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Working Anytime and Anywhere -Even When Feeling Ill? A Cross-sectional Study on Presenteeism in Remote Work

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ABSTRACT

Background: Working despite feeling ill − presenteeism − is a widespread behavioral phenomenon. Previous research has shown that presenteeism is influenced by various work-related and personal factors. It's an illness behavior leading to a range of negative but also positive consequences. Due to coronavirus disease 2019 (COVID-19) pandemic, remote work has become the "new normal" for many employees. But so far, little is known about presenteeism in remote work. This study aims to investigate presenteeism in remote work by looking at the extent of remote presenteeism, differences to presenteeism in on-site work, and associated factors.
Methods: A nationwide cross-sectional online survey was conducted in Germany with $N = 233$ participants. Data were analyzed using descriptive statistics, t-tests, and correlation analysis.
Results: The results reveal that presenteeism is prevalent in remote work $x = 4.13$ days ($Md = 3$; $D = 2$; $s = 4.95$). A low ability to detach from work ($r = -.17$; $p = .005$) and low supervisor support ($r = -.14$; $p = .02$) is associated with more remote presenteeism days. Remote working conditions seem to facilitate presenteeism.
Conclusion: This study provides empirical insights into a subject area of great societal relevance. The results show that awareness should be raised for presenteeism in remote work. It should be regarded as a behavior that can be functional or dysfunctional, depending on the individual situation. Supervisor support and detachment should be fostered to help reduce dysfunctional presenteeism. Promotion of health literacy might help remote workers to decide on a health-oriented illness behavior. Further research is vital to analyze to what extent and under which circumstances presenteeism in remote work is (dys)functional and to derive clear recommendations.

1. Introduction

Presenteeism is a widespread behavioral phenomenon [1]. In line with the European research line, presenteeism is defined as the behavior of working despite illness. It thus represents the alternative behavior to illness-related absence from work [2]. Both behaviors, presenteeism, and absenteeism, result from conscious decision-making processes when facing ill health [3]. A representative survey of the German working population shows that 65% of the respondents had worked at least once within a year despite feeling ill [4]. But what are the consequences of working despite illness? Presenteeism can be seen as adaptive behavior, which can be functional or dysfunctional [5]. In a health-oriented work environment, presenteeism can have positive effects. For example, it can foster workplace inclusion of employees with chronic conditions and is therefore considered functional [6]. At the same time, presenteeism also leads to a variety of negative effects. For example, frequent work despite illness is associated with a reduction in overall health [7]. In this case, presenteeism is a rather dysfunctional behavior [5].

The reasons for working ill are by no means monocausal, but multifactorial and multilayered. They can be subdivided into three main categories: personal factors, work- and organizational factors, as well as structural and environmental factors [8].

Due to COVID-19 pandemic and the resulting restrictions, supervisors and employees in many areas were forced to redesign

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established structures and processes. Remote work[1] has become the 'new normal' for many employees [9]. Due to its widespread usage, a new debate on remote work has been politically sparked. In the political discourse, apart from the current goal of infection control, the focus is primarily on the benefits of remote work, such as administrative cost savings for companies [10] and more flexibility to balance work and other life domains [11]. However, several studies show that working remotely also leads to disadvantages that need to be considered and minimized, especially concerning employee health. For example, working remotely can increase psychological stress and reduce the ability to detach from work during leisure time [12,13].

Regarding presenteeism, many factors, that lead people to work when ill, change in a remote working environment (e.g., leadership) [14]. Initial evidence suggests that presenteeism is also prevalent in remote work [15,16]. However, presenteeism in remote work is an understudied phenomenon. Some studies imply, that employees recognize working remotely as a good option to work despite illness [17,18]. Thus, expansion of remote work potentially exacerbates the problematic- but also positive effects of presenteeism.

To address the research gap on presenteeism in remote work, this study aims to examine the phenomenon of remote presenteeism more closely. It investigates different research questions and hypotheses, only part of which is presented in this article.[2] Research question 1 will first examine the existence of presenteeism in remote work in descriptive terms to describe the extent and relevance of the topic.

