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Associations of Shared Workspaces with Healthcare Professionals' Work Engagement and Perceived Stress

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Abstract. Introduction: The reform of the health and social services in Finland includes the modernization of both work processes and facilities. This means a transition to patient reception rooms and office facilities that are in shared use. However, research on the associations of shared workspaces with well-being is rare. The aim of this study is to investigate how healthcare professionals rate the functionality of the shared workspaces and how it is associated with work engagement and perceived stress. Methodology: Questionnaires were administered in five healthcare organizations (N=329). Pearson's correlation coefficients and linear regression were used to test which functionality factors of shared workspaces were associated with work engagement and perceived stress. Unadjusted models, as well as models adjusted for age, gender, managerial position, and use of spaces, are reported. Results: The perception of the safety of the facilities was the strongest predictor of work engagement and perceived stress in shared patient reception rooms. Furthermore, the perceptions on how well the facilities supported interaction and collaboration between teams/units predicted work engagement and perceived stress in both reception rooms and activity-based workspaces (ABW). Positive ratings of how well the facilities supported interaction and collaboration were associated with higher work engagement and lower stress. The perceived availability of spaces for quiet work predicted higher work engagement but not perceived stress. However, when adjusted for the use of spaces (assigned or non-assigned seating), non-assigned seating emerged as a stronger predictor of work engagement than perceived availability for quiet spaces. Given that disturbance of speech was common in ABWs, organizations and designers should focus on creating ABWs that enable undisturbed interaction and collaboration.

Keywords. Shared workspaces, Functionality, Health Care professionals, Well-being at work

1. Introduction

The healthcare sector is undergoing significant changes worldwide due to the aging population [1], cost pressure, healthcare reform, and shift towards outpatient care [2]. To address these changes, healthcare providers aim to increase efficiency by unifying fragmented service processes and adopting new technologies and facilities.

In Finland, social welfare and healthcare, as well as primary healthcare and specialized medical care, are moving to the same facilities to ensure better cooperation between professionals and to achieve seamless treatment processes. Regarding the work facilities in outpatient clinics, the change means transition to patient reception rooms and office facilities that are in shared use. As a result, the personnel give up their own reception rooms and switch rooms. Only immediate tasks related to patient care are carried out in the reception rooms, whereas other tasks such as reading and writing referrals, making phone calls, dictations as well as communicating with colleagues are performed in activity-based workspaces (ABW). An ABW refers to a flexible space concept that offers a variety of spaces for different tasks; typically offering open-plan layout and additional spaces for concentration and collaboration [3]. ABWs include rules regarding how the office should be used. Typically, the idea is to switch between workstations and spaces, that is, workers do not have assigned seating, although sometimes home bases are given to teams or groups of people. [4].

According to recent reviews of healthcare facilities [5], the facilities for personnel are investigated less than the patient facilities. In addition, research of shared workspaces in the social and healthcare sector is rare [6]. Several overlapping changes in recent years (including the COVID-19 pandemic) are straining healthcare personnel's ability to cope and perceived stress has increased [7,8]. Previous research shows that physical work environments may also cause stress [9-11] or, at best, provide employees with resources to cope with stress or support restoration from stress [12,13]. Considering the recent challenges healthcare professionals are facing, research investigating the role of the work environment in well-being is needed.

A recent review focused on empirical studies from 1990 to 2019 investigating associations of healthcare professionals' work environments with well-being [5]. The mental health outcomes such as stress and well-being were investigated. The reviewed studies showed that workspace design enabling ease of interaction and individual work as well as taking levels of noise, natural lighting, and exterior views into account, were associated with lower levels of stress and higher well-being of the staff. Furthermore, accessibility to multiple work areas (e.g., supplies, equipment, workstations) affected physical, cognitive, and psychosocial dimensions of fatigue and job satisfaction. Also, satisfaction with break areas and perception of safety of the environment were associated with lower levels of stress. Instead, associations of temperature, air quality, furniture and materials with health outcomes were mixed. [5]. A few more studies have appeared recently showing similar associations between natural light, access to window views and lower stress [14] as well as overall lightning and well-being [15]. Furthermore, high noise exposure was associated with higher stress [16], and satisfaction with proximity of supplies and equipment rooms were associated with increased satisfaction [17].

