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Published in:
Mental Health and Prevention

DOI (link to publication from Publisher):
[10.1016/j.mhp.2023.200300](https://doi.org/10.1016/j.mhp.2023.200300)

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Publication date:
2023

Document Version
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):
Pedersen, L. M., Laursen, S., & Buttenschon, H. N. (2023). Is mental health positively associated with workplace social capital among Danish hospital employees? A multilevel study. *Mental Health and Prevention*, 32, Article 200300. <https://doi.org/10.1016/j.mhp.2023.200300>

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Is mental health positively associated with workplace social capital among Danish hospital employees? A multilevel study

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ARTICLE INFO

Keywords:

Cross-sectional study
Health promotion
Hospital
Mental health
Multilevel linear regression
Social capital

ABSTRACT

Being mentally healthy is associated with being more productive, creative, altruistic, and innovative, which are key values in Western society and highly relevant among hospital employees. However, studies investigating the promotion of mental health rather than the prevention of poor mental health and mental illnesses among hospital employees are limited. Thus, we examined the association between workplace social capital and mental health among hospital employees using electronic survey data collected from Danish hospital employees. The study sample consisted of 1452 employees, corresponding to 40% of the hospital staff. Mental health was assessed using the Mental Health Continuum Short Form, in which mental health is understood as a combination of emotional, psychological, and social well-being. Workplace social capital was assessed using Borg et al.'s (2014) Social Capital Questionnaire, which measures bonding, bridging, and linking social capital in relation to immediate management and the workplace as a whole in four separate subscales. Multiple imputations by chained equations were applied.

Multilevel linear regression analyses showed a positive association among bonding, bridging, and linking social capital in relation to immediate management and mental health. First, our results highlight that hospital employees' mental health is associated with social capital in the workplace. Second, the strongest association was found between bridging social capital in work teams and mental health. Third, mental health was significantly poorer among employees aged between 25 and 35 years than among employees aged between 46 and 55 years. However, unlike our theoretical expectation, linking social capital in relation to the workplace as a whole was not associated with mental health. In conclusion, our results provide an impetus for further research on health promotion and interventions in hospitals and in similar sectors.

1. Introduction

Being mentally healthy is associated with being more productive, creative, altruistic, and innovative and having better health, a social life, higher education levels, employment and higher socioeconomic status (Koushede et al., 2015; Russell et al., 2023; Sallis et al., 2019; Zorach et al., 2023). In a two-year longitudinal panel survey, Keyes et al. (2020) documented inversely proportional associations between mental health levels and the risk of depression. A prospective study concluded that higher mental wellbeing was linearly associated with (1) lower health-care costs and (2) costs in terms of sickness benefit transfers one year later (Santini et al., 2021). Santini et al. (2021) measured healthcare

costs as general practitioner/specialist, hospitalization, outpatient service, and prescription medicine costs, while the cost of sick benefit transfers included partial sickness benefit transfers. Additionally, high levels of eudaimonic well-being are protective, providing individual resilience against detrimental or stressful environments (Santini et al., 2021). From a societal and workplace perspective, mentally healthy individuals are considered to be important employees (Huppert, 2009b; Keyes, 2002; Koushede et al., 2015; OECD, 2018).

Previous studies investigating mental health have mainly focused on poor mental health or mental illnesses (Barry, 2009), such as depression or symptoms of depression (Bassett et al., 2013; Kouvonen et al., 2008; Lofors et al., 2007; Murayama et al., 2013; Oksanen et al., 2010), stress

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<https://doi.org/10.1016/j.mhp.2023.200300>

Received 27 June 2023; Received in revised form 11 September 2023; Accepted 14 September 2023

Available online 15 September 2023

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(Pattussi et al., 2016), emotional exhaustion (Kowalski et al., 2010), and psychological distress (Firouzbakht et al., 2018; Han et al., 2013; Pattussi et al., 2016). A review by Harvey et al. (2017) concluded that certain work situations, such as high job demands, low job control, effort-reward imbalance and low social support, are associated with depression, anxiety and/or work-related stress. Hence, today, we know far more about what causes poor mental health in workplaces and in society in general and how to prevent poor mental health or mental illnesses, rather than how to promote mental health (Huppert, 2009b; Keyes, 2002; Koushede et al., 2015). Research, however, suggests that the drivers of ill-being are not the same as those of well-being (Huppert, 2009b). Furthermore, the best strategy to reduce mental health problems may involve active promotion of mental health rather than prevention and treatment (Huppert, 2009a, 2009b; Riedel et al., 2021). Research focusing on the positive aspects of mental health or how to promote mental health is therefore needed (Huppert, 2009b; Wadsworth et al., 2010).

