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Leadership, Job Well-Being, and Health Effects—A Systematic Review and a Meta-Analysis

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Learning Objectives

- State whether – and to what extent – good leadership was associated with job satisfaction or job “well-being” in this analysis of 27 studies.
- Conclude whether, and with what degree of certainty, good leadership correlated with job performance as estimated in most studies by a supervisor or manager.
- Summarize what the investigators found in these studies about whether good leadership influences the risk of sick leave or early retirement with a disability pension.

Abstract

Objective: The aim of this systematic literature analysis was to study the association between leadership and well-being at work and work-related health. These intermediate outcomes are supposed to predict work-related loss of productivity and disability at work. **Methods:** Original articles published in 1970 to 2005 were searched in MEDLINE and PsycINFO databases in a systematic manner. The main search terms were leadership, job satisfaction, well-being, sick leave, and disability pension. Out of 303 references, 93 publications were retrieved. In addition, other sources produced 69 articles. The strength of evidence was evaluated comprehensively. Altogether, 109 articles were thoroughly analyzed; our conclusions are based on 27 articles providing the best evidence. **Results:** There was moderate evidence that leadership is associated with job well-being (risk ratio [RR] 1.40, range 1.36 to 1.57), sick leave (RR 0.73, range 0.70 to 0.89), and disability pension (RR 0.46, range 0.42 to 0.59). The evidence was weak on that leadership is associated with job satisfaction (median RR 2.23, range 1.30 to 3.51) but not with job performance (RR 1.13, range 0.55 to 1.20). **Conclusions:** There is a relative lack of well-founded prospective studies targeting the association between leadership and employee health, but the few available good studies suggest an important role of leadership on employee job satisfaction, job well-being, sickness absences, and disability pensions. The relationship between leadership and job performance remains unclear. (J Occup Environ Med. 2008;50:904–915)

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The health inequalities in work organizations and their potentially drastic consequences are currently a major concern. In large cohort studies in public sector, work characteristics such as job control and support at work¹ and organizational factors such as organizational justice² and effort-reward balance³ have predicted health-related outcomes such as sickness absence.

Europe meets a challenge of ageing workforce and shortage of labor supply in the 2010s. The problems of productivity and competitiveness need an active role in human resource practices and policies. Early retirement practices have been tackled with new pension policies. At workplaces, initiatives for age management have included promotion of professional competence, flexible working hours, work-related health, and well-being, and promotion of work ergonomics. Good managerial practices and leadership skills will support employability of workers in all age groups, not just the aged and most experienced.^{4,5}

Effects of psychosocial work factors on health are mediated through the organizational structure and function. One of the important modifying factors between organizational factors and health is supervisory leadership. It most likely affects not only the productivity and effectiveness of an organization but also the health and well-being of employees.

Factors affecting work ability have been studied for a long time but from the view point of well-being at work

only from the 1990s. Actions promoting work ability have primarily focused on individuals, and only lately the target has widened to include the organizational and psychosocial levels as well. In the “tetrahedral model of work ability,” the constituents are the resources of an individual, organizational function, professional competence, and work environment.⁶ In the “house model,” the work ability builds up on individual health, values, professional competence, and circumstances in work life.⁶ In the “iceberg model,”⁷ it was presumed that near-misses can be avoided by eliminating threats and preventing hazards. Also in the 5D model of the World Health Organization (discomfort-disadvantages-disability-diseases-death), it is assumed that diseases and even death can be avoided by acting on symptoms and disadvantages at earlier stages.

We explored the evidence on the association between leadership and well-being and health in the context of a job well-being pyramid, a hierarchical model with intermediate outcomes from leadership through well-being to health outcomes (Fig. 1). As with the iceberg and 5D models, the best results are achieved when health problems are prevented at lower levels, eg, leadership, work environment, and work-

ing conditions. The causality between different levels of the pyramid was studied in a large systematic literature analysis. In this review, we focus on the causality between leadership and job satisfaction, well-being at work and job performance as well as absenteeism and early retirement.