RQ1: *To what extent do employees show presenteeism in remote work?*

Working remotely is associated with the reduced ability to detach from work [20]. Detachment describes the competence to mentally distance oneself from work during leisure time [19]. In on-site work the association between presenteeism and detachment has rarely been explored. Initial results on presenteeism in remote work indicate that a high degree of detachment is associated with less presenteeism [21,22]. However, since the association between detachment and presenteeism has not yet been sufficiently investigated, research question 2 is to be examined.

RQ2: *Is presenteeism in remote work associated with reduced detachment from work?*

Even though the research on presenteeism in remote work is relatively new, a common theoretical foundation can be established from the singular strands of investigation. Research shows that working remotely is associated with reduced supervisor support [23]. At the same time, various studies find a significant, negative association between supervisor support and presenteeism [24,25]. Only one study was found that investigates supervisor support in association with presenteeism in remote work. It detected a significant negative association [18]. In contrast, indirect work control was found to be positively associated with remote presenteeism [16]. Against this background, hypothesis 1 will be tested.

H1: *The more employees feel supported by their supervisors in remote work, the less presenteeism they show.*

Due to insufficient research and theoretical frameworks, no clear statements can be made about the associations and differences

between presenteeism in remote work and on-site work. Some studies could not find significant differences between presenteeism in remote and on-site work [26,15]. At the same time, there is initial empirical evidence and additional theoretical work [3] implying higher rates of presenteeism in remote work compared to on-site work [27,22]. Furthermore, research indicates that conditions in remote work seem to facilitate presenteeism [28]. Based on these studies, hypothesis 2 will be tested.

H2: *Employees show an increased tendency for presenteeism in remote work compared to on-site work.*

The main focus of this study lies on factors associated with presenteeism that can be modified (detachment and supervisor behavior). Yet, research on presenteeism in on-site work usually also includes aspects that are more static, like company characteristics. Various reviews conclude that employees in large enterprises engage in presenteeism more frequently than employees in small and medium-sized enterprises [29,30]. To analyze whether this difference is also valid in remote work research question 3 is to be examined.

RQ3: *Do employees in large enterprises show more presenteeism than employees in small and medium-sized enterprises when working remotely?*

In this study, we aim to address the gap in knowledge about presenteeism in remote work by examining the prevalence, associated factors (detachment and supervisor support), differences in the location-based tendency for presenteeism (remote vs. on-site work), and differences in remote presenteeism days due to enterprise size. The stated research questions and hypotheses are examined in a cross-sectional design.

2. Materials and methods

2.1. Procedure

A nonexperimental cross-sectional study was conducted. The data were collected via the online survey tool *SoSci Survey*. The questionnaire was pretested and revised accordingly. Data were collected nationwide in Germany in December 2020. We used different methods to disseminate the survey to the target population, remote workers in Germany (social media, snowball sampling, and recruitment via gatekeepers). The study data are, thus, collected from a nonrandom opportunity sample. Due to the distribution channels, it was not possible to calculate a response rate.

2.2. Measures

For this study, the research team developed a questionnaire by external expertise from a presenteeism researcher. The questionnaire consisted of established scales and self-developed items.

2.2.1. Presenteeism

Following recommendations by an international group of presenteeism researchers [3] the total presenteeism days were surveyed with an open ended question based on Demerouti et al. [31] *("On how many days did you work remotely in the last 3 months although you felt ill[3]")*. The measurement of presenteeism and all related aspects referred to a retrospective memory period of *3* months as done by Baeriswyl et al. [32], and Wang et al. [33]. The subjective perception of health/illness was chosen as it is the

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crucial issue for the decision-making progress [34,3]. Participants are rated as presentees in case of one or more presenteeism days.[4]

2.2.2. Detachment

The employees' ability to detach from work was operationalized using the validated scale by Sonnentag and Fritz [35]. It consists of four items (e.g., *"At the end of the day I don't think about work at all."*) and is measured on a 5-point Likert scale (*1 = strongly disagree* to *5 = strongly agree*).