Cross-sectional studies have shown that the self-perceived working conditions of nurses and doctors at hospitals are worse than those of employees in other sectors (Det Nationale Forskningscenter for Arbejdsmiljø, 2019; Teoh et al., 2019). Another international review showed that the mental health of healthcare staff deteriorated during the COVID-19 pandemic (Riedel et al., 2022). Hence, it is highly relevant to identify positive factors in the working environment, as these may contribute to improving the mental health of hospital employees. Well-functioning hospitals are important to citizens and hospital employees worldwide. Hence, hospitals are an important study setting.

The social capital research is diverse and based on different concepts embracing social cohesion, social support, social integration and/or participation among several other social determinants of health and mental health in particular (Almedom, 2005). Contemporary social capital and health research considers social cohesion and social network approaches as positive to health (Ehsan et al., 2019). Moreover, social capital is measured at the individual and group (aggregate or ecological) levels (Ehsan et al., 2019). In the workplace, social capital can be referred to as collective features or resources of an organization or social relations, such as norms and trust, that facilitate cooperation and coordination (Coleman, 1988; Meng et al., 2018; Oksanen et al., 2013; Putnam, 1996). Based on the work of Szreter and Woolcock (2004), social capital can be divided into three subtypes: bonding, bridging, and linking social capital. In the workplace, bonding social capital refers to relationships among employees belonging to the same group or team, whereas bridging social capital focuses on relationships among employees belonging to different groups or teams. Last, linking social capital concerns relationships between a work team and immediate management and workplace management as a whole (Clausen et al., 2019). Most studies investigating the association between social capital and mental health have been conducted in geographical or residential settings (Carpiano et al., 2020; Moore et al., 2020; Murayama et al., 2013, 2015). However, most adults spend a large part of their daily lives at work, where they develop committed relationships with their colleagues through their work tasks. This makes the workplace an important setting for social interaction and a natural setting for examining associations between social capital and mental health (Gao et al., 2014; Kawachi et al., 2014; Pattussi et al., 2016). However, only a few studies investigating social capital have been conducted in the workplace setting (Clausen et al., 2019; Firouzbakht et al., 2018; Gao et al., 2014; Kouvonen et al., 2008; Oksanen et al., 2010; Pattussi et al., 2016); none of these studies focused on the healthcare sector, which is an important part of every society. The setting of social capital can result in different resources, thereby contributing to whether and how social capital can influence health (Ehsan et al., 2019; Moore et al., 2020). This highlights the relevance of this study of associations between social capital and mental health at a hospital.

Most previous studies have investigated social capital as a single scale or index. Therefore, we aimed to take the different subtypes of

social capital into account and examine the pathways of how social capital is associated with mental health. In the workplace, bonding and bridging social capital may facilitate emotional, instrumental, and informational support from colleagues that protect mental health against stressors, such as workload, that might negatively affect mental health (Ferlander, 2007; Thoits, 2011). Conversely, linking social capital may facilitate access to information and resources from management (Oksanen et al., 2010) that might influence the mental health of employees.

The aims of the present study were as follows:

- (1) to investigate the association between subtypes of workplace social capital and mental health among hospital employees,
- (2) to investigate whether the associations vary depending on the type of workplace social capital, and
- (3) to contribute to the understanding of mental health and mental health promotion among hospital employees based on Keyes' perspective.

The overall focus of the article is illustrated in Fig. 1.

1.1. Theory of mental health

In the present study, mental health is defined using the World Health Organization's (WHO) definition, which states that mental health is "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (WHO, 2014). Hence, mental health is understood as a combination of emotional, psychological, and social well-being by including both the hedonic concept (i.e., one's feelings towards life) and the eudaimonic concept (i.e., psychological functioning). Research on mental health has, however, been dominated by only one of these two concepts, e.g., satisfaction with life or psychological well-being (Diener, 2009; Keyes et al., 2008; Ryan et al., 2001; Ryff, 1989; Santini et al., 2021; Westerhof et al., 2010). Traditionally, mental health has been defined as the absence of mental illness. Thus, people were previously considered mentally healthy if no mental illness was present. Following this understanding, mental health and mental illness theoretically belong to opposite ends of a single continuum (Keyes, 1998, 2005). However, evidence suggests that the lack of mental illness is not necessarily tantamount to being mentally healthy. By way of contrast, mental health concerns whether an individual is thriving both individually and socially and, if so, to what extent. Hence, mental health and mental illness belong to two separate yet correlated continuums (Barry, 2009; Huppert, 2009b; Keyes, 2002, 2005, 2007; Keyes et al., 2008; Ryan et al., 2001; Santini et al., 2020; Westerhof et al., 2010; WHO, 2004).

Studies have shown that males, adults over age 45, individuals with more than 16 years of education, married people, non-smokers, and physically active adults are most likely to flourish (Keyes, 2002; Keyes et al., 2012). Based on psychoanalytic research, Marcus (2017) highlighted the interplay between individual factors such as career choice and organizational factors when creating the conditions for employees to flourish at work.