Methods

Each side of the job well-being pyramid is an independent entity: job and work environment, work ability, and action. Job and work environment contains all physical and psychosocial factors that affect work and work environment. Work ability contains the measures that are frequently used to measure the employees' ability to work, such as work ability, sickness absences, and disability pension. Action contains all those actions taken at work which are intended to improve the employees' job well-being.

Literature Search

Literature published in 1970 to 2005 was searched in two databases: MEDLINE in June/July 2005 and PsycINFO in November 2005. Search terms were leadership combined with job satisfaction, well-being, morbidity, job performance,

sick leave, sickness absence, and disability pension. Indexed terms such as Medical subject headings in MEDLINE were used if possible. The aim was to find all relevant original studies published in international journals. Meta-analyses were searched and examined in order to guarantee that no important studies would be missed.

A study was included in the analysis, if it was an original one and the study population was at working age. Those studies that were conducted in other than a true working environment, such as in classes, courses, or among students were excluded. Also studies that did not give information on study design and results in sufficient detail were excluded. Dissertations were excluded for practical reasons; international dissertations are generally hard to obtain.

The abstracts were scrutinized and all potentially eligible articles were retrieved. Search terms, search strategy, the selection and use of publications were documented systematically. Detailed information was collected from each study included in the analysis.

Definitions

Leadership. Considerative leadership can mean relational justice when supervisor treats with consideration and truthfully. Considerative leadership is usually measured by the Ohio State Leader Behavior Description Questionnaire.^{8,9} Supportive leadership has been defined as leader's social support, concern for subordinates or coaching. It was measured mainly by Job Content Instrument,¹⁰ that measures the dimensions of the demand-control model. Transformational leadership has been measured mainly by Multifactor Leadership Questionnaire.¹¹ This kind of leadership has dimensions such as inspirational motivation, intellectual stimulation, and individual consideration.

Job Satisfaction. Job satisfaction was intended to describe the employee's satisfaction with the contents of the work. Satisfaction with the super-

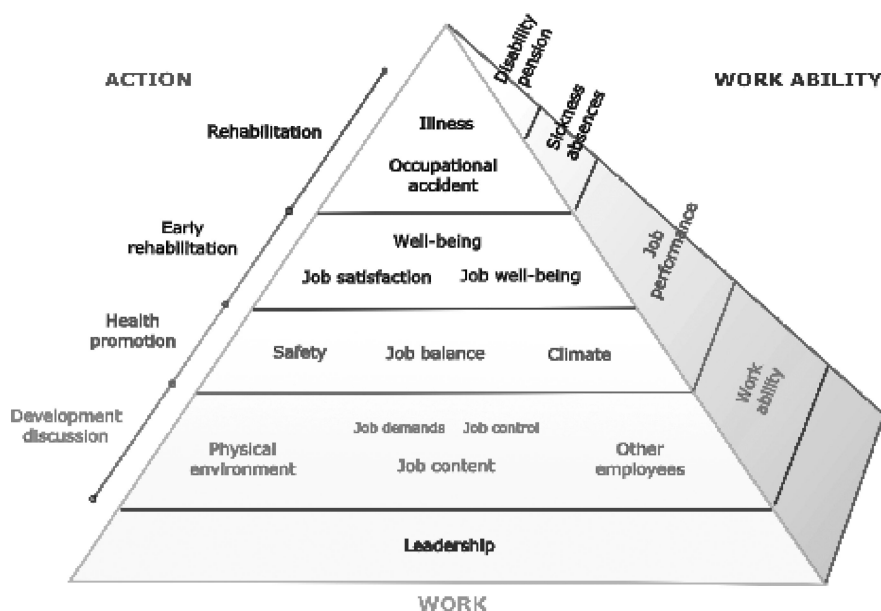


Fig. 1. The job well-being pyramid.

visor, workmates, physical environment, and organizational climate were considered other factors that needed to be conceptually separated from each other. Pay and promotional opportunities were considered organizational aspects rather than being part of the work itself. Our definition corresponded closely to what has been termed “intrinsic” satisfaction in the literature. Nevertheless, the measures of job satisfaction do not often make this distinction.

