchanged after adjusting for all covariates

2 and cross-level interaction terms ([B] = 0.150, [β] = 0.013, p = 0.094 for the one-year

3 follow-up). For the two-year follow-up analysis, the association was not significant in any of

4 the analytic models ([B] = 0.196, [β] = 0.018, p = 0.187 in Model 5), or the cross-level

5 interaction term ([B] = -0.102, [β] = -0.042, p = 0.551).

6 The association of Linking workplace social capital at baseline survey with psychological

7 distress in the follow-up survey was not statistically significant in any of the models,

8 regardless of the follow-up duration. In Model 5 for one-year follow-up analysis, multi-

9 collinearity between unit-level workplace social capital and cross-level interaction term was

10 found despite of centering method (Variance inflation factor score; 17.84 for unit-level

11 linking workplace social capital, 17.77 for cross-level interaction term). So I reported the

12 result of Model 4 ([B] = 0.112, [β] = 0.009, p = 0.249) as the final model for one-year

13 follow-up observation. In the two-year follow-up duration, the association of linking

14 unit-level workplace social capital with psychological distress was not statistically significant

15 in any of the models ([B] = -0.048, [β] = -0.004, p = 0.779 in Model 5) and the cross-level

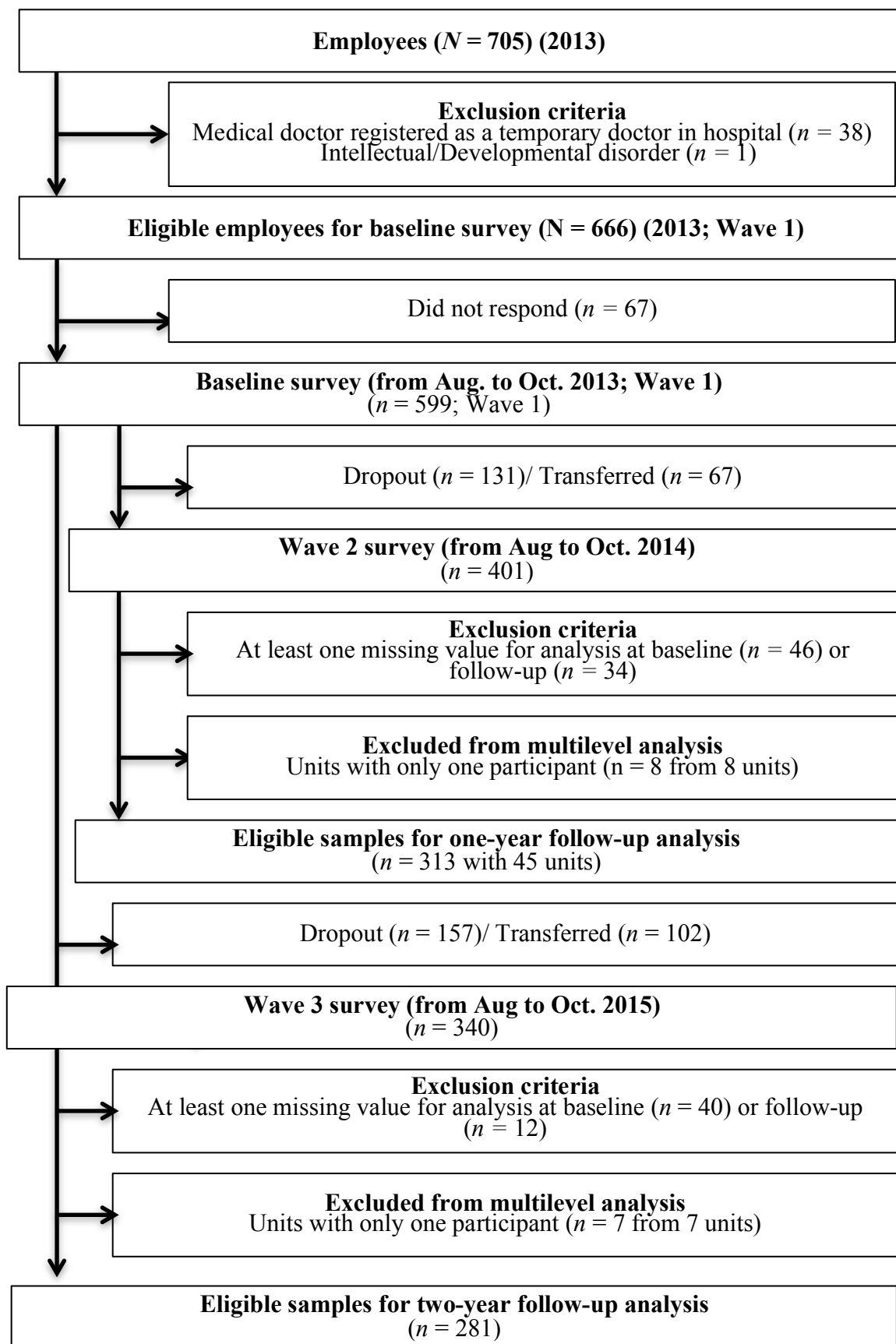16 interaction term ([B] = -0.043, [β] = -0.018, p = 0.879).

17

Figure 1 Flow of sampling for analysis

Table 1. Demographic, occupational and psychosocial job characteristics among analytic and drop-out samplesat baseline survey.

| | One-year follow-up survey | | | | | | | | Two-year follow-up survey | | | | | | | |
| | Analytic sample (n=313) | | | | Dropout sample (n=131) | | | | Analtytic sample (n=281) | | | | Dropout sample (n=157) | | | |
	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD	n	%
Sex																
Men			73	23.3			32	24.4			64	22.8			36	22.9
Women			240	76.7			99	75.6			217	77.2			121	77.1
			-	-			0	0.0			-	-			0	0.0
Age(yrs)	45.5	11.1			44.1	12.6			46.2	11.2			45.5	12.5		
Years of education																
<=12			69	22.0			22	16.8			66	23.5			26	16.6
13-15			122	39.0			60	45.8			104	37.0			72	45.9
>=16			122	39.0			40	30.5			111	39.5			50	31.8
Missing			-	-			9	6.9			-	-			9	5.7
Marital status																
Never married			65	20.8			27	20.6			52	18.5			27	17.2
Married			205	65.5			83	63.4			190	67.6			103	65.6
Divorced/widowed			43	13.7			12	9.2			39	13.9			19	12.1
Missing				-			9	6.9			-	-			8	5.1
Occupation																
Healthcare staffs																
Nurse/Public health nurse			100	31.9			57	43.5			80	28.5			70	44.6
Therapist(physio/occupational/Orthoptist/Speech therapist/other)			21	6.7			3	2.3			21	7.5			5	3.2
Laboratory technitian			10	3.2			6	4.6			13	4.6			2	1.3
Medical doctor			9	2.9			11	8.4			12	4.3			9	5.7
Pharmaceutical chemist			4	1.3			1	0.8			3	1.1			2	1.3
Welfare staffs																
Care manager/ Care worker/Home assistant helper			68	21.7			32	24.4			67	23.8			42	26.8
Psychiatry social worker/Medical social worker			14	4.5			6	4.6			10	3.6			5	3.2
Others																
Clerk			64	20.4			12	9.2			52	18.5			17	10.8
Cook			13	4.2			0	0.0			13	4.6			1	0.6
Nutritian			6	1.9			0	0.0			5	1.8			1	0.6
Others (Clinical therapist, System engineer, etc)			4	1.3			3	2.3			5	1.8			3	1.9
Employment contract																
Regular employment			184	58.8			81	61.8			160	56.9			84	53.5
Others			129	41.2			50	38.2			121	43.1			73	46.5
Missing			-	-			0	0.0			-	-			0	0.0
Rotating shift																
Yes			95	30.4			50	38.2			78	27.8			56	35.7
No			218	69.6			67	51.1			203	72.2			82	52.2
Missing			-	-			14	10.7			-	-			19	12.1
Job demand (score range: 1-4)	2.9	0.7			2.9	0.6			2.9	0.7			2.9	0.8		
Job control (score range: 1-4)	2.5	0.6			2.5	0.7			2.5	0.7			2.5	0.2		
Workplace social capital (score range: 1-5)	3.7	0.7			3.7	0.8			3.7	0.8			3.7	0.8		
Bonding workplace social capital (score range:1-5)	3.7	0.9			3.7	0.8			3.7	0.9			3.6	0.9		
Bridging workplace social capital (score range:1-5)	3.6	0.9			3.6	0.8			3.6	0.9			3.6	0.9		
Linking workplace social capital (score range:1-5)	3.8	0.8			3.8	0.9			3.8	0.8			3.8	0.9		
Psychological distress (score range: 0-24)	4.6	5.0			4.9	4.9			4.4	4.5			5.0	5.0		

SD:standard deviation

Table 2. Average of workplace social capital at Wave 1and psychological distressat Wave 2 by unit (one-year follow-up).