2. Material and methods

2.1. Participants and study design

The study was based on cross-sectional survey data on mental health, social capital, and other factors from the psychosocial work environment of employees at the Regional Hospital West Jutland (RHJW, now Gødstrup Hospital) in Denmark. The RHJW serves approximately 280,000–300,000 inhabitants from six municipalities. In March 2021, electronic surveys were sent to all employees at the hospital. However, (1) practice reserve doctors, (2) phase 2 and 3 doctors, (3) hospital

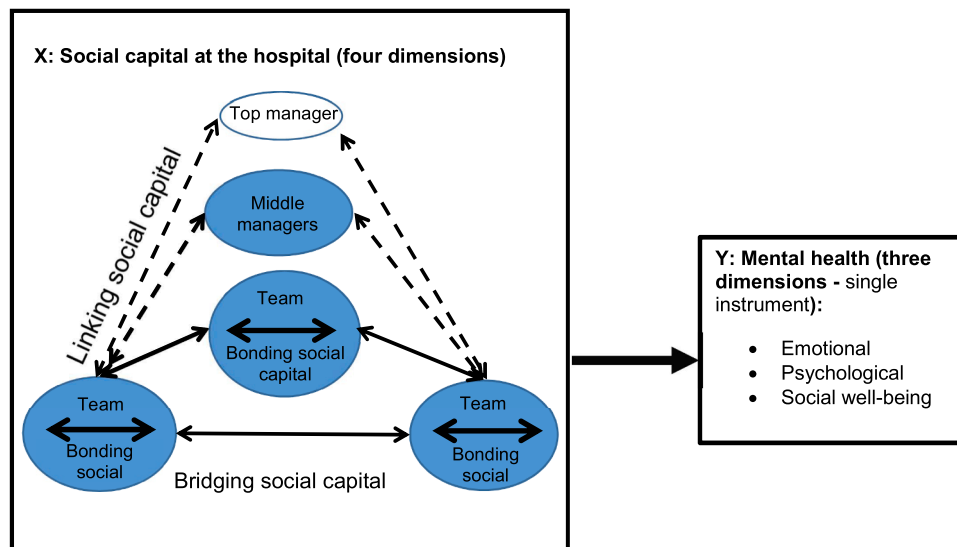


Fig. 1. Illustration of the focus of the article. (Inspired by Borg & Andersen, 2017, p. 22).

practice consultants, (4) students, (5) employees receiving job training, (6) employees on maternity leave, and (7) employees working less than 10 hours per week were not invited to participate in the study because of their lower association with the hospital. Thus, the study population consisted of 3624 full- and part-time employees. Due to missing responses on all of the key questions, 68 employees were excluded. In total, 1452 individuals responded to the questionnaire with consent and were included in the study sample (corresponding to a 40% response rate). The study was registered at the Danish Data Protection Agency (1-16-02-652-18). Informed consent was obtained from all participants. In accordance with Danish law, ethical approval is not required for this type of study. Study data were collected and managed using REDCap electronic data capture tools (Harris et al., 2009, 2019). Females and employees aged 36–55 years were slightly overrepresented. However, the dropout analyzes showed no major signs of systematic dropout.

2.2. Measures

2.2.1. Mental health

Mental health was measured using Keyes' *Mental Health Continuum Short Form* (MHC-SF) ($\alpha = 0.94$), as it includes both the hedonic and eudemonic concepts of mental health by distinguishing among emotional, psychological, and social well-being (Keyes, 2009; Santini et al., 2020). The scale consists of 14 six-point Likert-scale statements (Appendix A). Social well-being includes questions regarding the individuals' perspective on society and other people in general. The scale score ranges from 0 to 70. A higher score indicates better mental health.

2.2.2. Social capital

Workplace social capital was measured using the Danish Social Capital Questionnaire (DSCQ). The DSCQ consists of 15 five-point Likert items divided into four subscales measuring 1) bonding ($\alpha = 0.80$), 2) bridging ($\alpha = 0.85$), and linking social capital in relation to 3) immediate management ($\alpha = 0.92$) and 4) the workplace as a whole ($\alpha = 0.78$) (Borg et al., 2014; Clausen et al., 2019) (Fig. 1 and Appendix B). Initially, the DSCQ was evaluated by selected employees to ensure that the questions and the wording made sense in a hospital context. Based on the pilot test, we added a few extra text boxes to explain the terms 'leader' and 'team', as these terms have a broader meaning in a hospital context. Additionally, we added the answer "I do not know" as a hospital is a more complex organization than that in which the DSCQ was developed. Responses of "I do not know" were categorized as missing

data. For each question, approximately 10–20 employees answered, "I do not know". Furthermore, we made minor changes in the wording of the questions to fit the hospital setting (e.g., "group" was replaced with "section"). All subscale scores ranged from 1 to 100 (Borg et al., 2014). The questionnaire aimed to capture social capital as a group-level construct based on individual responses (Borg et al., 2014; Clausen et al., 2019). For example, the respondents were asked to consider "In our section, we help coworkers who are too busy" instead of the individual perspective "I help my coworkers if they are too busy". Additionally, all questions are asked with reference to the sections' ability to solve the job task (meso-level). By way of contrast the questions in the mental health scale addresses the individuals more general perspective on society (macro-level). An explorative factor analyzes of social capital and mental health revealed a minor correlation between the two concepts under the critical value of 0.7 (not shown). Hence, mental health and social capital differ conceptually and statistically.