Most common measures are on one hand one-item global questions and on the other hand multi-item questionnaires on satisfaction with work. A typical example of the former is “How satisfied are you with your work?” The answer is provided on a 5 to 7 level Likert scale from “very satisfied” to “very dissatisfied.” Job Description Index,¹² Job Expectation Questionnaire,¹³ Minnesota Satisfaction Questionnaire,¹⁴ the questionnaire by Rizzo et al¹⁵ and that of Hopcock¹⁶ are examples of multi-item questionnaires in use.

Job Well-Being. We intended job well-being as a measure of health related to work. As it is reasonable to assume that psychological symptoms are more likely to be associated with leadership practices than physical health that probably more reflects the physical and ergonomic contents of the work than leadership, job well-being was mirrored by such symptoms as exhaustion, anxiety, depression, or stress related to work. Maslach Burn-

out Inventory¹⁷ having three subscales, one of which is emotional exhaustion and Trait-State Anxiety Inventory¹⁸ are often used to measure work-related psychological symptoms.

Job Performance. No uniform standard way of measuring job performance has been generated. We aimed to examine performance as “work ability in action.” That is to say, we conceptualized that from full health and work ability, the intermediate level before calling on sick leave would be a decrease in job performance. Nevertheless, job performance is usually thought and measured in terms of productivity and economical effectiveness. It may be that an employee’s perception on his or her performance compared with one’s own maximum achievable performance would be the best measure. The measures used in the studies mostly relied on the supervisor’s or management’s evaluations and comparisons, if any, were made between employees or workgroups.

Evaluation of Strength of Evidence

Six factors affected the strength of evidence: study design, quality of studies, quality of results, applicability of results, number of studies, and homogeneity of studies (Table 1). Each study was assessed for the four first-mentioned properties. The study quality was based on the study population (eg, the population of a certain area, or all employees in a

certain department), and the definition and measurement of predictor and outcome. The quality of results, on the other hand, was based on the sample size, control group, number of dropouts, and those missing from analyses, follow-up time, and whether potential confounding factors were accounted for. The applicability of results was affected by study country, setting (eg, population, work environment), age and sex distribution, and coverage (ie, response rate, how many from the eligible base population participated in the study). The homogeneity of studies was assessed by comparing the following 11 factors between studies: study country, setting, age and sex distribution, the measurement of predictor and outcome, follow-up time, the risk or distribution of outcome in the control group, effect measure (risk difference, risk ratio [RR], odds ratio, difference in means, linear regression coefficient, correlation coefficient), effect (benefit, no effect, harm) and the continuity of the effects between studies.

The study was required to meet the predefined criteria at each level of strength of evidence. The evaluation was hierarchical, ie, only those studies were taken into consideration that fulfilled the criteria for the best possible level. The cut-points for each criterion were based on the current practice, specialist opinion, or common sense.

TABLE 1

Criteria for Strength of Evidence on a Preceding Factor

Strength of Evidence	Study Design	Minimum Study Quality	Minimum Results Quality	Minimum Results Applicability	No. Studies	Homogeneity Index*
Good	CT, CO, NCC	Good	Good	Moderate	3	6/8 (2/3)
Moderate	CT, CO, NCC	Moderate	Moderate	Moderate	2	5/8 (2/3)
	CC	Good	Good			
Weak	CT, CO, NCC	Weak	Weak	Weak	1	4/8 (1/2)
	CC	Moderate	Moderate			
Very weak	CS	Weak	Weak	Weak	1	3/8 (1/2)

CT, clinical trial; CO, cohort study; NCC, nested case-control study; CC, case-control study; CS, cross-sectional study.

*First fraction expresses the number of factors (eg, population, outcome, follow-up time) that need to be homogenous in between the studies. The latter fraction expresses the number of studies that need to be similar, in order the factor in question to be considered homogenous.

Statistical Analyses

The rate difference per 1000 person-years and RR were considered the most optimal effect measures. The medians and ranges of the effect sizes are reported. A summary statistic for RRs was calculated using the inverse variance method. If the authors reported only correlation or linear regression coefficients, risks were estimated for the purposes of this review in the following manner: the study population was divided in two parts at the median (or mean) of the predictor, eg, leadership, and based on assumptions of normal distributions, it was estimated using the correlation or linear regression coefficient what percentage of the participants of each group belonged to the uppermost tertile of the outcome, eg, job satisfaction. Those percentages represented the “risks” of which the calculation of RR was straightforward. If there were no cases in any of the comparison groups, 0.5 was added to each cell of the 2×2 table in order to calculate rate difference and RR.