Although the associations between work environments and well-being have been studied in the healthcare sector, previous research concerning the application of ABW as a shared workspace arrangement is from office environments [18-21]. Moreover, evidence on the effects of ABWs on employee well-being in office environments is also limited and contradictory [18, 20].

Well-being at work is a broad concept, that has been defined in many different ways [22]. In this study, well-being is approached with the concepts of perceived stress and work engagement. According to the Job Demands-Resources (JD-R) model [23, 24], working conditions contain both demands and resources with different long-term effects on workers. Demands, e.g., poor work conditions, require extra effort which may, over time, be manifested as negative effects, such as stress symptoms. Resources, on the other

hand, help in achieving work goals, reduce the negative effects of demands and stimulate development leading to positive experiences, such as work engagement. [24]. Previous research on physical work environments has mainly focused on negative effects (i.e., demands) but the JD-R model has also been applied in this area, drawing attention to the need to consider both negative and positive aspects of the work environment [e.g., 25]. The multidimensional framework of Wohlers and Hertel [4] is oriented towards the physical environment, and proposes that ABW features (e.g., openness of the main work environment, activity-related work locations) affect working conditions (e.g., privacy, visibility), which, in turn, have different short and long-term consequences for well-being.

Supportive environments may as well result in increased motivation and engagement [26]. Work engagement refers to a positive emotional and motivational state at work. The experience of absorbing work has been found to have a positive effect on an employee's physical and mental health, good performance and even the company's success. In addition, work engagement is enhanced by various work-related resources. One such is related to the interaction of the working community.[27]. As far as we know, only a few studies have investigated work engagement in the context of ABWs [28-32].

Previous studies of ABWs have focused on comparing them to other office concepts in terms of indoor environmental quality or overall satisfaction [e.g., 18, 33]. These studies have showed more positive results for ABWs in comparison with open-plan offices, but being more negative compared to private offices [15]. However, associations of the functionality of shared workspaces with well-being have received less attention. Of the previous studies Haapakangas et al. [34] concluded that satisfaction with the physical environment, privacy and communication had positive associations with well-being at work.

Organizations often justify the transition to ABWs with ease of communication and better ability to perform different work tasks as this office concept offers various spaces for privacy and collaboration. Still, lack of privacy and distractions are typical disadvantages also in ABWs [18]. The most common distractions are speech sounds [34, 35], which may lead to strain and increase stress symptoms [36]. It seems, that as office environments become more shared, employees report more distractions and cognitive stress, particularly if their work requires high concentration [19]. One reason for distractions in ABWs may be lack of quiet workspaces [4, 34].

Hodzic et al. [29] found that distractions had negative effects also on work engagement. This association was stronger if the workers suffered from work stressors such as time pressure. Other negative factors associated with ABWs include limited storage space [37, 38, 39], insufficient hygiene in shared facilities [39] as well as difficulties finding a suitable workspace [40, 41].

Space design can be a key to reinforcing social interaction [42], which in turn may be effective against harmful stress. However, in ABWs, the benefits of interaction and collaboration are mixed [18,19]. Mixed results may as well at least partly be explained by lack of additional spaces for private conversations, as workplaces providing sufficient spaces for private conversations seem to perform better [39, 43].

Another factor, which could show a positive association with well-being, is workspace switching [4]. For example, ten Brummelhuis et al. [44] found that the ability to choose physically where to work was positively associated with engagement.

In order for shared social welfare and healthcare facilities to be truly cost-effective, i.e., acknowledging that unsatisfactory work environments may also incur expenses, it is important that organizations and designers plan the offices based on evidence. The aim

of this study is to investigate how social and healthcare professionals rate the functionality of the shared workspaces and how perceived functionality is associated with work engagement and perceived stress.

2. Material and methods

2.1. Design

We conducted a cross-sectional, descriptive and correlational study using post occupancy survey [45] for social and healthcare in five Finnish organizations. All five organizations had transitioned from traditional reception rooms (healthcare professionals use own private rooms) to shared reception rooms in outpatient clinics (healthcare professionals switch rooms) and ABWs. Three of the investigated building complexes were new, one was a renovation site, and one included both new and renovated parts. Two sites were completed in 2019, one in 2020, and two in 2022. The questionnaire was carried out 1–3 years after the relocation (in Spring and Autumn 2023). Objective information on workspaces was gathered through documentary material (e.g., layout drawings) and by systematic inspections of each site. The study was ethically approved by Ethics Board of the Finnish Institute of Occupational Health.