2.2.3. Confounders

Work pace and workload are well-known risk factors for the physical and mental health of employees and thus included as confounders in the analyzes (Bowling et al., 2015; Pedersen et al., 2023). However, it has not been clearly determined whether workload and work pace influence the association between social capital and mental health of hospital employees. Work pace and workload were measured using validated scales from the Danish Psychosocial Work Environment Questionnaire (DPQ) (Clausen et al., 2019). The work pace scale consists of two Likert items ($\alpha = 0.74$); for example, "Is the work pace so high that it negatively affects the quality of your work?" The workload scale consists of four Likert items ($\alpha = 0.87$); for example, "How often do you get unexpected tasks that put you under time pressure?" All scales are coded so that low means agreeing to a low extent and vice versa. Hence, in this scale, a high number means that the employees often experience unexpected tasks that put them under time pressure.

2.2.4. Sociodemographic covariates

Sex, age, educational status, employment status, and seniority were included as covariates in the analyzes.

Age was measured in six categories: 18–24 years, 25–35 years, 36–45 years, 46–55 years, 56–65 years, and 65 years or older.

Educational status was measured by dividing the level of formal education into three categories: (1) master's degree or PhD, (2) bachelor's degree or short-cycle higher education (e.g., healthcare staff), and (3) no higher education (e.g., high school graduates, clerks, carpenters,

and electricians).

Employment status was measured in two categories, i.e., whether the respondent was working fulltime (37 h per week) or parttime (more than 10 but less than 37 h per week).

Seniority was measured with four responses to the question, "For how long have you been employed at your current workplace?": (1) less than a year, (2) from 1 to 4 years, (3) from 4 to 10 years, and (4) more than 10 years. Based on the definitions of social capital and mental health presented above, both key terms were considered dynamic social perceptions. Therefore, we asked the respondents about their seniority at their workplace and not in their profession.

2.2.5. Auxiliary variables

Cohen's Perceived Stress Scale (PSS-4) score, sex and age were used as auxiliary variables (Cohen et al., 1988; Nguyen et al., 2017). The PSS-4 scale consists of four Likert items; for example, "In the last month, how often have you felt that things were going your way?"

2.3. Statistical analyses

We applied multilevel linear regression using robust standard errors to investigate the association between different types of workplace social capital and mental health, as social capital is theoretically defined not only as an individual asset but also as a collective asset (Han et al., 2013). The two levels specified in our model were individuals or employees at level 1 nested within RHWJ departments at level 2.

The first model (Model 0), in which only the dependent variable (mental health, MHC-SF score) was included to investigate whether the residuals varied between and within departments. The following equation was used:

$$MHC_{ij} = \beta_0 + u_{0j} + e_{ij}$$

where i represents individuals and j represents departments. β_0 represents the constant, u represents the residual for the department, and e represents the residual for the individual. In Model 1, the independent variables were added: bonding social capital (Bonding), bridging social capital (Bridging), and linking social capital in relation to immediate management (LinkingI) and to the workplace as a whole (LinkingW). The following equation was used:

$$MHC_{ij} = \beta_0 + Bonding_{ij}\beta_1 + Bridging_{ij}\beta_2 + LinkingI_{ij}\beta_3 + LinkingW_{ij}\beta_4 + u_{0j} + e_{ij}$$

In Model 2, the confounders were added to Model 1 using the following equation:

$$MHC_{ij} = \beta_0 + Bonding_{ij}\beta_1 + Bridging_{ij}\beta_2 + LinkingI_{ij}\beta_3 + LinkingW_{ij}\beta_4 + Work\ pace_{ij}\beta_5 + Work\ load_{ij}\beta_6 + u_{0j} + e_{ij}$$

Finally, in Model 3, sociodemographic covariates were added to Model 2 using the following equation:

$$MHC_{ij} = \beta_0 + Bonding_{ij}\beta_1 + Bridging_{ij}\beta_2 + LinkingI_{ij}\beta_3 + LinkingW_{ij}\beta_4 + Work\ pace_{ij}\beta_5 + Work\ load_{ij}\beta_6 + Sex_{ij}\beta_7 + Age_{ij}\beta_8 + Education_{ij}\beta_9 + Employment\ status_{ij}\beta_{10} + Seniority_{ij}\beta_{11} + u_{0j} + e_{ij}$$

All statistical analyses were carried out using STATA 17.0. Due to potential bias because of missing data (Table 1), we used multiple imputation analyses by chained equations under the assumption that data were missing at random (Graham, 2009). We created 32 imputed datasets, as the literature suggests that the number of imputed datasets should be equal to the percentage of incomplete cases (32%) (Nguyen et al., 2017). Except for sociodemographic characteristics, all variables used in the analyses were included in the imputation model. Following imputation, we combined the effect estimates in multilevel regression

Table 1

Share of missing responses.