2.2.3. Perceived supervisor support

Perceived supervisor support was measured using the validated scale by Rusbasan [36]. Perceived supervisor support is measured via five subscales: *Emotional Support, Appraisal Support, Resource Support, Outside-of-Work Support Work,* and *Career Support*. The subscales comprise three items each and are measured using 7-point Likert scales. To keep the questionnaire within a reasonable time frame, the scale *Career Support* was excluded.

2.2.4. Location-based preference for presenteeism

The location-based preference for presenteeism (remote vs. on-site) was surveyed using two separate items. These are derived from the results of the qualitative survey by Dahlke et al. [37]. Using bipolar rating scales (*1 = much easier* to *5 = much more difficult*), first the comparison of the perceived difficulty of working despite feeling ill was assessed (*"Compared to on-site work, working remotely when I feel ill is … "*). Second, the location-based comparison of the decision when feeling ill was surveyed (*"Compared to on-site work, the decision not to work remotely when I feel ill is … "*).

2.2.5. Enterprise size

Enterprise size was surveyed according to the recommendation of the European Commission [38], differentiating between micro-, small-, medium-sized, and large enterprises (*"How many employees work in your company?" 1-9; 10-49; 50-249; more than 250*).

The questionnaire was designed to take about 10 minutes. A pretest was carried out (*n = 8*) to improve the validity of the questionnaire. The results were used to optimize the questionnaire mainly with regard to the comprehensibility and clarity of the items.

Two inclusion criteria were set for participation: 1) *average share of at least 60% remote work per week during the last 3 months.* This criterion was set to minimize the risk of a recall bias when working just a few hours remotely. At the same time, a pragmatic approach had been chosen by not being too restrictive to reach a sufficiently large sample. 2) *Feeling of illness at least once in the last three months.* This criterion was set as without a feeling of illness, there is no choice to be made about presenteeism.

2.3. Participants

A total of 595 data sets could be generated, of which 300 data sets met the required inclusion criteria. After checking the data for missing values, and data quality, *N = 233* participants remained in the sample. The sample only includes employees, not self-employed workers. The sociodemographic characteristics of the participants are shown in Table 1.

2.4. Data analysis

Descriptive, correlational, and reliability analyses and *t*-tests were performed using *SPSS 22* software. For significance tests, an

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[4] In this study, a conscious decision to work when feeling ill is always defined as presenteeism, even if employees only work for a shorter period than contractually agreed or for specific tasks/meetings.

error probability of 5%t was assumed. The reliability of all established scales was examined using *Cronbach's α*. All scales can be rated as *good* to *excellent* in their internal consistency according to the classification by Blanz [39] (α = .82 - .93). Regarding the self-developed items, confirmation of hypothesis 2 can be assumed if working remotely is rated significantly easier when feeling ill. At the same time, the decision against presenteeism in remote work must be rated more difficult. To analyze research question 3, a dummy coding of the item enterprise size was undertaken (*1 = micro-, small- or medium-sized enterprise; 2 = large enterprise*).

After data preparation, the distributions of interval-level scales were checked for outliers and normality. A *z*-transformation was performed. Values greater than 3.29 or less than -3.29 were identified as outliers. Since the outliers can be attributed to a few cases, they were winsorized. nonparametric procedures (*RQ2 & H1*: Spearman correlation, *H2:* one-sample Wilcoxon-test) were carried out for items that were not normally distributed to validate the results of parametric procedures (*RQ2 & H1*: Pearson correlation, *H2:* one-sample *t*-test). Since nonparametric analyses delivered congruent results in all analyses, they are not reported separately.

3. Results

RQ1. : Extent of presenteeism in remote work

The descriptive analysis of the *total presenteeism days* showed that 87% of the respondents had worked remotely at least one day during the last three months despite feeling ill. On average, presenteeism in remote work occurred on $\bar{x}$ = 4.13 days (*Md* = 3; *D* = 2; *s* = 4.95). The frequency distribution can be seen in Fig. 1. The *z*-values of the distribution display five values as outliers. The additional descriptive analysis of the winsorized values shows that the mean is not substantially distorted by these outliers. The right skewness and steepness of the distribution can be improved by winsorizing, but not eliminated.

RQ2. Association between presenteeism in remote work and detachment from work

The parametric correlation of the *total presenteeism days* (winsorized) with the *detachment scale* (*n* = 230) was tested one-sided due to the one-tailed research question. It showed a significant negative association (*r* = -.17; *p* = .005).