		One-year follow-up samples									
		Workplace social capital at baseline (score)								Psychological distress (score)	
		Total score		Bonding		Bridging		Linking			
Unit	n	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Accounting A	14	3.9	0.6	4.1	0.7	3.8	0.9	3.8	0.9	5.8	5.3
Accounting B	2	3.9	0.1	4.5	0.7	4.3	0.4	2.8	0.7	4.5	6.4
Area comprehensive support center B	5	4.2	0.5	4.3	0.6	3.9	0.9	4.3	0.4	0.8	1.8
Clinic A	7	3.8	0.4	3.9	0.4	3.7	0.8	4.0	0.2	5.3	6.1
Clinic B	14	3.6	0.9	3.5	1.0	3.6	0.9	3.7	1.1	4.0	5.1
Clinic C	8	3.5	1.1	3.5	0.9	3.2	1.3	3.8	1.1	5.6	5.5
Clinic D	10	3.9	0.7	3.8	0.8	3.8	1.0	4.2	0.7	4.2	4.6
Clinic E	8	4.1	0.5	4.3	0.7	4.3	0.5	3.6	0.8	3.6	3.9
Clinic F	10	3.7	0.5	3.6	0.7	3.6	0.6	3.7	0.5	6.3	6.8
Clinical examination division	4	3.9	0.4	3.8	0.2	3.6	0.5	4.3	0.7	2.0	2.7
Community medical collaboration center	4	3.5	1.1	3.2	1.1	3.1	1.2	4.1	1.2	5.3	5.1
Cooperation administration office A	2	3.3	0.1	3.0	0.0	3.5	0.7	3.5	0.7	3.0	2.8
Cooperation administration office D	3	4.0	0.9	3.8	1.0	3.8	1.3	4.3	0.6	4.7	5.7
Cooperation administration office E	4	4.0	0.5	3.8	0.7	4.0	0.4	4.2	0.4	4.8	5.6
Daycare A	4	4.2	0.3	4.3	0.6	4.0	0.4	4.3	0.9	3.0	5.4
Daycare B	3	3.9	1.4	3.7	1.5	4.0	1.7	4.0	1.0	4.7	5.5
Doctor's office A	4	3.8	0.4	3.9	0.2	3.6	0.8	3.9	0.6	3.5	2.9
Doctor's office B											
General Administration office	2	3.7	0.3	3.8	0.2	3.8	1.1	3.5	0.2	4.0	5.7
Health management office	3	3.4	0.6	3.1	0.7	3.3	0.3	3.8	0.7	3.7	3.5
Home help service A	3	3.8	0.3	3.9	0.2	3.8	0.3	3.8	0.5	3.0	1.7
Home help service B	18	3.8	0.7	3.7	0.8	3.7	0.9	4.0	0.8	3.5	3.9
Home help service C	23	3.9	0.6	3.9	0.7	3.7	0.7	4.0	0.6	3.6	4.2
Home help service D	4	4.4	0.4	4.4	0.7	4.5	0.4	4.4	0.5	3.3	2.5
Home nursing service D	5	4.3	0.3	4.3	0.3	4.4	0.5	4.2	0.6	0.6	0.9
Hospital administration office	5	3.5	0.5	3.5	0.5	3.2	1.0	3.5	0.4	4.8	4.3
Hospital outpatient ward A	10	3.8	0.6	3.5	0.7	3.4	0.8	4.2	0.6	5.5	5.4
Hospital ward A	5	4.6	0.6	4.5	0.5	4.4	0.9	4.7	0.5	4.2	4.4
Hospital ward B	5	4.0	1.2	3.5	1.4	3.5	1.4	4.5	0.9	6.6	10.0
Hospital ward C	8	2.8	1.1	2.5	1.1	2.5	1.1	3.2	1.1	7.6	7.9
Hospital ward D	12	3.6	0.5	3.6	0.6	3.7	0.7	3.5	0.7	3.8	3.8
Hospital ward X	12	3.8	0.5	3.6	0.7	3.6	0.7	4.2	0.7	5.5	6.7
Hospital ward Y	19	3.7	0.5	3.6	0.6	3.5	0.6	3.9	0.5	7.0	7.2
In-home care support center A	6	4.1	0.5	4.1	0.5	4.4	0.5	3.8	0.7	2.7	2.3
In-home care support center B	8	2.9	0.7	3.0	0.8	2.9	0.8	2.7	0.9	6.5	7.9
In-home nursing care support center A	5	3.5	0.5	3.7	0.3	3.2	0.8	3.5	0.5	4.0	4.3
Nurse administration	2	4.7	0.4	4.5	0.7	4.5	0.7	5.0	0.0	3.5	0.7
Nursing care project division	2	4.3	0.4	4.5	0.7	4.5	0.7	4.0	0.0	4.5	3.5
Nutrition division	20	3.0	0.8	2.8	0.9	3.1	0.8	3.2	0.9	4.2	4.0
Pharmacology devision	4	4.3	0.3	4.3	0.3	4.6	0.5	4.2	0.6	3.5	5.1
Psychiatry social worker's office	4	4.3	0.2	4.4	0.5	4.6	0.5	4.0	0.5	6.3	4.3
Psychotherapy unit	2	3.5	0.7	3.5	0.7	3.3	0.4	3.7	0.9	1.0	1.4
Rehabilitation unit A	3	4.0	0.1	4.0	0.0	4.0	0.0	3.9	1.9	7.7	6.7
Rehabilitation unit B	9	3.3	0.7	3.3	0.8	3.3	0.6	3.4	0.9	5.7	3.2
X-ray examination division	5	4.0	0.5	4.1	0.9	3.6	0.7	4.1	0.3	3.6	6.5
Welfare service center for the disabled A	3	3.5	1.4	3.2	2.0	2.7	1.8	4.3	0.6	3.3	4.9

SD: standard deviation

Table 3. Average of workplace social capital at Wave 1 and psychological distress at Wave 3 by unit (two-year follow-up).

		Two-year follow-up samples									
		Workplace social capital at baseline (score)								Psychological distress (score)	
		Total		Bonding		Bridging		Linking			
Unit	n	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Accounting A	2	4.0	0.7	4.1	0.8	3.9	0.9	4.0	0.6	5.5	5.8
Accounting B	7	3.8	0.1	4.5	0.7	4.3	0.9	2.8	0.7	12.0	12.7
Area comprehensive support center B	5	4.2	0.5	4.3	0.6	3.9	0.9	4.3	0.4	0.2	0.4
Clinic A	7	3.9	0.4	3.9	0.4	3.7	0.4	4.0	0.2	5.1	5.4
Clinic B	15	3.7	0.9	3.6	1.0	3.6	0.8	3.8	1.1	5.8	4.6
Clinic C	10	3.5	1.1	3.6	1.0	3.2	1.2	3.5	1.3	4.6	5.5
Clinic D	7	4.0	0.6	4.0	0.6	4.1	0.7	4.0	0.7	4.0	4.9
Clinic E	6	4.1	0.5	4.4	0.5	4.3	0.4	3.7	1.0	3.2	2.1
Clinic F	9	3.8	0.4	3.8	0.6	3.8	0.6	3.9	0.4	5.6	5.3
Clinical examination division	7	3.8	0.4	3.7	0.5	3.6	0.5	4.0	0.8	4.7	6.7
Community medical collaboration center	3	3.4	1.3	3.2	1.3	3.2	1.4	3.8	1.3	7.0	5.6
Cooperation administration office A	2	3.4	0.8	3.2	0.5	3.0	1.4	4.0	0.0	3.5	4.9
Cooperation administration office D	3	4.4	0.6	4.3	0.5	4.5	0.7	4.5	0.7	3.5	4.9
Cooperation administration office E	4	4.0	0.5	3.8	0.7	4.0	0.4	4.2	0.4	3.3	4.6
Daycare A	3	4.3	0.1	4.2	0.7	4.2	0.3	4.6	0.8	5.3	6.1
Daycare B	3	3.9	1.4	3.7	1.5	4.0	1.7	4.0	1.0	2.7	3.8
Doctor's office A	4	4.0	0.7	4.2	0.6	3.9	1.0	4.0	0.7	6.8	5.3
Doctor's office B	2	3.6	0.4	3.5	0.7	3.0	0.0	4.0	0.5	4.0	1.4
General Administration office	3	3.9	0.3	3.8	0.2	4.0	1.0	3.9	0.2	5.3	2.1
Health management office	3	3.9	3.1	3.8	0.5	3.7	0.3	4.2	0.2	1.3	1.5
Home help service A	3	3.8	0.3	3.9	0.2	3.8	0.3	3.8	0.5	5.3	2.3
Home help service B	17	3.9	0.6	3.9	0.6	3.8	0.8	4.1	0.7	3.7	4.3
Home help service C	22	3.9	0.6	3.8	0.7	3.7	0.7	4.0	0.5	3.1	3.8
Home help service D	6	3.6	1.1	3.7	1.2	3.8	1.0	3.4	1.4	9.5	7.6
Home nursing service D	4	4.1	0.1	4.2	0.2	4.3	0.5	4.0	0.5	1.3	2.5
Hospital administration office	4	3.3	0.5	3.5	0.6	3.0	1.1	3.4	0.3	3.0	6.2
Hospital outpatient ward A	11	3.8	0.6	3.5	0.6	3.4	0.7	4.3	0.6	3.5	4.3
Hospital ward A	6	4.5	0.6	4.4	0.5	4.3	0.8	4.6	0.5	5.5	5.4
Hospital ward B	5	3.4	1.1	3.2	1.4	3.3	1.3	3.7	1.0	8.4	3.6
Hospital ward C	5	2.4	1.1	1.9	0.9	2.2	1.1	3.0	1.4	5.2	4.3
Hospital ward D	12	3.3	0.8	3.3	0.8	3.4	1.0	3.4	0.8	4.8	5.4
Hospital ward X	10	4.0	0.6	3.7	0.8	3.7	0.7	4.4	0.7	6.9	5.8
Hospital ward Y	6	3.8	0.5	3.9	0.4	3.8	0.8	3.8	0.7	8.5	3.6
In-home care support center A	4	4.0	0.8	4.3	0.5	4.5	0.6	3.5	1.3	1.5	2.4
In-home care support center B	4	2.9	0.7	3.1	0.8	3.0	0.9	2.7	0.6	9.5	9.7
In-home nursing care support center A	2	3.2	0.1	3.5	0.2	2.5	0.7	3.3	0.5	6.5	3.5
Nurse administration	4	4.6	0.3	4.5	0.6	4.3	0.5	4.8	0.3	2.3	1.7
Nursing care project division	3	4.2	0.4	4.3	0.6	4.3	0.6	4.0	0.0	4.0	1.7
Nutrition division	19	3.1	0.8	2.9	0.8	3.1	0.8	3.2	0.9	4.0	4.3
Pharmacology devision	3	4.3	0.3	4.3	0.3	4.7	0.6	3.9	0.2	7.7	2.5
Psychotherapy unit	2	3.5	0.7	3.5	0.7	3.3	0.4	3.7	0.9	2.5	3.5
Rehabilitation unit A	3	4.0	0.1	4.0	0.0	4.0	0.0	3.9	0.2	10.3	2.5
Rehabilitation unit B	10	3.3	0.7	3.3	0.7	3.2	0.7	3.3	0.9	5.8	4.2
X-ray examination division	5	4.0	0.5	4.1	0.9	3.6	0.7	4.1	0.3	3.2	5.1
Welfare service center for the disabled A	4	3.8	1.2	3.6	1.2	2.9	1.5	4.5	0.6	4.5	3.0

SD:standard deviation

Table 4. Multilevel analysis of the association of workplace social capital (total score) at Wave 1 (baseline) with individual-level psychological distress at Wave 2 (follow-up) among 45 units in a social medical cooperation.