	<i>n</i> missing	%	<i>n</i>	min	max
Mental health	187	12.88	1265	0	70
Bonding social capital	39	2.69	1413	0	100
Bridging social capital	234	16.12	1218	0	100
Linking social capital, immediate management	86	5.92	1366	0	100
Linking social capital, workplace as a whole	111	7.64	1341	0	100
Work pace	78	5.37	1374	0	100
Workload	86	5.92	1366	0	100
Seniority	3	0.21	1449	1	4

Note. $N = 1452$.

analysis using Rubin (1996) rule. Imputed variable means were compared to complete case means. These analyses showed minor differences for the MHC-SF scale, where the difference was the largest; the mean was 51.25 for the original scale and 51.04 after imputation. Furthermore, the results from regression analyses using imputed values were compared to complete case analyses. Both comparisons showed no major differences between the complete cases and imputed values (results not shown).

3. Results

In Table 2, the sociodemographic characteristics of the participants are presented. Most respondents were female (89%), aged between 25 and 65 years (96%), had a bachelor's degree or short-cycle higher education (65%), and worked fulltime (67%). Forty-five percent of the respondents had been working at the hospital for more than 10 years. Table 3 shows the means of the variables with missing values after imputation. The mean score for mental health among the respondents was approximately 51. Furthermore, the subscales bonding (73.94) and linking social capital in relation to immediate management had the highest mean scores (69.64).

Table 4 (Models 1–3) shows the positive association among bonding, bridging, and linking social capital in relation to immediate management and mental health. No significant associations were observed

Table 2

Sociodemographic characteristics of the participants.

	<i>N</i>	%
All	1452	100
Sex		
Male	166	11.43
Female	1286	88.57
Age (years)		
18–24	23	1.58
25–35	295	20.32
36–45	387	26.65
46–55	403	27.75
56–65	310	21.35
65+	33	2.27
Educational status		
Master's degree and PhD	254	17.49
Bachelor's degree or short-cycle higher education	953	65.63
No higher education	245	16.87
Employment status		
Fulltime (37 h per week)	979	67.42
Parttime (10–36 h per week)	473	32.58
Seniority*		
< 1 year	243	16.74
1–4 years	278	19.15
4–10 years	275	18.94
> 10 years	653	44.97

$N = 1452$.

* All scales are coded so that low means correspond to a low extent and vice versa.

Table 3
Imputed means for variables with missing values.

Variable	Means [95% CI]	Min	Max
Mental health	51.04 [50.42, 51.65]	0	70
Bonding social capital	73.94 [73.17, 74.71]	0	100
Bridging social capital	60.02 [59.16, 60.87]	0	100
Linking social capital, immediate management	69.64 [68.58, 70.70]	0	100
Linking social capital, workplace as a whole	61.04 [60.11, 61.97]	0	100
Work pace	43.77 [42.86, 44.67]	0	100
Workload	48.67 [47.67, 49.67]	0	100

between linking social capital in relation to the workplace as a whole and mental health. Moreover, Models 1–3 showed different coefficients for the workplace social capital subscales. Bridging social capital was slightly more associated with mental health than bonding and linking social capital in relation to immediate management. Model 2 showed that neither work pace nor workload was associated with mental health. Finally, the model was adjusted for sociodemographic characteristics (Model 3). The coefficients did not change significantly after adjustments for confounders and sociodemographic covariates. Compared to employees between 46 and 55 years of age, employees between 25 and 35 years of age had poorer mental health. Educational status, employment status and seniority were not significantly associated with mental health.

The linear associations between bridging, bonding and linking social capital and mental health are illustrated in Fig. 2. At first glance, the

associations in our models might seem small because our subscales for the different types of social capital were coded from 0 to 100, and mental health was coded from 0 to 70. However, we observed a change in the level of mental health from 37 to 56 for the lowest reported level of bonding social capital to the highest reported level of bonding social capital. Additionally, the effect sizes measured in eta-squared were 0.01** for bonding social capital, 0.02*** for bridging social capital and 0.01** for linking social capital in relation to the immediate management and insignificant for linking social capital in relation to the workplace as a whole (Appendix C).