H1. Association between remote presenteeism and perceived supervisor support

The parametric correlation of the *total presenteeism days* (winsorized) with the *supervisor* support *scale* (*n* = 230) was tested one-sided due to the one-tailed hypothesis and showed a significant negative correlation (*r* = -.14; *p* = .02).

H2. Presenteeism in remote vs. on-site work

The evaluation of this hypothesis was carried out using descriptive statistics as well as one-sample *t*-tests. The theoretical mean and median, on which the analyses were based, were three (on a five-point likert-scale) and postulated no location-related difference (*equally easy or difficult*).

Of the 201 participants, 85% rated working remotely when feeling ill as *easier* or *much easier* compared to on-site work ($\bar{x}$ = 1.93; *Md* = 2; *D* = 2; *p* = .72). Only 3% of the sample reported finding it *more difficult* or *much more difficult* (see Fig. 2). The analysis of the *z*-values revealed *n = 1* outliers for this distribution. The one-sample *t*-test revealed that the actual mean is significantly different from the theoretical scale mean (*t (200)* = -21.13; *p* < .001; *d* = -1.49). The difference in mean values is -1.07 (95%-CI[-1.17,-0.97]).

Table 1
Sociodemographic and study-relevant characteristics of participants

	N = 233 (100%)
Age	$\bar{x}$ = 41.00; Md = 40.00; s = 10.40
Overall self-rated health	
Very bad	1%
Bad	10%
Acceptable	33%
Good	45%
Very good	11%
Chronic condition	37%
Days of absence due to illness (within 3 months)	$\bar{x}$ = 3.27; Md = 1.00; s = 6.83
Enterprise size	
Microenterprises	8%
Small enterprises	15%
Medium-sized enterprises	13%
Large enterprises	64%
Company sector	
Information and communication	9%
Real estate and housing	>1%
Banks/financial and insurance service providers	8%
Trade, transport and storage, hospitality, food services	3%
Industry, manufacturing/production of goods	5%
Professional, scientific and technical services, other business services (e.g., business-, legal- and tax consulting, architecture-/engineering office, advertisement and market research, secretary services etc.)	10%
Public administration, defense, social security, education, health care, social services	59%
Other services (e.g., entertainment, sports, leisure, labor union, politics, religious association, etc.)	5%
In a leadership position	25%
Percentage of remote working hours per week	
60−80%	37%
80−99%	35%
100%	28%
Prepandemic remote working experience	
No previous experience	36%
Experience with fewer remote working hours	59%
Experience with the same percentage of remote working hours	4%
Experience with more remote working hours	1%
Supervisor support*	$\bar{x}$ = 5.08; Md = 5.23; s = 1.15
Detachment†	$\bar{x}$ = 2.90; Md = 3.00; s = 0.99

* Scale from 1 (no support) to 7 (very high support).
† Scale from 1 (no ability to detach) to 5 (very good ability to detach).

Regarding the location-based comparison of the presenteeism decision when feeling ill, 65% of the participants stated that the decision against presenteeism is *more difficult* or *much more difficult* in remote work ($\bar{x}$ = 3.69; Md = 4; D = 4; p = .91). Nine percent found this decision *easier* or *much easier* in remote work (see Fig. 3). The analysis of the z-values revealed no outliers for this distribution. The one-sample t-test showed that the actual mean deviates significantly from the theoretical scale mean ($t (200)$ = 10.71; $p < .001$; d = .76). The difference in mean values is 0.69 (95%-CI [0.56,0.81]).

RQ3. *Presenteeism days in small- and medium-sized enterprises vs. large enterprises*

An unpaired t-test was carried out to analyze differences in *the total presenteeism days* between remote employees in *small and medium-sized enterprises* (n = 82) compared to employees in *large enterprises* (n = 147). In *small and medium-sized enterprises* remote presenteeism occurred on $\bar{x}$ = 3.85 days (Md = 3; D = 2; s = 3.74); in *large enterprises* remote presenteeism occurred on $\bar{x}$ = 4.18 days (Md = 3; D = 2; s = 4.71). There was no statistically significant difference between both groups ($t (227)$ = 0.53, p = .594). The difference in mean values is 0.32 (95%-CI[-1.52, 0.87]).