2.2. Context of the study

The buildings included in the study had reception rooms (access for clients and staff) and ABWs (access only for staff), both directly proximate to natural light and in windowless areas with only artificial lighting. There were slightly more reception rooms in the windowless areas. The reception rooms were located next to each other and, except for one site, were mostly detached from the ABWs. In one site, the reception rooms could be directly accessed from the ABW. In the other four sites, they were accessed mainly from the same corridor that customers used, and the reception rooms had escape doors between them with soundproofing class ranging from 30 to 35 dB. The main features of the layout concepts are presented in Figure 1.

The ABWs did not have separate zones for noisy and quiet work. In the open office areas, there were usually 4 to 16 workstations often grouped closely together. Near the open office areas, four of the sites had shared enclosed office spaces for concentrated work and phone calls, etc., (1 enclosed space per ~4 – ~1,5 workstations), furnished mainly with one to two workstations and used only occasionally for meetings or discussions. The enclosed spaces were often designated primarily for a specific team, function, or sometimes also a specific person. One site had only open office areas along with designated team or private rooms. Reception rooms were also variably used for calls and concentrated work in all sites.

The workstations located in the open areas varied in size and shape and were bordered by table or floor screens in all sites. The staff had mainly fixed, shared computers, personal or workstation-specific phones and lockable compartments for personal belongings. Electronic systems for reserving reception rooms and enclosed office spaces in the ABWs were in use either in both, only in reception rooms, or in neither, depending on the site. All sites also had separate meeting rooms and break rooms, some without windows or natural light. The general lighting in all the included

buildings could be adjusted in workspaces, and three of the sites also had motion sensor-controlled lights.

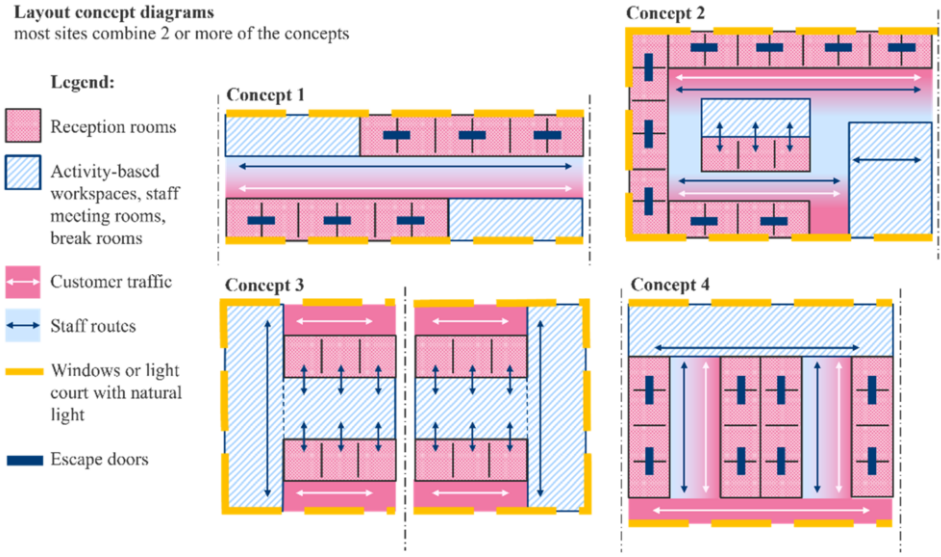

Figure 1. Layout concept diagrams

2.3. Data gathering and participants

A total of 1100 social and healthcare professionals from five Finnish public outpatient clinics consisting of specialized and primary medical care were approached via a web-based questionnaire, obtaining a final sample of 329 participants (30 % response rate). The respondents were nurses and nursing assistants, doctors, psychologists, rehabilitation professionals, social workers and secretaries, as well as managers.

The average age of the respondents was 47 years (range 21-67), and the majority were women (91%) (Table 1). Nearly half (46%) of the respondents had their own patient reception rooms and 54% changed the rooms. In ABWs, the majority (75%) of the respondents had non-assigned seating.