(n of respondents = 313, n of units=45)	Model 1				Model 2				Model 3				Model 4				Model 5			
	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P
Fixed effect																				
Individual level variables																				
Gender (woman=1. man= 0)					0.171	0.075	0.014	0.023	0.172	0.076	0.014	0.023	0.183	0.076	0.015	0.016	0.244	0.081	0.020	0.003
Age at baseline (yrs.)					0.007	0.004	0.016	0.042	0.007	0.004	0.015	0.048	0.006	0.004	0.014	0.074	0.006	0.004	0.014	0.095
Years of education (reference: 12y or less)																				
13y to 15y					0.061	0.083	0.009	0.465	0.060	0.085	0.009	0.481	0.037	0.086	0.006	0.666	0.099	0.089	0.015	0.269
16y or more					0.110	0.087	0.017	0.208	0.101	0.880	0.015	0.253	0.075	0.088	0.011	0.393	0.220	0.093	0.033	0.019
Marital status at baseline (reference: single)																				
married					-0.270	0.080	-0.031	0.001	-0.276	0.081	-0.032	0.001	-0.279	0.081	-0.032	0.001	-0.314	0.087	-0.036	<0.00
divorce/bereaved					-0.172	0.110	-0.020	0.120	-0.033	0.078	-0.005	0.673	-0.183	0.115	-0.021	0.100	-0.222	0.116	-0.026	0.055
Employment status (reference :regular employment)					-0.061	0.076	-0.009	0.418	-0.033	0.078	-0.005	0.673	-0.032	0.780	-0.005	0.685	0.002	0.081	<0.00	0.985
Occupation (reference: healthcare staff)																				
welfare staff					-0.184	0.092	-0.031	0.045	-0.205	0.095	-0.034	0.031	-0.215	0.096	-0.036	0.025	-0.236	0.098	-0.039	0.016
others					0.071	0.083	0.012	0.396	0.072	0.086	0.012	0.403	0.054	0.087	0.009	0.538	0.024	0.094	0.004	0.794
Shift rotating (reference: not engaged in shift work)					-0.158	0.076	-0.014	0.039	-0.171	0.078	-0.016	0.028	-0.171	0.079	-0.016	0.030	-0.007	0.082	-0.001	0.932
Psychological distress score at baseline					0.107	0.005	0.105	<0.001	0.103	0.005	0.101	<0.001	0.096	0.006	0.095	<0.001	-0.102	0.006	0.102	<0.001
Job demand at baseline									0.102	0.048	0.014	0.003	0.083	0.046	0.011	0.083	0.104	0.051	0.004	0.044
Job control at baseline									-0.021	0.050	-0.003	0.682	-0.012	0.050	-0.002	0.810	0.001	0.053	<0.00	0.990
Workplace social capital at baseline													-0.139	0.047	-0.017	0.003	-0.195	0.102	-0.024	0.055
Unit level																				
Workplace social capital at baseline	-0.360	0.130	-0.027	0.006	0.176	0.098	0.013	0.074	0.182	0.103	0.014	0.079	0.161	0.105	0.012	0.123	0.183	0.080	0.014	0.061
Individual × unit interaction of workplace social																	-0.108	0.250	-0.006	0.665

B , unstandardized coefficient; β, standardized coefficient; SE, standard error.
Model 1: Crude
Model 2: Psychological distress score at baseline, demographic and occupational characteristics were added into Model 1.
Model 3: Psychosocial work characteristics were added into Model 2.
Model 4: Individual level workplace social capital was added into Model 3.
Model 5: Cross-level interaction term was added into Model 4.

Table 5. Multilevel analysis of the association of workplace social capital (total score) at Wave 1 (baseline) with individual-level psychological distress at Wave 3 (follow-up) among 45 units in a social medical cooperation.

(n of respondents = 281, n of units=45)	Model 1				Model 2				Model 3				Model 4				Model 5			
	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P
Fixed effect																				
Individual level variables																				
Gender (woman=1, man= 0)					0.042	0.082	0.004	0.060	0.054	0.082	0.005	0.510	0.051	0.082	0.004	0.533	-0.093	0.087	-0.008	0.288
Age at baseline (yrs)					−0.00	0.004	-0.019	0.030	-0.191	0.004	-0.441	0.025	-0.009	0.004	-0.021	0.020	-0.011	0.004	-0.027	0.006
Years of education (reference: 12y or less)																				
13y to 15y					0.019	0.085	0.003	0.827	-0.005	0.086	-0.001	0.952	-0.018	0.086	-0.003	0.834	0.024	0.968	0.004	0.804
16y or more					-0.165	0.094	-0.026	0.078	0.152	0.095	0.024	0.004	-0.204	0.095	-0.033	0.032	0.025	0.108	0.004	0.819
Marital status at baseline (reference: single)																				
married					-0.001	0.086	<0.001	0.989	-0.005	0.096	-0.001	0.960	-0.015	0.096	-0.002	0.878	-0.133	0.104	-0.016	0.201
divorce/bereaved					0.163	0.124	0.019	0.189	0.153	0.124	0.018	0.219	0.155	0.124	0.018	0.212	0.168	0.130	0.020	0.197
Employment status (reference: regular					-0.266	0.084	-0.027	0.002	-0.213	0.089	-0.022	0.017	-0.211	0.089	-0.022	0.018	-0.019	0.098	-0.002	0.845
Occupation (reference: healthcare staff)																				
welfare staff					-0.041	0.109	-0.007	0.711	-0.059	0.110	-0.010	0.590	-0.066	0.110	-0.011	0.547	-0.164	0.119	-0.028	0.167
others					0.047	0.105	0.008	0.651	0.052	0.106	0.009	0.621	0.039	0.106	0.007	0.715	-0.053	0.115	-0.009	0.648
Shift rotating (reference: not engaged in shift work)					-0.100	0.093	-0.009	0.285	-0.123	0.095	-0.011	0.193	-0.114	0.095	-0.011	0.229	-0.020	0.102	-0.002	0.845
Psychological distress score at baseline					0.097	0.006	0.090	<0.001	0.094	0.007	0.087	<0.001	0.090	0.095	0.084	<0.001	0.109	0.009	0.102	<0.001
Job demand at baseline									0.139	0.054	0.018	0.010	0.129	0.054	0.017	0.017	0.128	0.060	0.017	0.032
Job control at baseline									-0.001	0.053	<0.001	0.990	0.009	0.053	0.001	0.860	-0.034	0.059	-0.005	0.565
Workplace social capital at baseline													-0.068	0.047	-0.004	0.146	−0.15	0.121	-0.009	0.197
Unit level																				
Workplace social capital at baseline	-0.344	0.177	-0.028	0.052	0.134	0.179	0.011	0.454	0.143	0.180	0.012	0.429	0.127	0.179	0.010	0.477	0.198	0.189	0.016	0.295
Individual × unit interaction of workplace social																	-0.322	0.278	-0.019	0.247

B, unstandardized coefficient; β, standardized coefficient; SE, standard error.
Model 1: Crude
Model 2: Psychological distress score at baseline, demographic and occupational characteristics were added into Model 1.
Model 3: Psychosocial work characteristics were added into Model 2.
Model 4: Individual level workplace social capital was added into Model 3.
Model 5: Cross-level interaction term was added into Model 4.

Table 6. Multilevel analysis of the association of bonding workplace social capital at Wave 1 (baseline) with individual-level psychological distress at Wave 2 (follow-up) among 45 units in a social medical cooperation.

(n of respondents= 313, n of units=45)	Model 1 B	SE	β	P	Model 2 B	SE	β	P	Model 3 B	SE	β	P	Model 4 B	SE	β	P	Model 5 B	SE	β	P
Fixed effect																				
Individual level variables																				
Gender (woman=1. man= 0)					0.174	0.075	0.015	0.020	0.176	0.076	0.015	0.020	0.181	0.076	0.015	0.017	0.233	0.080	0.019	0.004
Age at baseline (yrs)					0.007	0.004	0.015	0.039	0.007	0.004	0.016	0.046	0.007	0.004	0.016	0.044	0.009	0.004	0.019	0.016
Years of education (reference: 12y or less)																				
13y to 15y					0.582	0.084	0.088	0.488	0.058	0.085	0.009	0.496	0.055	0.085	0.008	0.522	0.102	0.088	0.015	0.250
16y or more					0.110	0.087	0.017	0.206	0.101	0.088	0.015	0.250	0.099	0.088	0.015	0.258	0.199	0.093	0.030	0.032
Marital status at baseline (reference: single)																				
married					-0.269	0.080	-0.031	0.011	-0.274	0.085	-0.032	0.001	-0.275	0.085	-0.032	0.001	-0.347	0.087	-0.040	<0.001
divorce/bereaved					-0.174	0.111	-0.020	0.117	-0.184	0.088	-0.021	0.100	-0.181	0.088	-0.021	0.105	-0.265	0.114	-0.031	0.020
Employment status (reference :regular employment)					-0.062	0.076	-0.009	0.417	-0.033	0.081	-0.005	0.670	-0.035	0.081	-0.005	0.655	0.013	0.080	0.002	0.871
Occupation (reference: healthcare staff)																				
welfare staff					-0.184	0.092	-0.031	0.045	-0.205	0.112	-0.034	0.031	-0.207	0.112	-0.034	0.030	-0.231	0.095	-0.039	0.015
others					0.067	0.083	0.011	0.422	0.064	0.078	0.011	0.424	0.065	0.078	0.011	0.448	0.054	0.086	0.009	0.533
Shift rotating (reference: not engaged in shift work)					-0.145	0.078	-0.013	0.061	-0.158	0.079	-0.014	0.046	-0.158	0.095	-0.014	0.047	-0.021	0.082	-0.002	0.795
Psychological distress score at baseline					0.107	0.005	0.105	<0.001	0.103	0.053	0.101	<0.001	0.101	0.006	0.099	<0.001	0.102	0.006	0.100	<0.001
Job demand at baseline									0.102	0.048	0.014	0.033	0.099	0.048	0.013	0.039	0.141	0.051	0.019	0.006
Job control at baseline									-0.025	0.051	-0.003	0.627	-0.020	0.051	-0.003	0.697	0.011	0.054	0.001	0.831
Workplace social capital at baseline													-0.039	0.041	-0.006	0.337	-0.073	0.079	-0.010	0.359
Unit level																				
Workplace social capital at baseline	-0.300	0.110	-0.027	0.007	0.156	0.085	0.014	0.067	0.165	0.090	0.015	0.066	0.160	0.090	0.014	0.077	0.168	0.083	0.015	0.043
Individual × unit interaction of workplace social capital																	-0.017	0.157	-0.006	0.914

B , unstandardized coefficient; β, standardized coefficient; SE, standard error.
Model 1: Crude
Model 2: Psychological distress score at baseline, demographic and occupational characteristics were added into Model 1.
Model 3: Psychosocial work characteristics were added into Model 2.
Model 4: Individual level workplace social capital was added into Model 3.
Model 5: Cross-level interaction term was added into Model 4.

Table 7. Multilevel analysis of the association of bonding workplace social capital at Wave 1 (baseline) with individual-level psychological distress at Wave 3 (follow-up) among 45 units in a social medical cooperation.