4. Discussion

In this study, we aimed to analyze presenteeism in remote work and its associated factors. We also examined location-based differences of presenteeism in remote compared to on-site work and group-based differences in presenteeism days between employees in small- and medium-sized enterprises compared to large enterprises. For this, we conducted an online questionnaire in a cross-sectional design. The results show that presenteeism is prevalent in remote work. Employees seem to decide for presenteeism more easily in remote work than in on-site work. Detachment, as well as supervisor support, are detected as associated factors of remote presenteeism. Enterprise size was not found to affect presenteeism days significantly in remote work.

4.1. The extent of presenteeism in remote work

The results of the present study indicate that presenteeism is a widespread phenomenon in remote work. An overwhelming majority of the sample worked at least one day within the last 3 months despite feeling ill. The measures of central tendency and dispersion indicate that the distribution is broad and shifted to the left, indicating many answers in the lower value range. This indicates that many participants only showed a small number of presenteeism days, and the mean may be affected by fewer cases toward the right end of the distribution.

Since presenteeism is measured using different operationalizations and recall periods, the comparison of results is challenging. With comparable operationalizations, representative studies in the German on-site working population have identified 65% to 71% of participants as presentees within 1 year [2,40,4]. In the present sample, substantially more employees showed presenteeism in only a quarter of the period. The number of presenteeism days $\bar{x}$ = 4.13 in the present sample is also higher than in previous research [40]. This should not be overinterpreted due to the already mentioned, broad, and shifted distribution.
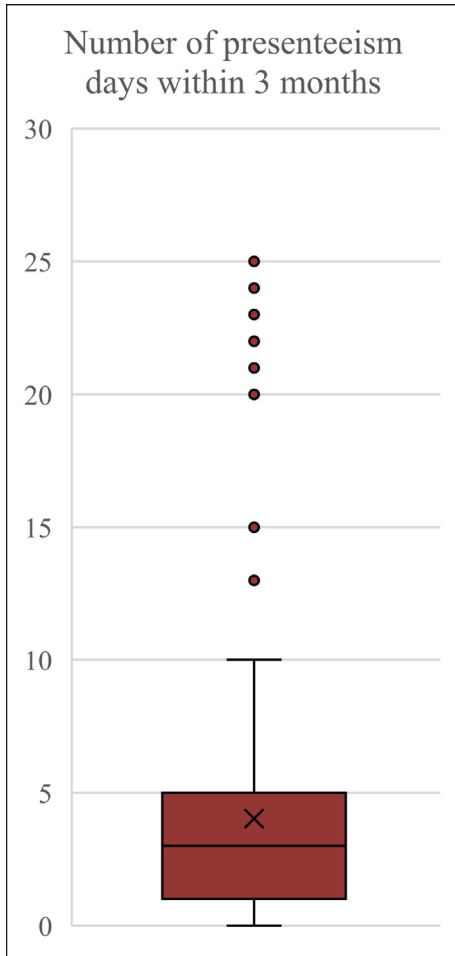
Fig. 1. Boxplot for the number of presenteeism days within 3 months.

market during the pandemic could also cause the prevalence to be overestimated. All in all, the available data shows that presenteeism in remote work is prevalent, but the analyzed extent must be interpreted with caution.

4.2. Remote presenteeism and detachment

The explorative analysis of the association between detachment and presenteeism identified a significant, negative correlation in the expected direction. Accordingly, reduced detachment is associated with an increased number of presenteeism days. The effect size of the association is small, according to Cohen [42]. The results are in line with the qualitative study by Eddleston and Mulki [21] and Strasser et al. [22]. Due to the small effect size, it must be assumed that reduced detachment is one aspect among many others that can be associated with remote presenteeism in the present sample.