Table 1. Descriptive statistics for variables included in the study. N=329

Variable	Category	%	Mean	SD
Population statistics				
Gender	Women	91		
	Men	9		
Age			47	11
Managerial position	Yes	13		
	No	87		
Predictors				
Perceived support for interaction and collaboration between teams/units [a]	Shared workspaces as a whole		3.22	0.90
Perceived office support for individual work [a]	Shared workspaces as a whole		3.25	1.16

Safety of the patient reception rooms [a]	Reception room	3.90	0.95
Accessibility and sufficiency of workspace[a]	Reception room	3.80	1.00
	ABW	3.09	1.11
Functionality of the storage space [a]	Reception room	2.92	1.39
	ABW	2.46	1.21
Functionality of the lighting [a]	Reception room	3.82	0.92
	ABW	3.30	0.99
Natural light and window views [a]	Reception room	2.05	1.39
	ABW	2.86	1.53
Temperature and air quality [a]	Reception room	3.36	1.15
	ABW	3.11	1.23
Soundproofing [a]	Reception room	2.76	1.38
	ABW	1.75	1.08
Disturbing speech sounds [a]	Reception room	2.83	1.37
	ABW	3.44	1.08
Acoustics [a]	Reception room	4.00	1.06
	ABW	3.20	1.22
Availability of quiet space [b]	Shared workspaces as a whole	2.08	0.64
Availability of closed spaces for phone calls and dictation [b]		2.19	0.65
Availability of spaces for spontaneous discussions [b]		2.04	0.64
Satisfaction with work environment [c]	Shared workspaces as a whole	4.20	1.46
Outcome variables			
Work engagement [d]		4.44	2.32
Perceived stress [e]		2.85	1.07

a Scale: 1 ‘Strongly disagree - 5 Strongly agree.’ b Scale: 1 ‘not at all – 3 Yes, well enough' c Scale: 1 ‘Very dissatisfied – 7 Very satisfied’, d Scale: 0 ‘never - 6 every day’, e Scale: 1 ‘Not at all - 5 Very much’).

2.4. Questionnaire

The Work Environment and Well-being questionnaire [45] was modified for the social and healthcare context. It addressed several themes related to the physical and psychosocial work environment as well as well-being at work. The following items were included in the study:

- Age and gender.
- The use of customer or patient reception rooms and activity-based offices was asked as follows: “In what kind of workspace do you mainly receive customers/patients face to face?” (1 = My own reception room (one or more), which others do not mainly use, 2 = My own reception room, which others use when the space is not at my disposal (e.g., if you work only a few days a week, 3 = Shared reception rooms, which are also used by others (e.g., room change once a day). In the analysis, options 1 and 2 were combined.” Do you have your own workstation in the activity-based office? (1 = I have my own, assigned workstation, 2 = I don't have my own workstation, but work in shared workspaces).
- Experiences of the functionality of work environment were asked separately concerning patient reception rooms and activity-based offices. The studied

items for both facilities were: Accessibility and sufficiency of work spaces (”The premises are accessible” and “I have enough working space”, α = 0.73), Functionality of the storage space (“I have enough storage space” and “The storage facilities are close enough”, α =0.83), Functionality of the lighting (“There is enough light in the premises” and ”There is no disturbing glare caused by lighting in the premises”, α =0.64), Natural light and window views (“The premises have sufficiently natural light” and “I am satisfied with the window views”, α =0.88), Temperature and air quality (“I am satisfied with the temperature of the premises” and “The premises have good air quality”, α =0.73). Soundproofing and acoustics were used as three single items (“Soundproofing between rooms is sufficient”) and (“Speech sounds often disturb me in these workspaces”) and (“While working, I hear what other people are saying). All the questions were answered with the following response options: 1= Strongly disagree, 2 = More or less disagree, 3 = Neither agree nor disagree, 4 = More or less agree, 5 = Strongly agree.