4. Discussion

In this study, we examined whether workplace social capital was positively associated with the mental health of hospital employees and whether subtypes of workplace social capital were differently associated with mental health. We studied the association between the four subtypes of workplace social capital and mental health among Danish hospital employees. Our findings suggest a strong positive association between workplace social capital and mental health. Interestingly, we found the association between workplace social capital and mental health to be more complex than suggested in previous research, as associations varied across the different subtypes of workplace social capital. The strongest association was found between bridging social capital and mental health. No association was found between linking social capital in relationship to the workplace as a whole and mental health. Thus, mental health among hospital employees may be promoted through a systematic intervention focusing on bonding, bridging, and linking social capital in relationship to the immediate management.

This study is not directly comparable to most other studies due to our focus on hospital employees and the different assessments of workplace

Table 4
Associations between workplace social capital and mental health.

	Model 0 Empty Coefficient [95% CI]	Model 1 Added social capital Coefficient [95% CI]	Model 2 Added confounders Coefficient [95% CI]	Model 3 Added sociodemographic characteristics Coefficient [95% CI]
Bonding social capital		0.08** [0.03, 0.13]	0.08** [0.03, 0.14]	0.08** [0.03, 0.13]
Bridging social capital		0.11*** [0.06, 0.16]	0.11*** [0.06, 0.16]	0.12*** [0.06, 0.17]
Linking social capital, immediate management		0.07** [0.03, 0.11]	0.07** [0.03, 0.11]	0.07** [0.03, 0.12]
Linking social capital, workplace as a whole		0.02 [−0.03, 0.07]	0.02 [−0.03, 0.06]	0.01 [−0.04, 0.06]
Work pace			−0.02 [−0.06, 0.02]	−0.02 [−0.06, 0.02]
Workload			0.01 [−0.03, 0.05]	0.01 [−0.03, 0.05]
Sex				
Male				−2.79 [−5.93, 0.35]
Female				REF.
Age (years)				
18–24				−3.94 [−10.52, 2.64]
25–35				−2.07* [−4.10, 0.04]
36–45				−0.95 [−3.00, 1.11]
46–55				REF.
56–65				0.16 [−2.05, 2.52]
65+				0.71 [−4.81, 6.24]
Educational status				
Master's degree and PhD				REF.
Bachelor's degree or short-cycle higher education				1.11 [−0.82, 3.03]
No higher education				−1.25 [−2.90, 2.68]
Employment status				
Parttime				0.03 [−2.07, 2.13]
Fulltime				REF.
Seniority				
< 1 year				0.79 [−1.51, 3.10]
1–4 years				0.44 [−1.45, 2.34]
4–10 years				0.38 [−1.25, 2.00]
> 10 years				REF.
Constant	50.91 [50.04; 51.77]	31.99 [28.72, 35.26]	32.96 [27.77, 38.14]	34.11 [28.08, 40.15]
Department level variance (S.E)	1.17 (0.30)	1.33 (0.42)	1.34 (0.41)	1.24 (0.41)
Individual level variance (S.E)	11.15 (0.28)	10.54 (0.27)	10.53 (0.27)	10.47 (0.26)

Note. Abbreviations: CI: confidence interval; S.E.: standard error; REF.: reference category.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. $N = 1428$. Imputations = 32.