(n of respondents =281, n of units = 45)	Model 1				Model 2				Model 3				Model 4				Model 5			
	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P
Fixed effect																				
Individual level variables																				
Gender (woman=1. man= 0)					0.040	0.081	0.004	0.620	0.052	0.082	0.005	0.524	0.052	0.082	0.005	0.524	-0.029	0.088	-0.003	0.740
Age at baseline (yrs)					-0.008	0.004	-0.019	0.029	-0.009	0.004	-0.020	0.024	-0.009	0.004	-0.020	0.024	-0.010	0.004	-0.023	0.015
Years of education (reference: 12y or less)																				
13y to 15y					0.020	0.085	0.003	0.814	-0.003	0.086	<0.00	0.972	-0.004	0.086	-0.001	0.965	-0.007	0.097	-0.001	0.943
16y or more					-0.165	0.093	-0.026	0.078	-0.190	0.095	-0.030	0.045	-0.190	0.095	-0.031	0.044	-0.042	0.107	-0.007	0.693
Marital status at baseline (reference: single)																				
married					-0.001	0.096	<0.001	0.991	-0.005	0.096	-0.001	0.962	-0.004	0.096	<0.001	0.959	-0.135	0.105	-0.016	0.200
divorce/bereaved					0.164	0.124	0.019	0.186	0.154	0.124	0.018	0.216	-0.190	0.124	-0.022	0.214	0.156	0.133	0.018	0.241
Employment status (reference : regular employment)					-0.261	0.086	-0.027	0.003	-0.210	0.089	-0.021	0.018	-0.005	0.089	-0.001	0.018	-0.034	0.097	-0.003	0.730
Occupation (reference: healthcare staff)																				
welfare staff					-0.036	0.108	-0.006	0.739	-0.056	0.109	-0.010	0.610	0.155	0.109	0.027	0.607	-0.178	0.119	-0.031	0.135
others					0.039	0.104	0.007	0.707	0.043	0.105	0.007	0.681	-0.210	0.105	-0.036	0.688	-0.114	0.116	-0.020	0.328
Shift rotating (reference: not engaged in shift work)					-0.084	0.093	-0.008	0.371	-0.106	0.095	-0.010	0.264	-0.056	0.095	-0.005	0.272	-0.015	0.102	-0.001	0.881
Psychological distress score at baseline					0.097	0.006	0.090	<0.001	0.095	0.007	0.088	<0.001	0.094	0.007	0.087	<0.001	0.110	0.009	0.103	<0.001
Job demand at baseline									0.138	0.054	0.018	0.010	0.137	0.054	0.018	0.011	0.123	0.059	0.016	0.036
Job control at baseline									-0.005	0.053	-0.001	0.921	-0.004	0.053	-0.001	0.938	-0.07	0.006	-0.010	0.231
Workplace social capital at baseline													-0.006	0.043	-0.001	0.896	-0.058	0.102	-0.009	0.714
Unit level																				
Workplace social capital at baseline	-0.194	0.154	-0.019	0.208	0.237	0.147	0.023	0.108	0.240	0.149	0.023	0.107	0.238	0.149	0.023	0.109	0.318	0.153	0.031	0.038
Individual × unit interaction of workplace social																	-0.058	0.194	-0.003	0.765

B , unstandardized coefficient; β, standardized coefficient; SE, standard error.
Model 1: Crude
Model 2: Psychological distress score at baseline, demographic and occupational characteristics were added into Model 1.
Model 3: Psychosocial work characteristics were added into Model 2.
Model 4: Individual level workplace social capital was added into Model 3.
Model 5: Cross-level interaction term was added into Model 4.

Table 8. Multilevel analysis of the association of bridging workplace social capital at Wave 1 (baseline) with individual-level psychological distress at Wave 2 (follow-up) among 45 units in a social medical cooperation.

(n of respondents = 313, n of units=45)	Model 1				Model 2				Model 3				Model 4				Model 5			
	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P
Fixed effect																				
Individual level variables																				
Gender (woman=1. man= 0)					0.166	0.075	0.014	0.028	0.168	0.076	0.014	0.027	0.177	0.076	0.015	0.020	0.222	0.083	0.019	0.007
Age at baseline (yrs)					0.007	0.035	0.016	0.038	0.007	0.004	0.016	0.044	0.007	0.036	0.016	0.048	0.009	0.004	0.019	0.025
Years of education (reference: 12y or less)																				
13y to 15y					0.064	0.084	0.010	0.449	0.062	0.086	0.009	0.466	0.039	0.086	0.006	0.647	0.056	0.089	0.008	0.529
16y or more					0.114	0.087	0.017	0.189	0.105	0.088	0.016	0.231	0.084	0.088	0.013	0.341	0.203	0.093	0.031	0.030
Marital status at baseline(reference: single)																				
married					-0.273	0.081	-0.032	0.001	-0.279	0.081	-0.032	0.001	-0.280	0.081	-0.032	0.001	-0.299	0.089	-0.034	0.001
divorce/bereaved					-0.180	0.111	-0.021	0.105	-0.190	0.112	-0.022	0.090	-0.186	0.112	-0.021	0.096	-0.262	0.117	-0.030	0.025
Employment status (reference :regular employment)					-0.062	0.076	-0.009	0.419	-0.033	0.078	-0.005	0.666	-0.031	0.078	-0.005	0.689	0.014	0.082	0.002	0.864
Occupation (reference: healthcare staff)																				
welfare staff					-0.182	0.093	-0.030	0.050	-0.202	0.060	-0.034	0.035	-0.210	0.096	-0.035	0.029	-0.235	0.101	-0.039	0.019
others					0.064	0.084	0.011	0.446	0.065	0.087	0.011	0.451	0.048	0.087	0.008	0.581	0.041	0.090	0.007	0.648
Shift rotating (reference: not engaged in shift work)					-0.156	0.078	-0.014	0.045	-0.169	0.080	-0.015	0.033	-0.171	0.079	-0.016	0.032	-0.060	0.083	-0.005	0.471
Psychological distress score at baseline					0.106	0.005	0.105	<0.001	0.103	0.005	0.101	<0.001	0.097	0.006	0.096	<0.001	0.105	0.007	0.103	<0.001
Job demand at baseline									0.101	0.048	0.014	0.035	0.096	0.048	0.013	0.046	0.154	0.052	0.021	0.003
Job control at baseline									-0.021	0.051	-0.003	0.678	-0.013	0.506	-0.002	0.796	-0.00	0.055	-0.001	0.872
Workplace social capital at baseline													-0.093	0.040	-0.014	0.020	0.023	0.064	-0.003	0.718
Unit level																				
Workplace social capital at baseline	-1.394	0.642	-0.122	0.030	0.127	0.085	0.011	0.135	0.128	0.089	0.011	0.151	0.113	0.089	0.010	0.204	0.150	0.090	0.013	0.094
Individual × unit interaction of workplace social capital																	-0.247	0.131	-0.098	0.060

B, unstandardized coefficient; β, standardized coefficient; SE, standard error.
Model 1: Crude
Model 2: Psychological distress score at baseline, demographic and occupational characteristics were added into Model 1.
Model 3: Psychosocial work characteristics were added into Model 2.
Model 4: Individual level workplace social capital was added into Model 3.
Model 5: Cross-level interaction term was added into Model 4.

Table 9. Multilevel analyses of the association of bridging workplace social capital at Wave 1 (baseline) with individual-level psychological distress at Wave 3 (follow-up) among 45 units in a social medical cooperation.

(n of respondents=281, n of units=45)	Model 1 B	SE	β	P	Model 2 B	SE	β	P	Model 3 B	SE	β	P	Model 4 B	SE	β	P	Model 5 B	SE	β	P
Fixed effect																				
Individual level variables																				
Gender (woman=1.man= 0)					0.039	0.082	0.003	0.637	0.051	0.083	0.004	0.538	0.047	0.082	0.004	0.567	-0.048	0.088	-0.004	0.580
Age at baseline (yrs)					-0.008	0.004	-0.019	0.030	-0.009	0.004	-0.020	0.025	-0.009	0.004	-0.020	0.023	-0.010	0.004	-0.022	0.020
Years of education (reference: 12y or less)																				
13y to 15y					0.021	0.085	0.003	0.809	-0.003	0.086	-0.001	0.969	-0.019	0.087	-0.003	0.826	-0.040	0.096	-0.006	0.673
16y or more					-0.160	0.094	-0.026	0.087	-0.186	0.095	-0.03	0.050	-0.201	0.095	-0.032	0.023	-0.099	0.105	-0.016	0.345
Marital status at baseline(reference: single)																				
married					-0.004	0.096	<0.001	0.970	-0.007	0.095	-0.001	0.944	-0.015	0.096	-0.002	0.873	-0.173	0.106	-0.020	0.103
divorce/bereaved					0.161	0.124	0.019	0.194	0.151	0.124	0.018	0.223	0.154	0.124	0.018	0.217	0.093	0.132	0.011	0.479
Employment status (reference :regular employment)					-0.263	0.087	-0.027	0.002	-0.212	0.089	-0.022	0.017	-0.207	0.089	0.021	0.020	-0.085	0.095	-0.009	0.375
Occupation (reference: healthcare staff)																				
welfare staff					-0.034	0.109	-0.006	0.758	-0.053	0.110	-0.009	0.628	-0.056	0.110	-0.010	0.612	-0.163	0.119	-0.028	0.170
others					0.044	0.105	0.008	0.673	0.049	0.106	0.008	0.641	0.039	0.106	0.007	0.715	-0.062	0.114	-0.011	0.584
Shift rotating (reference: not engaged in shift work)					-0.097	0.093	-0.009	0.299	-0.121	0.095	-0.011	0.200	-0.116	0.095	-0.011	0.222	-0.015	0.100	-0.001	0.878
Psychological distress score at baseline					0.097	0.006	0.090	<0.001	0.094	0.007	0.087	<0.001	0.090	0.007	0.084	<0.001	0.105	0.009	0.098	<0.001
Job demand at baseline									0.136	0.054	0.018	0.011	0.131	0.054	0.017	0.016	0.082	0.060	-0.007	0.172
Job control at baseline									-0.001	0.053	<0.001	0.983	0.009	0.053	0.001	0.087	-0.05	0.060	-0.007	0.404
Workplace social capital at baseline													-0.050	0.042	-0.008	0.228	-0.099	0.092	-0.015	0.281
Unit level																				
Workplace social capital at baseline	-0.440	0.656	-0.041	0.503	0.144	0.140	0.013	0.304	0.132	0.141	0.012	0.349	0.122	0.141	0.011	0.384	0.196	0.148	0.018	0.187
Individual × unit interaction of workplace social																	-0.102	0.170	-0.042	0.551

B , unstandardized coefficient; β, standardized coefficient; SE, standard error.
Model 1: Crude
Model 2: Psychological distress score at baseline, demographic and occupational characteristics were added into Model 1.
Model 3: Psychosocial work characteristics were added into Model 2.
Model 4: Individual level workplace social capital was added into Model 3.
Model 5: Cross-level interaction term was added into Model 4.

Table 10. Multilevel analysis of the association of linking workplace social capital at Wave 1 (baseline) with individual-level psychological distress at Wave 2 (follow-up) among 45 units in a social medical cooperation.