- Perceived office support for individual work or collaboration, adequacy of supportive facilities and satisfaction with work environment were asked from the reception facilities as a whole. Perceived office support was asked as follows: “What do you think of the reception facilities as a whole?” with the following response options: (“The facilities support the work tasks that I carry out alone and independently”, single item), and interaction and collaboration between teams/units (“The facilities support collaboration between different teams/units”, “The facilities support collaboration between one's own team/unit” and “The facilities support interaction between individuals”, α = 0.81).
- Satisfaction with the work environment was evaluated with a question “How satisfied are you with your work environment as a whole?” using a seven-point scale: 1 = Very dissatisfied – 7 = Very satisfied [46]. The adequacy of supportive facilities was asked separately for “Closed spaces for phone calls and dictation”, “A quiet space for work that requires concentration”, “Spaces for spontaneous discussions/meetings”, and “Bookable meeting rooms” using a question “Do you have the following spaces available at work?” with the following response options: 1 = Yes, well enough, 2 = Yes, to varying degrees, but not well enough, and 3= not at all. The scale was reverse coded for the analyses.
- Well-being at work was analyzed using two variables: Work engagement and perceived stress. To assess work engagement, we used the ultra-short 3-item version of the Utrecht Work Engagement Scale [47]. This scale consists of three dimensions, namely: vigor (“At my work I feel that I am bursting with energy”); dedication (“I am enthusiastic about my job”) and absorption (“I am immersed in my work”). The participants answered the three items using a scale, which ranged from 0 (never) to 6 (every day). High scores expressed high levels of work engagement in the participants. The Cronbach's alpha reliability coefficient obtained in the present study was 0.85.
- Perceived stress was asked with the following question [48]: “Stress refers to a situation in which a person feels tense, restless, nervous or anxious or has difficulty sleeping when things are constantly bothering his mind. Do you feel this kind of stress these days?” (1 =Not at all, 2= only a little, 3 = Some, 4= Quite a lot, 5 =Very much).

2.5. Statistical analysis

We used IBM SPSS Statistics, Version 27 (IBM Corporation) for the statistical analyses. Descriptive statistics were derived using frequencies and percentages for categorical variables and means and standard deviations (SD) for continuous variables. Pearson's correlation coefficients and multiple linear regression were used to test which functionality factors (indoor environmental factors, facilities' support for work tasks, availability of facilities) of shared workspaces were associated with work engagement and perceived stress (Table 2). A stepwise linear regression was used to determine the associations of each predictor on work engagement and perceived stress. Because the study sample consisted of five organizations, a further Intra-class Correlation Coefficient (ICC) analysis using organization as a random factor for work engagement and perceived stress was calculated. As the ICC-Coefficients were small (near zero), and thus no intra-correlation effects were found, no further analysis with mixed linear methods was needed. For all analyses, multicollinearity of the variables in the model was examined with tolerance and variance inflator factor (VIF) and those variables having multicollinearity were deleted. In addition, residuals, linearity and normality were checked.

First, all independent variables and work engagement were entered into the model (Table 1). Second, the model was adjusted for age, gender and managerial position. Third, as some of the employees had their own patient reception rooms or used their own assigned seats in ABWs, the model was adjusted with the questions of how the spaces were used. Finally, the same procedure was repeated with perceived stress as the dependent variable. The stepwise analysis resulted in six models (Tables 3-4). Adjusted R^2 is reported as a measure of model fit. For each model, unstandardized (*B*) and standardized (β) estimates were determined with 95% confidence intervals (CI). The level of statistical significance was set at 0.05.

3. Results

Descriptive statistics are shown in Table 1. Regarding the reception rooms, respondents were mostly satisfied with the accessibility and sufficiency of the workspaces, overall lighting, safety, and acoustics, whereas they were less satisfied with natural lighting, window views, soundproofing, and the lack of storage spaces. In ABWs, opinions on most functionality factors varied, while the adequacy of soundproofing and disturbance of speech were evaluated negatively. Correlation analysis showed that healthcare professionals' ratings of the functionality of shared workspaces were associated with both work engagement and perceived stress (Table 2).

Table 2. Correlations between predictors and outcomes. Pearson's correlation coefficients are shown for continues variables and Spearmans for categorical variables.