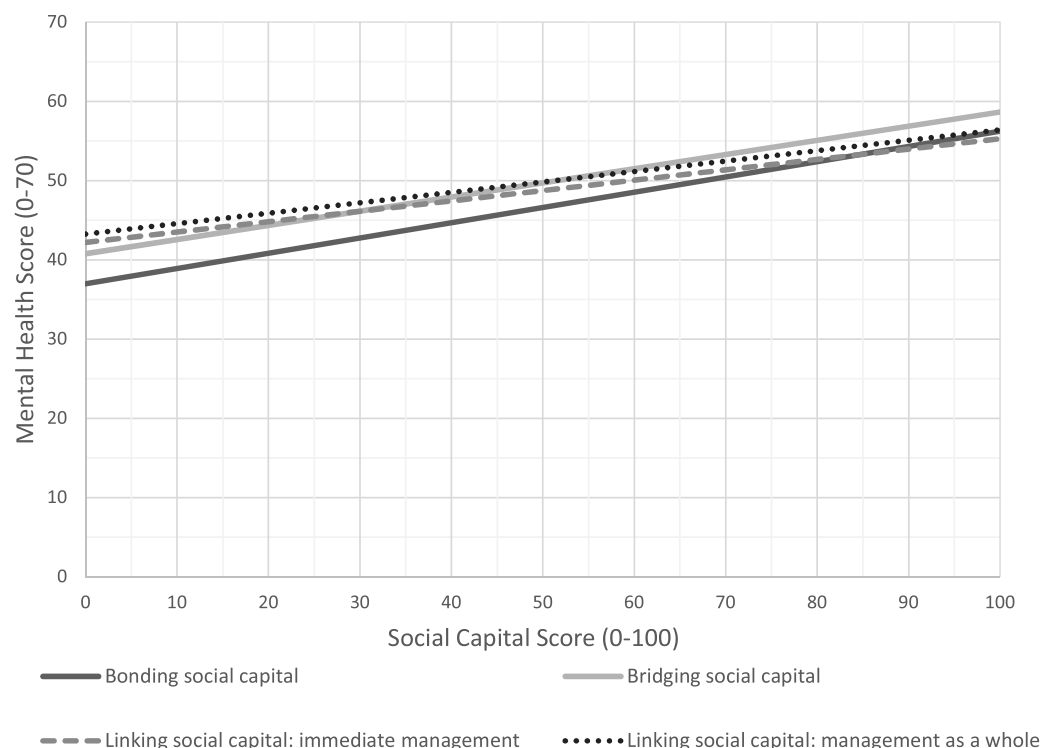


Fig. 2. Illustration of the linear association between the four subtypes of social capital and mental health.

social capital and mental health. However, overall, our results are considered to be in line with previous research.

Contemporary research highlights social cohesion and social network as the most important aspects of social capital for mental health (Ehsan et al., 2019). The workplace is an important setting for social cohesion and social networks and a relevant place to study associations between social capital and mental health. A Danish longitudinal study using the same four workplace social capital subscales also showed a positive association between workplace social capital and mental health (Clausen et al., 2019). Moreover, Clausen et al. (2019) found bridging social capital to be slightly more strongly associated with mental health than the other three types of workplace social capital. In contrast to our study, Clausen et al. (2019) found linking social capital in relation to the workplace as a whole to be associated with mental health. Our study was conducted among employees at a hospital, whereas Clausen et al. (2019) investigated individuals working in the dairy industry, where interactions between employees and management were more frequent, and the organization was smaller and less complex. Furthermore, our study was based on approximately 1500 hospital employees, whereas the study by Clausen et al. (2019) was based on approximately 550 employees in the dairy industry. Mental health was likewise assessed differently, as Clausen et al. (2019) used the 5-item WHO Well-Being Index (WHO-5). Other international studies showed low workplace social capital in general to be a predictor for psychological distress (Firozabakht et al., 2018), poorer mental health (Gao et al., 2014) antidepressant treatment and/or depression (Kouvonen et al., 2008; Oksanen et al., 2010) and the purchase of antidepressants (Jensen et al., 2020). Based on the results of our study, high workplace social capital was associated with better mental health. Hence, systematic work with workplace social capital may be a way to promote mental health, e.g., among hospital employees.

One of the strengths of the present study is that we combined two aspects, social capital and mental health, both of which have been underrepresented in social science research and health research thus far. Second, we focused on (subtypes of) workplace social capital as a positive factor for mental health rather than a broad and more diffuse

concept of social capital or the causes or prevention of mental illnesses or poor mental health. Third, we conducted a large study among hospital employees, including healthcare professionals in addition to other hospital employees. To our knowledge, studies investigating the promotion of mental health among hospital employees are limited. Recent research has shown that the mental health of healthcare staff is deteriorating and has declined during the COVID-19 pandemic (Riedel et al., 2022). Furthermore, most European countries are experiencing a nursing shortage (Mcgrath, 2021). Thus, the identification of protective factors in the working environment may be more relevant than ever. Fourth, we studied social capital in the workplace rather than in geographical or residential settings, and previous studies in this context have been conducted only a handful of times (De Silva et al., 2005; Han et al., 2013; Kawachi et al., 2004; Moore et al., 2020; Pfortner et al., 2015). Employed adults spend a large part of their lives at work, which makes work an important setting for mental health promotion. A fifth strength is that we examined bonding, bridging, and linking social capital through four separate subscales. Hitherto, workplace social capital has most commonly been measured by the 8-item Kouvonen Index (Pattussi et al., 2016), as in Finnish Public Sector Studies (Gao et al., 2014; Kobayashi et al., 2014; Kouvonen et al., 2008; Oksanen et al., 2013). Only a few studies have investigated subscales of workplace social capital. However, these studies used depression (Oksanen et al., 2010), overweight (Kobayashi et al., 2014), and work engagement (Meng et al., 2018) as the outcome variables. Our results, however, underline that evaluating workplace social capital by using a single index or scale is not adequate. Sixth, in addition to relevant sociodemographic variables, the analyzes included work pace and workload as possible confounders. Previous studies have shown that work pace and workload influence the working environment and the quality of health care services (Pedersen et al., 2023; Teoh et al., 2019).