4.3. Remote presenteeism and perceived supervisor support

For hypothesis 1, which postulates a negative association between supervisor support and presenteeism in remote work, the alternative hypothesis is accepted. The present survey provides evidence that more support from supervisors in remote work is associated with fewer presenteeism days. Since the effect size of the correlation is small, supervisor support must be interpreted as one component among others. Studies that identified significant, negative associations between presenteeism and supervisor support in on-site work also found small effect sizes [43,44,24,45,46]. Accordingly, the determined correlation is in line with current findings regarding the direction and strength of association.

4.4. Presenteeism in remote vs. on-site work

For the postulated location-based preference for presenteeism in remote work the alternative hypothesis is accepted. Participants rated working remotely despite feeling ill to be significantly easier than working ill on-site. The effect size can be classified as large, according to Cohen [42]. At the same time, employees rated the decision against presenteeism to be significantly more difficult in remote-compared to on-site work. The effect size corresponds to a medium to large effect.

These findings indicate that employees might be more prone to presenteeism in remote than on-site work. That is in line with current research by Walter et al. [47], showing that remote workers
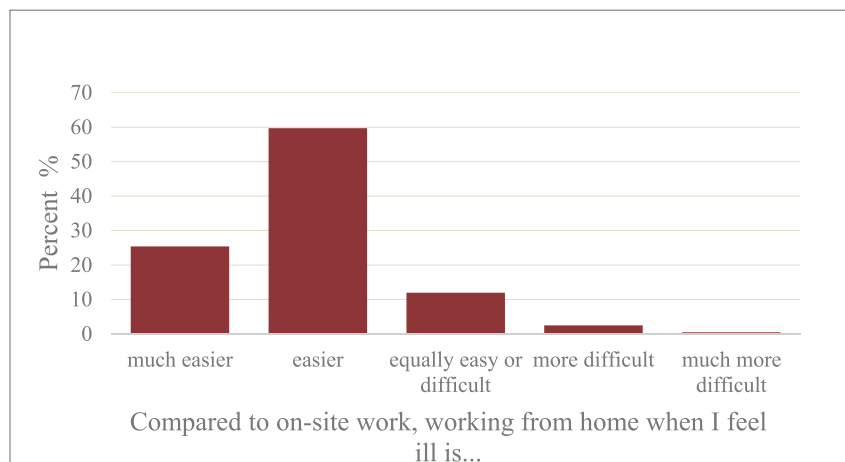
Many factors could have impacted the prevalence of presenteeism in the present study. First of all, the self-selection of the sample may have caused a bias that can lead to an overestimation of remote presenteeism. Due to the increased mental strain during the pandemic [41], it is possible that more employees felt a worsening of their mental health. Thus, the probability of presenteeism may be increased as the base rate of impaired health might be higher. Aspects such as job insecurity with an uncertain labor

Fig. 2. Difficulty to work when feeling ill in remote work compared to on-site work.
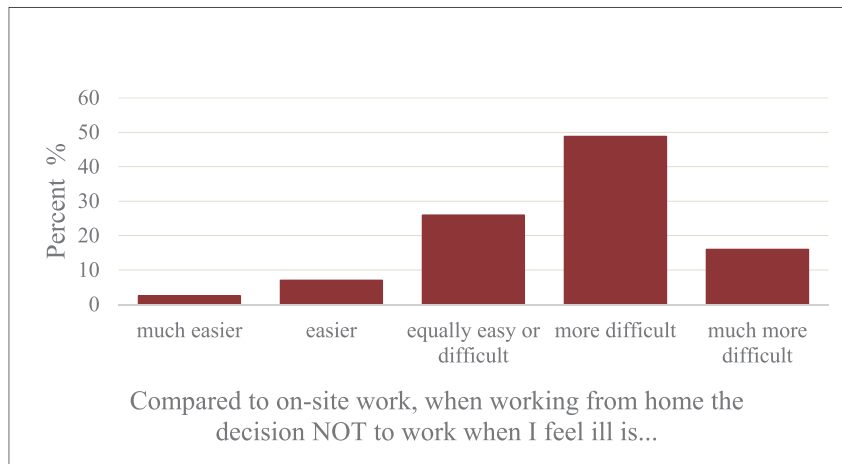
Fig. 3. Difficulty to stay absent when feeling ill in remote work compared to on-site work.

report significantly more presenteeism than on-site workers. Furthermore, it shows that remote work seems to facilitate presenteeism, as also seen in research conducted by Ruhle and Schmoll [48]. The fact that employees find it easier to work ill in remote work settings suggests that remote work may favor functional presenteeism. Remote presenteeism could, therefore, make it possible to continue performing without worsening the health status. However, the fact that the decision against presenteeism is more difficult at the same time dampens the positive view. This result indicates that employees may also decide in favor of presenteeism when their health status does not allow it.