Variable	1	2	3	4	5	6
1 Perceived support for interaction and collaboration between teams/units	-				0.311 ***	-0.261 ***
2 Safety of the patient reception rooms		-			0.284 ***	-0.291 ***

3 Satisfaction with work environment			-		0.270 ***	-0.161 ***
4 Availability of quiet space				-	0.213 ***	-0.175 ***
5 Work engagement	0.311 ***	0.284 ***	0.270 ***	0.213 ***	-	
6 Perceived stress	0.261 ***	-0.291 ***	-0.161 ***	-0.175 ***		-

***$p < .001$
**$p < .01$
*$p < .05$

*3.1. Work en*gagement

The associations between the predictors and work engagement are shown in Table 3. Of the different predictors, the perception of how well the overall facilities (patient reception rooms and ABWs) supported interaction and collaboration between teams/units (β=0.21) and the perceived availability of spaces for quiet work (β=0.21) as well as how safe the patient reception rooms were (β=0.15) predicted work engagement (Model 1). These variables together explained 14 % (p<.001) of the variance of work engagement. More positive ratings of these variables predicted higher work engagement. How well the overall facilities supported interaction and collaboration between teams/units was the strongest predictor.

In the second step, the model was adjusted for age, gender, and managerial position. (Model 2). These variables along with the functionality factors, explained 22 % of the variance (p<.001). The association between the predictors and the outcome remained statistically significant and age (β=0.13) was also a statistically significant predictor. Next, the use of spaces was added to the model (Model 3). All these variables, including the background variables, explained 24 % of the variance. The analysis showed that non-assigned seating in ABWs (β=0.18) emerged as a statistically significant predictor, whereas the association between the perceived availability for quiet spaces and work engagement was no longer statistically significant.

Table 3. Summary of the stepwise linear regression analysis for variables predicting work engagement.

Predictor	Unstandardized (B)	95 % CI	Standardized (β)	*p*	F	R^2
Model 1.					7.82	**0.14**
Perceived support for interaction and collaboration between teams/units	0.30	0.07;0.52	**0.21**	**0.01**		
Safety of the patient reception rooms	0.21	0.02;0.39	**0.15**	**0.02**		
Availability of quiet space	0.43	0.14;0.72	**0.21**	**0.01**		
Satisfaction with the work environment	0.14	-0.01;0.29	0.16	0.06		
Model 2.					10.74	**0.22**
Age	0.01	0.00;0.03	**0.13**	**0.02**		
Perceived support for interaction and collaboration between teams/units	0.47	0.26;0.67	**0.32**	**0.001**		
Availability of quiet space	0.33		**0.19**	**0.01**		

Safety of the patient reception rooms	0.27	0.10;0.44	**0.19**	**0.001**		
Model 3.					8.24	**0.24**
Age	0.02	0.00;0.03	**0.15**	**0.01**		
Shared reception rooms	-0.00	-0.39;0.38	-0.00	0.99		
Non-assigned seating in ABW	0.59	0.15;1.03	**0.18**	**0.01**		
Perceived support for interaction and collaboration between teams/units	0.68	0.43;0.92	**0.46**	**0.001**		
Availability of quiet space	0.33	-0.02; 0.68	0.14	0.06		

3.2. Perceived stress

The unadjusted (Model 4) and adjusted (Models 5 and 6) associations between the predictors and perceived stress are shown in Table 4. Of the different predictors, the perception of how safe the patient reception rooms were (β=-0.20) and how well the overall facilities (patient reception rooms and ABWs) supported interaction and collaboration between teams/units (β=-0.24) were statistically significant predictors of perceived stress (Model 4). These variables along with the functionality factors explained 12% ($p<.001$) of the variance in perceived stress. Higher ratings on the perceived support for interaction and collaboration, as well as the safety of the patient reception rooms, were associated with lower stress. When adjusted for age, gender and managerial position, support for interaction and collaboration (β=-0.24) as well as safety (β=-0.19) remained in the model, but also age (β=0.22), gender (β=0.13) and managerial position (β=-0.17) were significant predictors of perceived stress, age being the strongest explanatory factor among the background variables (Model 5). These variables together with the functionality factors explained 18 % of the variance of perceived stress. Finally, when the shared use of spaces was added in the model (Model 6), support for interaction and collaboration, age, gender and managerial position remained as statistically significant predictors, but safety was no longer included in the model. Older age, being male, or not being in a managerial position were associated with less stress. Although shared use remained, it was a non-significant predictor. The variables in model 6 explained 18 % of the variance ($p<.001$).

Table 4. Summary of the stepwise linear regression analysis for variables predicting perceived stress.