The final strength of the study was the use of multiple imputation. This provided us with a complete and larger sample. The primary goal of multiple imputation is not to replace missing data with plausible values but to obtain valid inferences (Rodwell et al., 2014). Hence, the primary reason for using multiple imputation was to validate the results based on

non-imputed data and to indirectly control for bias caused by unsystematic drop out. Moreover, the mathematical procedures currently used for multiple imputations are highly precise (De Silva et al., 2019; Graham, 2009), and the validity depends on the specifications of the imputation model and the checking of the model (Nguyen et al., 2017).

An obvious limitation of the study is the cross-sectional study design investigating the effect of subtypes of social capital on mental health and not the cause-effect relationship. Thus, the study was not able to determine whether increased workplace social capital results in better mental health. Furthermore, a review of the association between social capital and mental health suggests that social capital can have a negative influence on certain aspects of mental health (Ehsan et al., 2019). We did not explore this issue. Interestingly, previous studies using a longitudinal design revealed that social capital influences mental health (Clausen et al., 2019; Gao et al., 2014), depressive mood (Murayama et al., 2013), and depression (Kouvonen et al., 2008; Oksanen et al., 2010). Another limitation of the study was the use of a single instrument to evaluate mental health. The MHC-SF was originally designed as a single instrument, as used in the present study, or as three subscales measuring *emotional well-being* (hedonic well-being), *psychological well-being* (an aspect of eudemonic well-being), and *social well-being* (an aspect of eudemonic well-being) separately. A study validating the Danish version of the MHC-SF showed that these subscales are not usable with the Danish version of the instrument (Santini et al., 2020). Additionally, we believe our assessment of mental health reflects the theoretical understanding of the WHO definition more comprehensively than other measurements typically used to assess mental health, e.g., the WHO-5 or the 12-item Short Form survey (SF-12). These measurements often measure only one or a few aspects of mental health and only include psychopathology items or a mixture of distress and well-being items (Bech et al., 2003; Christensen et al., 2010; Lamers et al., 2011). In contrast, all the questions in the MHC-SF scales are positively worded (Santini et al., 2020). The multilevel approach may be viewed as a limitation as this focuses on formal structures instead of informal structures and the overall social capital in the organization (Borg et al., 2014). However, due to the organizational structure of RHWJ, we found it relevant to use this approach. Last, the study was conducted during the COVID-19 pandemic, which might have negatively influenced both the mental health of the hospital staff and the social capital at the hospital. However, the data were collected at a time when COVID-19 was not at a peak in terms of population prevalence and hospital admissions (The Danish Health Authority, 2021). Recent research has shown that healthcare staff reactions to the COVID-19 pandemic depend on their seniority, and longer work experience enables them to cope with increased work pressure (Riedel et al., 2022). Seventeen percent of the sample in this study had less than one year of seniority and may have been influenced differently by the COVID-19 pandemic than the rest of the sample. However, we observed no significant association between seniority and mental health in Model 3 (Table 4).

In conclusion, our study showed positive associations between the subtypes of workplace social capital and mental health in a hospital setting. Moreover, this study adds to the current knowledge on the association between mental health and workplace social capital by documenting variation in the strength of the association depending on the subtype of social capital. Hence, our results highlight the importance for future research to investigate social capital with the use of four separate subscales. Bridging social capital was found to be more strongly associated with mental health than the other three types of workplace social capital. Research focusing on social ties to family and in the geographical setting highlights the importance of social ties for mental health (Gu, 2020; Pullen et al., 2022). Additionally, bonding social capital in teams involves close and frequent interaction and communication in solving the key job task, which provides opportunities for mutual influence on mental health, especially the social aspects of mental health (Borg et al., 2014). Hospital employees often work in different teams; thus, working in a team in a hospital setting may have a different impact

on mental health compared to working on teams in other workplaces. The lack of association between linking social capital in relation to the whole workplace and mental health can be understood in the same context. Interestingly, a recent study investigating the association between social capital and the quality of health care services in a hospital setting found the strongest association between bridging social capital and the quality of health care services (Pedersen et al., 2023). Additionally, the study adds to the research on mental health among hospital employees by highlighting the importance of age. Our overall results may provide inspiration for the promotion and interventions of mental health among hospital employees through a systematic focus on subtypes of social capital.

CRedit authorship contribution statement

Louise Møller Pedersen: Conceptualization, Methodology, Validation, Investigation, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition. **Signe Laursen:** Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Visualization. **Henriette Nørmmølle Buttenschøn:** Writing – review & editing, Supervision, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

This study was funded by The Danish Working Environment Research Fund (20-2019-09), the Department of Sociology and Social Work, Aalborg University and Gødstrup Hospital, Denmark.

We thank all the employees at Gødstrup Hospital who took the time to respond to the survey. Furthermore, we thank the hospital directorate for making the study possible. Finally, we thank Martin Brygger Andersen for helpful statistical advice.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.mhp.2023.200300](https://doi.org/10.1016/j.mhp.2023.200300).

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