(n of respondents= 281, n of units=45)	Model 1				Model 2				Model 3				Model 4				Model 5			
	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P
Fixed effect																				
Individual level variables																				
Gender (woman=1, man= 0)					0.170	0.075	0.014	0.024	0.170	0.076	0.014	0.025	0.173	0.170	0.014	0.024	0.175	0.082	0.015	0.032
Age at baseline (yrs)					0.007	0.004	0.015	0.047	0.007	0.004	0.015	0.052	0.005	0.007	0.010	0.204	0.001	0.004	0.002	0.812
Years of education (reference: 12y or less)																				
13y to 15y					0.062	0.084	0.009	0.463	0.057	0.085	0.009	0.502	0.026	0.057	0.004	0.762	0.074	0.074	0.011	0.416
16y or more					0.112	0.088	0.017	0.202	0.101	0.088	0.015	0.253	0.049	0.101	0.007	0.580	0.132	0.132	0.020	0.155
Marital status at baseline (reference: single)																				
married					-0.269	0.080	-0.031	0.001	-0.275	0.081	-0.032	0.001	-0.285	0.081	-0.033	<0.001	-0.231	0.089	-0.027	0.010
divorce/bereaved					-0.168	0.111	-0.019	0.130	-0.178	0.112	-0.021	0.112	-0.200	0.112	-0.023	0.073	-0.103	0.121	-0.012	0.394
Employment status (reference: regular employment)					-0.068	0.076	-0.010	0.371	-0.037	0.078	-0.006	0.632	-0.228	0.078	-0.034	0.723	-0.085	0.083	-0.013	0.305
Occupation (reference: healthcare staff)																				
welfare staff					-0.179	0.093	-0.030	0.053	-0.201	0.096	-0.03	0.036	-0.215	0.097	-0.036	0.027	-0.274	0.106	-0.046	0.010
others					0.068	0.084	0.011	0.420	0.067	0.087	0.011	0.438	0.047	0.088	0.008	0.593	0.007	0.097	0.001	0.946
Shift rotating (reference: not engaged in shift work)					-0.177	0.077	-0.016	0.021	-0.191	0.079	-0.017	0.015	-0.188	0.079	-0.017	0.017	-0.099	0.084	-0.009	0.236
Psychological distress score at baseline survey					0.106	0.005	0.104	<0.001	0.103	0.005	0.101	<0.001	0.096	0.006	0.094	<0.001	0.103	0.006	0.101	<0.001
Job demand at baseline									0.105	0.048	0.014	0.029	0.064	0.049	0.009	0.190	0.045	0.052	0.006	0.385
Job control at baseline									-0.011	0.050	-0.001	0.833	-0.015	0.050	-0.002	0.758	-0.04	0.056	-0.006	0.404
Workplace social capital at baseline													-0.173	0.040	-0.024	<0.001	-0.167	0.085	-0.023	0.048
Unit level																				
Workplace social capital at baseline survey	-1.027	0.708	-0.082	0.147	0.116	0.093	0.009	0.214	0.118	0.097	0.009	0.224	0.112	0.098	0.009	0.249	0.570	0.489	0.045	0.244
Individual × unit interaction of workplace social																	-0.124	0.130	-0.050	0.340

B, unstandardized coefficient; β, standardized coefficient; SE, standard error.
Model 1: Crude
Model 2: Psychological distress score at baseline, demographic and occupational characteristics were added into Model 1.
Model 3: Psychosocial work characteristics were added into Model 2.
Model 4: Individual level workplace social capital was added into Model 3.
Model 5: Cross-level interaction term was added into Model 4.

Table 11. Multilevel analysis of the association of linking workplace social capital at Wave 1 (baseline) with individual-level psychological distress at Wave 3 (follow-up) among 45 units in a social medical cooperation.

(n of respondents= 281, n of units=45)	Model 1				Model 2				Model 3				Model 4				Model 5			
	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P	B	SE	β	P
Fixed effect																				
Individual level variables																				
Gender (woman=1. man= 0)					0.046	0.081	0.004	0.575	0.057	0.082	0.005	0.487	0.051	0.082	0.004	0.533	-0.080	0.089	-0.007	0.365
Age at baseline (yrs)					-0.008	0.004	-0.019	0.030	-0.009	0.004	-0.020	0.025	-0.009	0.004	-0.022	0.015	-0.012	0.004	-0.028	0.004
Years of education (reference: 12y or less)																				
13y to 15y					0.014	0.085	0.002	0.869	-0.009	0.086	-0.00	0.914	-0.022	0.086	-0.004	0.796	-0.036	0.095	-0.006	0.702
16y or more					-0.163	0.094	-0.026	0.083	-0.189	0.095	-0.030	0.047	-0.208	0.095	-0.033	0.029	-0.055	0.104	-0.009	0.599
Marital status at baseline(reference: single)																				
married					-0.002	0.095	<0.00	0.983	-0.005	0.096	-0.001	0.957	-0.024	0.096	-0.003	0.801	-0.054	0.103	-0.006	0.597
divorce/bereaved					0.160	0.124	0.019	0.196	0.151	0.124	0.018	0.225	0.146	0.124	0.017	0.238	0.188	0.131	0.022	0.149
Employment status (reference :regular employment)					-0.269	0.086	<0.001	0.002	-0.216	0.089	<0.001	0.015	-0.209	0.089	<0.001	0.019	-0.084	0.098	<0.001	0.395
Occupation (reference: healthcare staff)																				
welfare staff					-0.043	0.110	-0.007	0.698	-0.061	0.110	-0.01	0.579	-0.072	0.111	-0.012	0.513	-0.084	0.117	-0.014	0.471
others					0.049	0.105	0.008	0.640	0.055	0.106	0.099	0.605	0.034	0.106	0.006	0.743	0.091	0.113	0.016	0.419
Shift rotating (reference: not engaged in shift work)					-0.110	0.093	-0.010	0.238	-0.133	0.094	-0.012	0.157	-0.127	0.094	-0.012	0.177	-0.090	0.010	-0.008	0.388
Psychological distress score at baseline					0.095	0.006	0.089	<0.001	0.093	0.007	0.086	<0.001	0.087	0.007	0.081	<0.001	0.101	0.008	0.094	<0.001
Job demand at baseline									0.137	0.054	0.018	0.011	0.123	0.054	0.016	0.024	0.165	0.059	0.022	0.005
Job control at baseline									0.002	0.052	<0.001	0.974	0.007	0.052	<0.001	0.889	-0.00	0.058	-0.001	0.900
Workplace social capital at baseline													-0.092	0.039	-0.014	0.019	-0.172	0.126	-0.026	0.172
Unit level																				
Workplace social capital at baseline	-0.434	0.735	0.135	0.033	-0.099	0.166	-0.008	0.553	-0.072	0.167	-0.006	0.666	-0.075	0.165	-0.006	0.652	-0.048	0.172	-0.004	0.779
Individual × unit interaction of workplace social																	-0.043	0.282	-0.018	0.879

B , unstandardized coefficient; β, standardized coefficient; SE, standard error.
Model 1: Crude
Model 2: Psychological distress score at baseline, demographic and occupational characteristics were added into Model 1.
Model 3: Psychosocial work characteristics were added into Model 2.
Model 4: Individual level workplace social capital was added into Model 3.
Model 5: Cross-level interaction term was added into Model 4.

1 **4. DISCUSSION**

2   Here, I summarize my research findings. Contrary to my hypotheses, this prospective cohort

3 study showed a null association of unit-level workplace social capital of the total scale with

4 respondents' psychological distress. This association was discovered by psychological

5 distress status at baseline survey. Moreover, in a longer observational duration (between

6 Wave 1 to Wave 3), the same association was observed. However, with regard to bonding

7 workplace social capital, the association was adverse and statistically significant regardless of

8 follow-up duration. The cross-level interaction term of the unit level and individual

9 perception of workplace social capital on psychological distress was not statistically

10 significant.

11 These present findings were not consistent with the findings from two previous

12 cross-sectional studies (De Clercq et al., 2013; Gao et al., 2014) or with a longitudinal study

13 (Kouvonen et al., 2008). Contrary to these previous studies, my study showed that the total

14 score of workplace social capital at the unit-level may not have a contextual effect on

15 psychological distress among Japanese employees. Furthermore, although the cross-level

16 interaction term was not statistically significant, unit-level bonding workplace social capital

17 was adversely associated with psychological distress for the two-year observation. This study

1   shows that unit-level bonding workplace social capital may have a partially adverse

2   contextual effect on individual psychological distress; that is, higher homogeneous social

3   capital may contribute to a member's psychological distress. Where does this discrepancy

4   come from?

5   A possible explanation of the discrepancy among studies may involve the study design used.

6   First, both the study in Belgium and the one in China employed a cross-sectional design,

7   while of the one in Finland and my study were prospective cohort studies. With my samples,

8   cross-sectional analysis results were consistent with the two cross-sectional studies ([B] =

9   -0.377, [β] = -0.033, $p < 0.001$ in the total scale of workplace social capital; the table was not

10   shown). The benefit (or harm) of workplace social capital for individuals may not persist in

11   longer terms.

12   Surprisingly, the inverse association of workplace social capital with psychological distress

13   in the crude model turned adverse after adjusting for K6 score at baseline and demographic

14   and occupational characteristics in Model 2. I conducted a supplementary analysis adjusting

15   the K6 score and other variables separately. In the K6 score adjusted model, the coefficient

16   sign turned plus and was no longer statistically significant ([B] = 0.163, [β] = 0.100, $p =$

17   0.090); whereas it did not change its trend in demographic and occupational characteristics in

1   the adjusted model ([B] = -0.163, [β] = 0.146, p = 0.006). I also checked multi-collinearity,

2   but the variance inflation score was not abnormally high. These results indicated that

3   psychological distress observed simultaneously with unit-level workplace social capital may

4   discover the true longitudinal association. On the other hand, in my sample, the coefficient of

5   unit-level workplace social capital did not change and still was not significant even after

6   adjusting for such assumed confounders. This result was partially consistent with one study

7   regarding contextual effects (Gao et al., 2014) and two studies focusing on individual

8   perceptions (Jung et al., 2012; Tsuboya et al., 2015). My findings implied that psychosocial

9   job characteristics, in particular job control, might not confound the association.

10   In subscale analysis, only bonding workplace social capital was adversely associated with

11   psychological distress regardless of observational duration (shown in Table 6 and table 7).

12   This association was independent from individual cognition of workplace social capital. My

13   finding was partially in line with other studies focusing on individual perception of bonding

14   workplace social capital (Sakuraya et al., 2017). Although the cross-level interaction term was

15   not statistically significant, my study suggested that bonding workplace social capital has an

16   adverse contextual effect on individuals' psychological distress. Strict norms and

17   unreasonable obligations may limit members' freedom, generate threats of discrimination

1 from the network, and result in psychological distress (Portes, 1998). Collective social

2 structures (Allik et al., 2004) like Japan may enhance such adverse effects, called "the dark

3 side of social capital." Therefore, we should be careful about promoting a climate of

4 unit-level bonding in terms of mental ill-being in a collective society.