4.5. Remote presenteeism in small- and medium-sized- vs. large enterprises

In this study, no significant group differences between the presenteeism days of remote employees in small- and medium-sized enterprises compared to large enterprises could be found. The sizes of the analyzed groups differed remarkably (small- and medium-sized enterprises $n = 82$, large enterprises $n = 147$). Therefore, it was checked whether the power was sufficient to determine a potential significant difference. For this purpose, a post-hoc power analysis was performed using the software G-Power 3.1. With a result of *1-ß = .99,* the power was good. Therefore, detecting a significant group difference in the data was statistically possible.

This result is not consistent with former on-site work research, which could detect more presenteeism days in large enterprises [30,29]. This might indicate that enterprise factors are not as relevant in remote work as in on-site work. An explanation could be that working conditions might converge more in remote work. Furthermore, the direction of the mean difference leads in the same direction as in previous research for on-site work. For further interpretation, more research is needed.

4.6. Limitations

The conceptual limitations can, first and foremost, be seen in the nonexperimental cross-sectional design, which does not allow any conclusions about causality. However, an experimental study design is unsuitable for the present research question, since presenteeism is a variable that can hardly be manipulated. For this reason, nonexperimental surveys are currently the most common design in studies on presenteeism [3].

Another limitation concerns the sample structure. The representativeness of the sample is questionable. Besides the sample size, it cannot be ruled out that the results are distorted by a (self-) selection bias leading to an overestimation of the prevalence of remote presenteeism. Sex or gender were not surveyed in this study. The generalizability of the results to all genders is therefore questionable. In addition, there is insufficient knowledge about the target population (people working remotely in Germany) which doesn't allow a sufficient analysis of possible self-selection effects. Yet some studies give indications about the population and allow comparisons. The sample (see Table 1) shows similarities to the (known) target population looking at:

- enterprise size [49].
- remote working experience [50]
- supervisor support [51]
- and detachment [52]

Compared to the general working population in Germany, the sample shows similar characteristics regarding health status [4], the proportion of chronic conditions [53], and the ratio of presenteeism to absenteeism days [54]. When comparing to the general working population, it must be noted that remote workers are generally disproportionately often white-collar workers while blue-collar workers are underrepresented [11]. This is also found in the present sample. Compared to the general working population in Germany [55], the service sector is overrepresented in this study, whereas the industry sector is underrepresented. Even if no conclusive statement regarding the target population is possible, it can be assumed that the sample may well reflect the population in key characteristics.

Due to the survey type, recall biases may occur. However, Strasser et al. [22] showed that retrospective measurements underestimate presenteeism compared to real-time measurements. Therefore, these effects may offset each other. In the current study, multivariate regression analysis combining the investigated variables detachment, supervisor support and enterprise size, and controlling other variables would have been desirable, but couldn't be carried out due to methodological constraints.

Even if only one way of operationalization of presenteeism was presented in this article, it should be mentioned that the different measurements and their different scopes of validity lead to difficulties in measuring and interpreting results as well as comparing

them to existing research. Therefore, it is necessary to further examine the operationalization and measurements in comparative methods studies.

4.7. Implications for research and practice

The present study showed that remote presenteeism is a relevant phenomenon. Further research is needed to examine the prevalence of presenteeism in remote work in a representative sample. Reasons for remote presenteeism, possible moderators and mediators, and differences in decision-making behavior need to be investigated in more detail and compared to on-site work. More research on company characteristics, such as enterprise size, is necessary to get further insights into correlates of remote presenteeism. In addition, mixed types of presenteeism and absenteeism due to employees' individual load- and power control and their consequences should be further examined. These mixed types can be expressed, for example, by only attending a specific online meeting or doing an urgent task but being absent for the rest of the working day. It can be assumed that those mixed types are more prominent in remote work as work and relaxation can be combined more easily, compared to on-site work. Longitudinal or diary studies are also necessary to identify the direction and nature of associations and to determine the consequences of presenteeism in remote work. Multivariate analyses, such as regressions, are desirable to analyze the multilayered correlates of remote presenteeism in depth.