Predictor	**Unstandardized (B)**	**95 % CI**	**Standardized (β)**	***p***	**F**	**R^2**
Model 4.				**0.001**	18.23	**0.12**
Perceived support for interaction and collaboration between teams/units	-0.29	0.43;0.14	**-0.24**	**0.001**		
Safety of the patient reception rooms	-0.23	-0.36;0.09	**-0.20**	**0.001**		
Model 5.				**0.001**	12.13	**0.18**
Age	-0.02	-0.03;-0.01	**-0.22**	**0.01**		
Gender (Men)	-0.47	-0.89;-0.05	**-0.13**	**0.02**		
Managerial position (No)	-0.68	-1.14;-0.22	**-0.17**	**0.01**		

Perceived support for interaction and collaboration between teams/units	**-0.28**	-0.42;0.14	**-0.24**	**0.001**		
Safety of the patient reception rooms	**-0.21**	-0.35;-0.08	**-0.19**	**0.001**		
Model 6.				**0.001**	7.58	**0.18**
Age	-0.02	-1.31;-0.25	**-0.23**	**0.001**		
Gender (Men)	-0.78	-1.12;-0.02	**-0.20**	**0.01**		
Managerial position (No)	-0.57	-0.;0.41	**-0.14**	**0.02**		
Non-assigned seating in ABW	-0.20	-0.53;0.13	-0.05	0.24		
Shared reception rooms	0.11	-0.39;0.38	-0.08	0.43		
Perceived support for interaction and collaboration between teams/units	-0.35	-0.50;-0.20	**-0.31**	**0.001**		

4. Discussion

This study investigated perception of functionality of shared workspaces in outpatient clinics and its associations with well-being among social and health care personnel. The study is relevant for two reasons: first, it is one of the first to study shared outpatient facilities in the context of social and healthcare sector and, second, association between the functionality of ABWs and well-being is contradictory [e.g. 19].

Our research showed that healthcare professionals were quite satisfied with the work environment as a whole (Table 1). Regarding the reception rooms, the personnel were most satisfied with the accessibility and sufficiency of the spaces, overall lighting, safety and acoustics, whereas they were less satisfied with natural lighting, window views, soundproofing, and storage spaces. All the buildings included in the study had reception rooms that are also or even mostly in windowless areas with only artificial lighting. If these reception rooms were used as the main workspace, the user would end up having little access to natural light. As natural lighting has been shown to be important for healthcare professionals' well-being [5], in the future, designers should pay attention to providing also shared reception rooms with windows or explore novel solutions such as LED virtual windows [49]. However, prioritizing windows for most spaces easily leads to a narrow building frame and a more spread-out layout where distances are long. The views from windows should also be considered, since the quality of the views (nature, concrete etc.) has been linked to well-being at work.

Furthermore, even though the soundproofing was planned according to current regulations, many respondents evaluated the soundproofing in patient reception rooms as insufficient. Further research is needed to determine the reasons behind insufficient soundproofing. In addition, as the patient reception rooms in the studied sites were designed to be generic, it may have led to insufficient storage spaces for certain specialties. Studying the need for additional storage spaces in more detail from the perspective of different specialties would be important, as inadequate accessibility to supplies in the healthcare context is known to affect fatigue and job satisfaction [50].

Regarding the ABWs, healthcare professionals' views of most of the functionality factors varied, whereas insufficient soundproofing and disturbance of speech were

common. The result is similar with previous studies showing speech as one of the known disturbances in ABWs [35, 36]. Views on how well the overall facilities supported interaction and collaboration between teams/units or individual work varied between the respondents in this study. This is in line with other studies showing both positive and negative results of ABWs on the interaction and collaboration [18,19]. One reason for the varying results may be the differences in the studied layouts, in the agreements on how the spaces should be used, and in the possibilities, to reserve or see available spaces in ABWs via electrotonic systems.

When comparing these results to previous studies on ABWs, it's important to note that although the amount of enclosed office spaces compared to workstations in open offices seems high in the included sites, many of these spaces are not freely usable as they are dedicated to certain people or groups, officially or unofficially. We also don't have precise information on how many people use these ABWs, as the reception rooms form a big part of the work environment and the user groups for each ABW area are not clearly defined.

4.1. Functionality of shared workspaces, work engagement and perceived stress

The aim of the shared outpatient clinics in the social and healthcare sector is to improve cooperation between professionals. Our study showed that the perception of how well the overall facilities supported interaction and collaboration between teams/units was the strongest predictor for both work engagement and perceived stress.