5

6 **Limitations**

7 Some limitations should be declared. First of all, data of this study were obtained from

8 employees in a social medical corporation. The findings may be specific to healthcare sector

9 organizations. Compared to other business settings, health and related sectors include more

10 certified specialists and non-permanent employees. Moreover, as a group, workers in

11 healthcare and related occupations have high levels of exposure to stressors. Due to such

12 participant characteristics, the findings of this study should be applied only with caution to the

13 general working population. However, there was not a huge gap between the study's samples

14 and average Japanese employees regarding the average point of job stressor indicators

15 (Quantitative job burden: 2.1 ± 0.8, Job control: 2.5 ± 0.74 in Japanese average data;

16 compared to our respondents' data: 2.9 ± 0.7, 2.5 ± 0.6, respectively;; Ministry of Health,

17 Labour and Welfare, 2012). In addition, this study included various healthcare and related

1   workers not featured in many previous studies (Ruotsalainen et al., 2015) of occupational

2   health. This occupational diversity reflects real healthcare settings. Therefore, these findings

3   could be reasonably expanded to other healthcare settings, at least. Also, due to the

4   characteristics of study settings, our samples were predominantly women. In Japanese

5   collectivistic culture (Allik et al., 2004), workplace contextual features sometimes force men

6   into unhealthy behaviors (e.g., frequent after-hour drinking parties) as a way of signaling

7   commitment to the organization (Fujino et al., 2012). Confirming gender differences using

8   sex-stratified analysis is more robust than simply adjusting for it in regression. Further studies

9   should be conducted with adequate sample sizes to examine the sex difference more clearly.

10   These two limitations above are the major limitations in this study for generalizability. The

11   findings should be strictly and carefully interpreted for other populations, occupations, work

12   settings, or countries.

13   The samples in this study were not randomly selected and participation was voluntary.

14   Compared to dropout samples or non-participants, the possibility cannot be denied that the

15   participants' workplace trust and commitment were relatively better, as well as having better

16   mental health status (i.e., healthy-worker effect). In fact, the dropout samples showed higher

17   scores of psychological distress than either of the follow-up samples (See Table 1).

1   My research team gave feedback of the survey results to both individuals and the corporation

2   in the end of each survey year. This might have had an effect similar to an intervention.

3   Respondents received a feedback sheet based on their answers to the questionnaire I delivered.

4   Through the feedback sheet, they knew their status regarding job-stressors, physical stress and

5   psychological stress response, and workplace support, and further received comments and

6   advice on how to improve their status. Based on these feedback sheets, some respondents

7   could have changed their cognition or behavior to improve their health. Such individual

8   feedback might also have affected the answer to the questionnaire of the following survey. I

9   also gave feedback to the managers of the corporation. They might have changed their

10   management or leadership style due to the results about their work unit. However, in this

11   study site, organizational-level interventions to improve the work environment were not

12   executed except for the shift work system, which changed between Wave 1 and Wave 2.

13   I could not fully adjust all possible confounders that were treated in previous studies, for

14   example household income (Oshio et al., 2014; Tsuboya et al.., 2015). Without adjusting for

15   such unobserved confounders, the effect of workplace social capital might be overstressed.

16   Regarding health behaviors like smoking, alcohol consumption (Oksanen et al., 2010), or

17   health awareness (Jung et al., 2012), I did not model them as confounders but regarded them

1   as potential mediators. I modeled in this way based on Kawachi and Berkman's theory

2   (2014). Adjusting these mediators for as confounders, would falsely attenuate the effect of

3   the main indicator (unit-level change in workplace social capital, in this study;   Katz, 2006).

4   I could not exclude the possibility that respondents' perception of "workplace" differs with

5   each other especially among some professions and units. For example, medical doctors in the

6   hospital were aggregated within doctors' offices based on personnel administered information

7   (See Table 2 and Table 3). However, they actually work in several medical wards day by day.

8   This gap between data and actual work settings might cause an underestimate of the effect of

9   unit-aggregated workplace social capital.

10   The questionnaire used in this study contained other scales, for example turnover intention.

11   To minimize the possibility to funnel such sensitive information, the respondents were asked

12   to return questionnaires by mail to the author or dropped into a locked box in a study setting

13   and the authors unlocked it by themselves. However, I cannot perfectly exclude the possibility

14   that samples intentionally made favorable, socially desirable answers regarding their

15   workplace.

16   Finally, I could not consider the effect of social capital outside the workplace. Workplace

17   social capital could have a simultaneous effect with community social capital (Fujino et al.,

1   2012). This limitation might lead to overestimation of the effect of workplace social capital in

2   my results.

3

4   **Conclusion**

5   In conclusion, the current study presented no contextual effect of workplace social capital on

6   individual psychological distress in Japan. However, in such a highly collective and

7   hierarchical society, group-level high cohesion and attitude toward mutual benefit may

8   slightly obscure an employee's mental ill-being—that is dark side of social capital.

9

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平成 27 年度 職場のストレスに関する調査
質 問 票

＜この調査の目的＞

＊この調査は，職場の環境や人間関係等のストレスが健康にどのように影響するのかを明らかにし，働きやすい職場づくりに広く役立てることを目的としています。調査に関する説明は，別途説明文書に記載しております。お読みいただければ幸いです。

＜この質問票について＞

＊質問票にご記入後，返信用封筒に厳封のうえ，<u>平成 27 年 9 月末までに</u>，＊＊病院内に設置した専用回収ボックス，または，郵便ポストへご投函ください。＊＊病院内で封が開けられることはありません。回収・開封は，東京大学の調査担当者のみが行います。

＊調査の都合上，質問の数が多く，また同じような質問が繰り返し出てくる箇所もあります。いずれも科学的な調査研究のために必要な質問ですので，ご理解の上ご回答くださいますようお願いいたします。

＊部署ごとの傾向分析，経年的変化の分析の際に必要となりますので，<u>職員番号</u>と<u>氏名</u>，および<u>日付</u>は必ずご記入ください。

なお，質問票の回答内容を東京大学の担当者以外の者が閲覧することは一切ありません。

職員番号		氏 名	
記入日	平成 27 年　　　月　　　日		

※次のページの注意点をご確認の上，ご記入をお願いいたします。

<ご記入に関する注意>

回答について

1． 回答は，質問に応じて該当する番号に〇をつけるか，文字または数字を回答欄にご記入ください。

2． 必要な場合には，カッコ内にもご記入ください。

3． 2か所以上の職場，2つ以上の役職を兼任されている方は，本務のお仕事について，ご回答ください。

4． 管理職などで同僚がいらっしゃらない方は，「同僚」についてたずねる質問については，「同僚はいない」とご回答ください。ひとり職場の方も，同様にご自身の状況に当てはまらない場合には，無理にご回答いただく必要はございません。

5． ご自宅から利用者様宅へ直行・直帰されている方は，利用者様宅を職場としてご回答ください。また，上司・同僚の方にあまりお会いにならなくても，上司・同僚についてたずねる質問につきましては，その方々を想定してご回答くださいますようお願いいたします。

提出について

6． 本質問票にご記入いただいた後，回答用封筒に厳封の上，下記にご投函ください。

　・**病院に勤務されている方：院内の専用回収ボックス

　・**病院外の事業場に勤務されている方：郵便ポスト

　　*郵便ポストに投函すると，東京大学に直接届きます。

　　*切手は不要です。皆様に料金は一切発生いたしません。

ここまでお読みいただき，誠にありがとうございます。

次のページから，質問へのご回答をお願いいたします。

１．あなたのお仕事全般について

あなたのお仕事についてうかがいます。
最もあてはまるものに〇をつけてください。

	そうだ	まあそうだ	ややちがう	ちがう
1. 非常にたくさんの仕事をしなければならない	1	2	3	4
2. 時間内に仕事が処理しきれない	1	2	3	4
3. 一生懸命働かなければならない	1	2	3	4
4. かなり注意を集中する必要がある	1	2	3	4
5. 高度の知識や技術が必要なむずかしい仕事だ	1	2	3	4
6. 勤務時間中はいつも仕事のことを考えていなければならない	1	2	3	4
7. からだを大変よく使う仕事だ	1	2	3	4
8. 自分のペースで仕事ができる	1	2	3	4
9. 自分で仕事の順番・やり方を決めることができる	1	2	3	4
10. 職場の仕事の方針に自分の意見を反映できる	1	2	3	4
11. 自分の技能や知識を仕事で使うことが少ない	1	2	3	4
12. 私の部署内で意見のくい違いがある	1	2	3	4
13. 私の部署と他の部署とはうまが合わない	1	2	3	4
14. 私の職場の雰囲気は友好的である	1	2	3	4
15. 私の職場の作業環境（騒音，照明，温度，換気など）はよくない	1	2	3	4
16. 仕事の内容は自分にあっている	1	2	3	4
17. 働きがいのある仕事だ	1	2	3	4

最近1か月間のあなたの状態についてうかがいます。
最もあてはまるものに○を付けてください。

		ほとんど なかった	ときどき あった	しばしば あった	ほとんど いつも あった
18.	活気がわいてくる	1	2	3	4
19.	元気がいっぱいだ	1	2	3	4
20.	生き生きする	1	2	3	4
21.	怒りを感じる	1	2	3	4
22.	内心腹立たしい	1	2	3	4
23.	イライラしている	1	2	3	4
24.	ひどく疲れた	1	2	3	4
25.	へとへとだ	1	2	3	4
26.	だるい	1	2	3	4
27.	気がはりつめている	1	2	3	4
28.	不安だ	1	2	3	4
29.	落着かない	1	2	3	4
30.	ゆううつだ	1	2	3	4
31.	何をするのも面倒だ	1	2	3	4
32.	物事に集中できない	1	2	3	4
33.	気分が晴れない	1	2	3	4
34.	仕事が手につかない	1	2	3	4
35.	悲しいと感じる	1	2	3	4
36.	めまいがする	1	2	3	4
37.	体のふしぶしが痛む	1	2	3	4
38.	頭が重かったり頭痛がする	1	2	3	4
39.	首筋や肩がこる	1	2	3	4
40.	腰が痛い	1	2	3	4
41.	目が疲れる	1	2	3	4
42.	動悸や息切れがする	1	2	3	4
43.	胃腸の具合が悪い	1	2	3	4
44.	食欲がない	1	2	3	4
45.	便秘や下痢をする	1	2	3	4
46.	よく眠れない	1	2	3	4