When examining the relationship between presenteeism and supervisor support, colleague support should be included in future research. That is, because research in organizational sociology suggests a close relation between both variables [56]. Therefore, one variable might moderate or mediate the association with presenteeism of the other. The theoretical framework by Ferreira et al. [57] might help guide future research on remote presenteeism. It is necessary to conduct qualitative as well as quantitative studies and integrate the findings from studies with different operationalizations in a common framework, to be able to adequately reflect the complexity of the phenomenon. Furthermore, methodological studies are needed to improve operationalizations and measures of presenteeism on common grounds.

Concerning practice, the present study, first of all, implies the importance of raising awareness among companies about remote presenteeism. This is the pivotal point for developing actions. To date, however, knowledge about presenteeism as well as its causes and consequences has been insufficiently disseminated in companies and businesses, even concerning on-site work settings [58]. The topic of remote presenteeism should be implemented in existing programs for remote work and remote supervision.

To monitor presenteeism in companies in the long term, the measure of *total presenteeism days* is a relevant indicator of health, performance, and costs [58]. Especially in companies with already established employee surveys, the indicator of *total presenteeism days* can be added easily and raise attention to presenteeism in the long term.

So far, only a few intervention studies exist analyzing the effectiveness of measures to reduce on-site presenteeism [59]. Research evidence suggests that workplace health promotion interventions designed to increase health and reduce absenteeism can also reduce (dysfunctional) presenteeism [60]. Functional presenteeism doesn't need to be reduced and can even be health-promoting. The current findings indicate that the health literacy of employees in remote work needs to be supported. Sociomedical guidelines for assessing work ability [61] can help understand the

difference between illness and health-related (un)fitness for work. It seems particularly necessary for remote employees to develop competencies for appropriately assessing their health condition and accordingly making a health-conscious decision for functional or against dysfunctional presenteeism.

The associations of remote presenteeism with supervisor support and the ability to detach cannot provide any clear recommendations for action due to the small effect sizes. However, participants reported that detaching from remote work was more difficult for them, and they felt less supported by their supervisors. Accordingly, there is a need for action in both areas, which might also have beneficial effects on reducing dysfunctional presenteeism. To improve supervisor support training should be conducted that focuses on the specific characteristics of remote work. Supervisors must develop awareness that remote leadership needs to be adapted and that an indirect leadership style is usually effective [62]. To improve the ability of remote employees to detach from work, (online) programs for health promotion, for example, improving the ability to draw boundaries between work and private life [63], should be implemented.

5. Conclusion

This study provides empirical findings in a subject area of great and probably growing societal relevance. The results indicate that presenteeism is widespread in remote work. Therefore, it should be considered in remote management and self-management practices. Detachment from work and supervisor support were found to be associated factors of remote presenteeism. Supervisor support can be improved by trainings, focusing on the specific conditions and the subsequent employees' needs in remote work. Detachment from work can be improved using established health promotion programs. Both might help reduce dysfunctional presenteeism. As employees show a higher tendency for presenteeism in remote- compared to on-site work, it seems necessary to foster the health literacy of remote employees.

Based on these results, further studies are necessary to identify mechanisms of presenteeism in remote work and to be able to derive more specific recommendations for action. In particular, it is important to analyze under what circumstances remote presenteeism can be functional and which conditions contribute to dysfunctional presenteeism. The aim is to create health-oriented settings in remote work that build on the advantages of working remotely - also with regard to presenteeism - while tendencies to work until complete exhaustion are prevented.

Ethical statement

Ethical review and approval were not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the participants was not required to participate in this study in accordance with the national legislation and institutional requirements. All data were collected anonymously. No personal data were collected. At no time can the data be used to draw conclusions about the subjects.

Conflicts of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Saf Health Work 2023;14:375—383

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