For work engagement, also the perceived availability of spaces for quiet work was associated with work engagement. Positive ratings of how well the overall facilities supported interaction and collaboration between teams/units and how sufficiently quiet spaces were available, predicted higher work engagement. Generally, social support from co-workers in terms of social and emotional integration and collaboration between them is related to higher work engagement [51]. Regarding the patient reception rooms, safety was the strongest factor explaining work engagement. This corresponds to other studies showing positive associations between safety and overall well-being in the healthcare facilities [5].

As some of the respondents used their own patient reception rooms and had assigned seats in the ABW, the associations were further adjusted for the use of workspaces. Our study showed that also non-assigned seating in ABWs predicted higher work engagement. This may be due to the autonomy to choose where to work, as non-territorial working conditions have previously been associated with well-being [4]. In our study, non-assigned seating turned out to be an even stronger predictor than availability of quiet spaces. This may have to do with the work content of healthcare personnel having more communication activities and less independent computer work compared to office workers [52]. Speech sounds were also perceived as a frequent disturbance in the studied ABWs, which might indicate a greater need for enclosed individual spaces for varying tasks (patient calls, ad hoc meetings, etc.) rather than specifically for quiet work. This result is supported by previous findings of Zamani et al. [53] indicating that ease of private interaction enhanced staff satisfaction in the healthcare sector. Also, the quiet rooms in our study were often very small, not so well soundproofed and therefore not so comfortable to use.

Our study showed that the more functional the spaces were for interaction and collaboration between teams/units, the lower the perceived stress. This may be due to the need for collegial support such as discussing patient cases with colleagues ad hoc.

Discussing in the open office spaces may be discouraged by codes of conduct or fear of disturbing others, so having enclosed space available for private interaction can be relevant for getting collegial support. As social support is highly effective in fighting stress [42], attention should be paid to designing high quality spaces for interaction and collaboration close to other workspaces. Unlike for work engagement, the adequate number of quiet rooms was not associated with perceived stress. This result is unexpected since based on previous research, work environment factors are related to negative well-being effects (stress) rather than positive ones (work engagement) [54].

Another factor associated with stress was the perception of how safe the patient reception rooms were. When further adjusted for background variables, age proved to be a stronger predictor than safety of the patient reception rooms. Finally, when shared use of the spaces was added in the model, all other variables, except for the safety of the patient reception rooms, remained in the model.

In sum, our study showed that experiences of how well spaces supported interaction and collaboration between teams/units predicted both work engagement and perceived stress the most. This indicates that in shared outpatient clinics, spaces supporting interaction and collaboration are essential resources [23] for healthcare personnel in preventing negative effects such as stress and enhancing positive effects such as work engagement.

4.2. Strengths and limitations

The strength of this study is that we gathered new knowledge of the shared workspaces in outpatient clinics, as the previous research on these concepts is from the office environments. In addition, our study brings new knowledge about the associations between the perceived functionality of shared patient reception rooms, ABWs, and well-being, which is a sparsely studied [18]. Another strength is that the research subjects comprehensively represent primary and specialized healthcare personnel and different professional groups. In addition, objective information on workspaces was gathered through documentary material and by systematic inspections of each site. Although this gives a good general idea of the workspaces in each site as a whole, the ways the spaces are used can vary greatly from the planned use. Also, the collected objective information did not provide measured data, which would give better insight to, for example, the soundproofing problems experienced. One weakness of the study is that psychosocial factors were not included in the analyses, even though, according to previous research, psychosocial factors influence well-being more than workspace design [55]. Future studies should investigate the role of psychosocial factors, ways of using the spaces, and different layout concepts on well-being.

5. Conclusion

Our study shows that the perceived functionality of shared workspaces is associated with well-being at work. In the patient reception rooms, safety aspects, which are associated with well-being, must be carefully considered. Shared healthcare workspaces should be designed not only to support different tasks such as private and undisturbed interaction and collaboration, quiet and noisy individual work - but also to help separate the tasks that potentially disturb one another. This can be achieved by ensuring that a sufficient number of closed and soundproofed one- to two-person spaces are available to all

personnel, in the activity-based office areas. Managers in social and healthcare organizations should ensure that healthcare professionals use the spaces as intended and find ways to better support their commitment to the new ways of utilizing the spaces, as shared use has also been shown to predict work engagement.

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