あなたの周りの方々についてうかがいます。
最もあてはまるものに〇を付けてください。

	非常に	かなり	多少	全くない

次の人たちはどのくらい気軽に話ができますか？

	非常に	かなり	多少	全くない
47. 上司	1	2	3	4
48. 職場の同僚	1	2	3	4
49. 配偶者，家族，友人等	1	2	3	4

あなたが困った時，次の人たちはどのくらい頼りになりますか？

	非常に	かなり	多少	全くない
50. 上司	1	2	3	4
51. 職場の同僚	1	2	3	4
52. 配偶者，家族，友人等	1	2	3	4

あなたの個人的な問題を相談したら，次の人たちはどのくらいきいてくれますか？

	非常に	かなり	多少	全くない
53. 上司	1	2	3	4
54. 職場の同僚	1	2	3	4
55. 配偶者，家族，友人等	1	2	3	4

満足度についてうかがいます。
最もあてはまるものに〇を付けてください。

	満足	まあ満足	やや不満足	不満足
56. 仕事に満足だ	1	2	3	4
57. 家庭生活に満足だ	1	2	3	4

２．あなたのこころの健康について

過去 30 日の間に，どれくらいの頻度で次のことがありましたか。

	全くない	少しだけ	ときどき	たいてい	いつも
1. 神経過敏に感じましたか	0	1	2	3	4
2. 絶望的だと感じましたか	0	1	2	3	4
3. そわそわ，落ち着かなく感じましたか	0	1	2	3	4
4. 気分が沈み込んで，何が起こっても気が晴れないように感じましたか	0	1	2	3	4
5. 何をするのも骨折りだと感じましたか	0	1	2	3	4
6. 自分は価値のない人間だと感じましたか	0	1	2	3	4

3．あなたの仕事の出来について

次の 0 から 10 点までの数字は，仕事の出来を表したものです。0 点は，あなたの仕事を他の誰かがやって最悪だった時の出来，10 点は一番仕事のできる人がやった場合の出来とします。

最近 4 週間（28 日）のあなたの全般的な仕事の出来はどの程度だったでしょうか。もっとも当てはまる数字に〇をつけてください（勤務評定とは関係ありません。思った通りにお答えください）。

最悪の出来									最高の出来	
0	1	2	3	4	5	6	7	8	9	10

4．あなたのお仕事に対する印象について

次の説明を読んで，**この 1 か月**の自分にどの程度当てはまると思われるのかを答えて下さい。

	全く違う	ほとんど違う	どちらともいえない	まあそうだ	全くその通りだ
1.　この組織で働くことを選んだのは明らかなミスだったと思う	1	2	3	4	5
2.　もっと気軽に働き先を変えられるのなら，この仕事はとっくに辞めているだろう	1	2	3	4	5
3.　他の組織で働くのも構わない	1	2	3	4	5
4.　働き先を変える前に，しなければならないことがたくさんある	1	2	3	4	5

5．あなたのお仕事への取り組みについて

普段，仕事に関してどのように感じていますか。
それぞれ最も当てはまるものに〇をつけてください。

	全くない	ほとんど感じない（1年に数回以下）	めったに感じない（1ヵ月に1回以下）	時々感じる（1ヵ月に数回）	よく感じる（1週間に1回）	とてもよく感じる（1週間に数回）	いつも感じる（毎日）
1.　仕事をしていると，活力がみなぎるように感じる	0	1	2	3	4	5	6
2.　職場では，元気が出て精力的になるように感じる	0	1	2	3	4	5	6
3.　仕事に熱心である	0	1	2	3	4	5	6
4.　仕事は，私に活力を与えてくれる	0	1	2	3	4	5	6
5.　朝に目がさめると，さあ仕事へ行こう，という気持ちになる	0	1	2	3	4	5	6
6.　仕事に没頭しているとき，幸せだと感じる	0	1	2	3	4	5	6
7.　自分の仕事に誇りを感じる	0	1	2	3	4	5	6
8.　私は仕事にのめり込んでいる	0	1	2	3	4	5	6
9.　仕事をしていると，つい夢中になってしまう	0	1	2	3	4	5	6

６．あなたの職場組織について

あなたの職場の意思決定（処遇や資源配分の決定）の手順について，最もあてはまるもの１つに〇をつけてください。

	全く当てはまらない	あまり当てはまらない	どちらともいえない	やや当てはまる	非常に当てはまる
1. 意思決定は正確な情報に基づいてなされている	1	2	3	4	5
2. 決めたことがうまくいかなかった場合に意見を述べたり，異議を申し立てたりする機会が与えられている	1	2	3	4	5
3. 意思決定によって影響を受けるすべての関係者が，意思決定に参加している	1	2	3	4	5
4. 意思決定は一貫している（全ての従業員に対し規則が同様に適用される）	1	2	3	4	5
5. 意思決定によって影響を受けるすべての人たちの考えが，意思決定をする前に聞かれている	1	2	3	4	5
6. 意思決定やそれにもとづく実施について，事後に意見が集められている	1	2	3	4	5
7. 意思決定についてわからないことがあれば，説明や追加情報を要求することが可能である	1	2	3	4	5

あなたの上司の態度や行動について，最もあてはまるもの１つに〇をつけてください。

8. 上司は私たちの考え方を考慮してくれる	1	2	3	4	5
9. 上司は独りよがりなものの見方をしないようにすることができる	1	2	3	4	5
10. 上司は意思決定やその影響について，タイミングよく情報を提供してくれる	1	2	3	4	5
11. 上司は親切心と思いやりをもって私たちに接してくれる	1	2	3	4	5
12. 上司は私たちの従業員としての権利に対して理解を示してくれる	1	2	3	4	5
13. 上司は誠実な態度で，私たちに対応してくれる	1	2	3	4	5
14. 我々の上司は信用できる	1	2	3	4	5

あなたの職場の部署の現在の状況について，お尋ねします。
最も当てはまるものをひとつ選び〇をつけて下さい。

15. 私たちの部署では，仕事に関連した情報の共有ができている	1	2	3	4	5
16. 私たちの部署では，共に働こう，という姿勢がある	1	2	3	4	5
17. 私たちの部署では，お互いに認め合っている	1	2	3	4	5
18. 部署の人々は，新しいアイディアを考えたり実行に移すために協力し合っている	1	2	3	4	5
19. 部署のメンバーは，出来るだけ最良の成果を出すために，お互いの意見を取り入れ活かしあっている	1	2	3	4	5

過去 6 か月間の経験を思い浮かべながら，以下の記述に対し，それぞれどの程度同意できるか同意できないかを回答してください。

※「グループ」とは，ふだん一緒に作業や業務を行う方々をさします。各部署やユニット，あるいはそれよりも小さい単位をイメージしてください。

	全くそう思わない	そう思わない	どちらとも言えない	そう思う	とてもそう思う
1.　あなたのグループでは，メンバーはお互いに敬意をもって接している	1	2	3	4	5
2.　あなたのグループには，協力しようという気持ちやチームワークがある	1	2	3	4	5
3.　あなたのグループでは，対立や不和は公平に解決されている	1	2	3	4	5
4.　一緒に働いている人たちは，私に一人の人として関心を寄せてくれている	1	2	3	4	5
5.　一緒に働いている人たちは，私が困った時に頼りになる	1	2	3	4	5
6.　この組織が差別を許すことは決してない	1	2	3	4	5
7.　あなたのグループでは，個別性は尊重され，大事にされている	1	2	3	4	5
8.　上司やチームリーダーは，様々な経歴や生い立ちをもつスタッフらとうまくやっている	1	2	3	4	5

7. 周囲と自分の行動について

周りの人の行動についてお聞きします。
過去1か月間，あるいはもう少し長期間のことを思い出してください。どのくらいの頻度で上司からの下記のような振る舞いに出会いましたか。

	全くなかった	まれにあった（年に数回）	時々あった（月に1回以下）	一定の間隔であった（月に数回）	よくあった（週に1回）	とてもよくあった（週に2～3回）	毎日あった
1.　あなたの言い分を聞かなかったり，あなたの意見にほとんど関心を示さなかったりした	0	1	2	3	4	5	6
2.　職場にふさわしくない言葉であなたを呼んだ(皆の前か一対一かに関わらず）	0	1	2	3	4	5	6
3.　あなたのことを無視したり，仕事仲間から外したりした	0	1	2	3	4	5	6
4.　あなたの担当業務に関して，あなたの判断を信用しなかった	0	1	2	3	4	5	6
5.　あなたが望まないのに，私的な話題に引き込もうとした	0	1	2	3	4	5	6

8．あなたの職場での勤務の様子について

　ここ**最近**のあなたの職場での勤務の様子を振り返ってみてください。
次の 1～33 に示されるのは職場や組織における様々な行動です。
各々について，あなたが行っているものかどうかについて，1～5 のうちから
適当な番号を選んで，その数字に〇印をつけて答えて下さい。

	全く行わない	めったに行わない	たまに行う	しばしば行う	つねに行う
1．同僚の仕事上のトラブルを進んで手助けする	1	2	3	4	5
2．職場では机をいつもきれいにし，汚さないように努める	1	2	3	4	5
3．会社の新しい展開や内部の事情を，いち早く知るよう努める	1	2	3	4	5
4．多くの仕事を抱えている人の手助けをする	1	2	3	4	5
5．仕事中は無駄な会話で時間をつぶさないようにする	1	2	3	4	5
6．社内報や掲示物にまめに目を通して，社内の最新情報を知っておく	1	2	3	4	5
7．文房具・消耗品を使いやすいように整理し，配置する	1	2	3	4	5
8．不必要に仕事の手を休めないよう心がける	1	2	3	4	5
9．参加が義務づけられていなくても，会社が主催する行事や祭典には参加する	1	2	3	4	5
10．職場では自分の身の回りをきれいに掃除する	1	2	3	4	5
11．仕事上のトラブルを抱えている人を，進んで手助けする	1	2	3	4	5
12．仕事中に必要以上の休息をとらないようにする	1	2	3	4	5
13．仕事上のささいなことに対して，くどくど不平を言わないようにする	1	2	3	4	5
14．自分の周りにいる同僚や部下，上司に手を貸せるようにいつも準備している	1	2	3	4	5
15．休んでいる人の仕事を代わりに手伝ってあげる	1	2	3	4	5
16．昼休みや休息時間を長くとりすぎないよう努める	1	2	3	4	5
17．他の部署（あるいは課）にいる人の仕事を助けてあげる	1	2	3	4	5
18．会社（あるいは組織）の備品や消耗品を無駄づかいしないよう努める	1	2	3	4	5
19．他の部署（あるいは課）を尋ねに来た訪問者の応対をする	1	2	3	4	5
20．上司の仕事であっても進んで手伝う	1	2	3	4	5
21．一度受けた仕事は最後まで責任をもって実行する	1	2	3	4	5
22．同僚や部下からの疑問や質問には丁寧に答える	1	2	3	4	5
23．仕事の時間以外でも，会社が主催する行事や祭典には参加する	1	2	3	4	5
24．自分の意見を職場の人たちに押しつけない	1	2	3	4	5
25．自分から積極的に仕事を見つける	1	2	3	4	5
26．自分の仕事に注意を行き届かせる	1	2	3	4	5
27．職場の人に迷惑にならないように注意して行動する	1	2	3	4	5
28．仕事で間違いに気がついたらすぐに正す	1	2	3	4	5
29．個人的に得た有益な情報を，適切なときに職場に提供する	1	2	3	4	5
30．仕事上の役割を果たすためには，家庭も犠牲にする	1	2	3	4	5
31．仕事の場以外でも積極的に自分の会社（組織）を宣伝する	1	2	3	4	5
32．自分の会社（あるいは組織）が開催するイベントの情報を自主的に紹介する	1	2	3	4	5
33．優秀な人材を自分の組織に入るように勧める	1	2	3	4	5

９．職場における振る舞いについて

過去1か月間で，**上司**はどのくらいの頻度で以下のような振る舞いをしていましたか？

	全くなかった	まれにあった	時々あった	定期的にあった	よくあった	とてもよくあった	毎日あった
1．あなたを無視した	0	1	2	3	4	5	6
2．あなたをのけものにした	0	1	2	3	4	5	6
3．あなたに対して失礼な言い方をした	0	1	2	3	4	5	6
4．あなたに対して失礼な態度をとった（例えば，身ぶりや表情などで）	0	1	2	3	4	5	6
5．あなたに対して配慮がなかった	0	1	2	3	4	5	6

過去1か月間で，**同僚**はどのくらいの頻度で以下のような振る舞いをしていましたか？

	全くなかった	まれにあった	時々あった	定期的にあった	よくあった	とてもよくあった	毎日あった
1．あなたを無視した	0	1	2	3	4	5	6
2．あなたをのけものにした	0	1	2	3	4	5	6
3．あなたに対して失礼な言い方をした	0	1	2	3	4	5	6
4．あなたに対して失礼な態度をとった（例えば，身ぶりや表情などで）	0	1	2	3	4	5	6
5．あなたに対して配慮がなかった	0	1	2	3	4	5	6

過去1か月間で，**部下**はどのくらいの頻度で以下のような振る舞いをしていましたか？

	全くなかった	まれにあった	時々あった	定期的にあった	よくあった	とてもよくあった	毎日あった
1．あなたを無視した	0	1	2	3	4	5	6
2．あなたをのけものにした	0	1	2	3	4	5	6
3．あなたに対して失礼な言い方をした	0	1	2	3	4	5	6
4．あなたに対して失礼な態度をとった（例えば，身ぶりや表情などで）	0	1	2	3	4	5	6
5．あなたに対して配慮がなかった	0	1	2	3	4	5	6

過去1か月間で，**あなた**はどのくらいの頻度で職場の方々に対しこのような振る舞いをしていましたか？

	全くなかった	まれにあった	時々あった	定期的にあった	よくあった	とてもよくあった	毎日あった
1．無視した	0	1	2	3	4	5	6
2．のけものにした	0	1	2	3	4	5	6
3．失礼な言い方をした	0	1	2	3	4	5	6
4．相手に対して失礼な態度を取った（例えば，身ぶりや表情などで）	0	1	2	3	4	5	6
5．配慮をしなかった	0	1	2	3	4	5	6

10. 職場における「いじめ」について

　ここでは「いじめ」を「特定の個人もしくは複数の人が，1人もしくは複数の人から一定期間にわたって継続的に好ましくない行為を受けていると感じながらも，これらの行為から自分を守ることが難しい状況」と定義します。1回限りの出来事は含めません。

この定義を用いたとき，**過去 6 ヶ月間**に職場でいじめを受けたことがあるか，最も当てはまるものに〇をつけてください。	1.いいえ	2.はい，ほんのまれに	3. はい，時々	4.はい，週に何回か	5.はい，ほぼ毎日

11. 職場で受けた行為について

　過去 12 か月間に，あなたは次のような経験をしましたか。
当てはまるものに〇をつけてください。

	全くない	数か月に1回程度	1か月に1回程度	週に1回程度	ほぼ毎日
1.　身体的な暴力（例：殴られる，ひっかかれる，物を投げられる）	0	1	2	3	4
2.　精神的な暴力（例：暴言を吐かれる，人格を否定される，無視される）	0	1	2	3	4
3.　性的な暴力（例：望んでいないのに体を触られる，性的関係を求められる）	0	1	2	3	4

上記の経験は，誰から受けましたか？当てはまる人**すべて**に〇をつけて下さい。	上司・職位が上の人（同じ職種）	上司・職位が上の人（違う職種）	同僚（先輩・後輩含む）	部下	患者・利用者	患者・利用者の家族	その他（具体的にご記入ください）
1.　身体的な暴力	1	2	3	4	5	6	
2.　精神的な暴力	1	2	3	4	5	6	
3.　性的な暴力	1	2	3	4	5	6	（

アンケートは，残り少しです。

たくさんのご回答ありがとうございます！

引き続きよろしくお願いします。

89

12. あなたの行動について 　困ったこと，悩みなどに出会ったとき，あなたはどうすることが多いでしょうか？次の例のそれぞれについて，普段そのような対応を選ぶことがあるかどうか，お答えください。	ほとんどない	たまにある	ときどきある	よくある
1.　原因を調べ解決しようとする	1	2	3	4
2.　今までの体験を参考に考える	1	2	3	4
3.　いまできることは何かを冷静に考えてみる	1	2	3	4
4.　信頼できる人に解決策を相談する	1	2	3	4
5.　関係者と話し合い，問題の解決を図る	1	2	3	4
6.　その問題に詳しい人に教えてもらう	1	2	3	4
7.　趣味や娯楽で気をまぎらわす	1	2	3	4
8.　何か気持ちが落ち着くことをする	1	2	3	4
9.　旅行・外出など活動的なことをして気分転換をする	1	2	3	4
10.　解決できないとわかっていても誰かに愚痴を聞いてもらう	1	2	3	4
11.　自分をそのような状況に追いやった人を責める	1	2	3	4
12.　関係のない人に当たり散らす	1	2	3	4
13.　問題を放り出したり，先送りしたりする	1	2	3	4
14.　「いつか事態が変わるだろう」と思って，つらい時が過ぎるのを待つ	1	2	3	4
15.　どうしていいかわからないので，何もしないで我慢する	1	2	3	4
16.　「何とかなる」と希望をもつ	1	2	3	4
17.　その出来事のよい面を考える	1	2	3	4
18.　これも自分にはよい経験だと思うようにする	1	2	3	4

13. あなたの考え方について（1）

それぞれの文章を読んで，あなたの気持ちを最も良く表す番号を選んでください。

		まったくあてはまらない	かなりあてはまらない	ややあてはまらない	どちらともいえない	ややあてはまる	かなりあてはまる	とてもあてはまる
1.	たいていの場合，何とかしてやっていける	1	2	3	4	5	6	7
2.	人生で成し遂げてきたことに誇りを感じている	1	2	3	4	5	6	7
3.	たいていの場合，物事に冷静に対処する	1	2	3	4	5	6	7
4.	自分自身とうまくつきあっている	1	2	3	4	5	6	7
5.	1度に多くの物事に対処できると感じる	1	2	3	4	5	6	7
6.	決断力がある	1	2	3	4	5	6	7
7.	これまでに困難を経験してきたので，これからも困難を乗りこえられる	1	2	3	4	5	6	7
8.	自制心がある	1	2	3	4	5	6	7
9.	物事に飽きない	1	2	3	4	5	6	7
10.	たいていの場合，何か笑えることを見つけることができる	1	2	3	4	5	6	7
11.	自分自身に対する信念によって，つらいときを切り抜ける	1	2	3	4	5	6	7
12.	いざというときには，たいていほかの人から頼りにされる人間だ	1	2	3	4	5	6	7
13.	私の人生には意味がある	1	2	3	4	5	6	7
14.	困難な状況にあるとき，たいてい苦境を抜け出す方法を見つけることができる	1	2	3	4	5	6	7

14. あなたの考え方について（２）

次のことは，あなたにどのくらいあてはまりますか。

		まったくあてはまらない	ほとんどあてはまらない	あまりあてはまらない	どちらともいえない	少しあてはまる	大体あてはまる	非常によくあてはまる
1.	私は，日常感じる困難や問題の解決策を見つけることができる	1	2	3	4	5	6	7
2.	私は，人生で生じる困難や問題のいくつかは，向き合い，取り組む価値があると思う	1	2	3	4	5	6	7
3.	私は，日常生じる困難や問題を理解したり，予測したりできる	1	2	3	4	5	6	7

15. 仕事でのインシデント・アクシデントについて

あなたは，業務上のインシデントやアクシデントが発生した際に報告を義務づけられている職種に従事していますか。どちらかあてはまるもの１つに〇をつけてください。	1．はい　　　　　　　2．いいえ

上記で「1．はい」に〇をつけた方のみ，次の質問にお答えください。

過去 12 か月間に，あなたが起こしたインシデント・アクシデントについて，発生回数をお答えください。

1.	エラーや医薬品・医療用具の不具合が見られたが患者には実施されなかった，もしくは実施はされたが患者への実害はなかったもの（何らかの影響を与えた可能性は否定できないものも含む）。	☐☐ 回
2.	処置や治療は行わなかったが，患者観察の強化，バイタルサインの軽度変化，安全確認のための検査等の必要が生じたもの。	☐☐ 回
3.	簡単な処置や治療を要したもの（消毒，湿布，皮膚の縫合，鎮痛剤の投与など）。	☐☐ 回
4.	濃厚な処置や治療を要したもの（バイタルサインの高度変化，人工呼吸器の装着，手術，入院日数の延長，外来患者の入院，骨折など）。	☐☐ 回
5.	永続的な障害や後遺症が残ったもの。	☐☐ 回
6.	死亡に至ったもの（原疾患の自然経過によるものを除く）。	☐☐ 回

16. あなた自身のことについて

1.	あなたの年齢をご記入ください。	満 ☐ ☐ 歳
2.	学校教育を何年受けてから就職しましたか。 （例：小・中・高で 12 年）	1. 12 年以下　　　　　　　2. 13～15 年 3. 16 年以上
3.	あなたは結婚していますか？あてはまるものを１つ選んで〇をつけてください。	1. 未婚　　　　　　　　　2. 既婚 3. 死別または離婚
4.	こちらの病院や施設での勤続年数はどのくらいですか？	☐ ☐ 年 ☐ ☐ か月程度
5.	あなたのお仕事は交代制勤務ですか？	1. はい　　　　　　　2. いいえ
6.	あなたの１か月あたりの超過勤務時間は平均何時間ですか？ （管理職，裁量労働などで時間管理されていない方は，週 40 時間を超えた実質労働時間をお答えください）	およそ ☐ ☐ ☐ 時間 （残業されていない方は， 「0」時間とご記入ください）
7.	この 1 年間に，体調が悪いなどの健康の問題のためにあなたが休んだ日数は合計何日ですか。年休で休んだものも含めます。	1 年間に ☐ ☐ ☐ 日 （なければ0とご記入ください）
8.	過去 1 年間に，健康の問題（身体的，または精神的両方含む）によって連続 7 日以上お休みしたことはありますか？	1. はい　　　　　　　2. いいえ

質問票による調査は，これですべて終了です。

記入漏れがないか，再度ご確認の上，配付された返信用封筒に
同意書と一緒に入れてご提出ください。

ご回答，誠にありがとうございました

今後の予定

平成 27 年 12 月～平成 28 年初頭：

職業性ストレス調査の結果を，個人宛に返却します。