Results

Literature Search

In MEDLINE, 224 references were found in search of original studies. Seventy-one publications were selected and retrieved, 29 (41%) of which were included in the analysis.^{19–47} On the other hand, search in PsycINFO produced 79 references. Twenty-two articles were retrieved and 11 (50%) of them included in the analysis.^{48–58}

In addition to those 40 articles found through the targeted search, 69 articles found in other ways were included in the analysis. Thirty-eight studies were found through the manual search of the reference lists of the meta-analyses and original articles,^{59–96} and 31 through the other systematic searches performed for the whole project.^{97–127} In all, 109 articles were examined in detail and the best evidence presented here is based on 27 of them.

Description of Studies

The characteristics of the studies are shown in Tables 2 and 3. There were 1 clinical trial, 14 cohort studies and 94 cross-sectional studies. Six studies were from Finland, 5 from Scandinavia, 18 from other European countries, 67 from the United States, 2 from Australia, 6 from Asia, 2 from Africa, and 3 studies were multinational. Four studies were population-based, 103 were done in occupational, and 2 in health care settings. Most of the studies had mixed populations concerning gender even though the distribution might not have been even, especially in the studies done in work environments; 59 studies had both men and women in their study populations, 7 studies focused on men and 3 on women, and 40 studies did not report the distribution. The age distribution was reported in 61 studies, and most of them, if not all, seemed to have the whole working age covered.

The quality and strength of studies are shown in Table 3. The study quality was good in most of the studies; yet the results quality could be considered good in only 4 studies and poor in 50 studies. The applicability of studies was good to moderate in all but 19 studies. Thus, the study strength was strong in 2 studies, moderate in 6, weak in 7, and very weak in 94 studies.

Leadership style was measured by Ohio State Leader Behavior Description Questionnaire in 41 studies, Job Content Instrument in 5 studies, and Multifactor Leadership Questionnaire in 5 studies. The other 58 studies used miscellaneous questionnaires. Measures on internal consistency such as Cronbach's alpha were only infrequently reported.

Job satisfaction was measured by a one-item global question in 4 studies, by a multi-item questionnaire in 71 studies, and the measurement was unclear in 2 studies. Job Description Index was used in 20 studies, Minnesota Satisfaction Questionnaire in 4 studies, Job Expectation Question-

naire in 3 studies, the questionnaire by Rizzo et al in 3 studies, and that of Hoppock in 3 studies. The rest 38 studies used various other multi-item questionnaires.

Job well-being (or psychological symptoms) was measured by Maslach Burnout Inventory in 8 studies and Trait-State Anxiety Inventory in 2 studies. Three studies used a one-item and the rest 12 studies various other multi-item questionnaires. Mental or emotional exhaustion was measured in nine studies, stress or strain in nine studies, anxiety or tension in five studies, depression in one study, and psychological symptoms in general in one study.

Job performance was measured at individual level in 20 studies and at group-level in 4 studies. Three studies used routine files of companies. Of the 20 studies measured at individual level, performance was evaluated by the employee himself or herself in 3 studies and by the supervisor in 4 studies; in the rest, the measurement procedure was somewhat unclear.

Effect of Leadership on Job Satisfaction

There was weak evidence that good leadership was associated with increased job satisfaction (RR 2.23, range from 1.39 to 3.51) (Table 4). The subtypes of leadership had a similar associations, the point estimate for RR ranging from 1.63 to 2.59 (Table 5). The standardized beta was reported in 20 studies, the median value being 0.34 (range from 0.12 to 0.59), and the correlation coefficient was reported in 52 studies, the median value being 0.35 (range from 0.07 to 0.88).

Effect of Leadership on Job Well-Being

The strength of evidence was moderate on that good leadership was associated with increased well-being at work (RR 1.40, range from 1.36 to 1.57) (Table 4). The subtypes of leadership had similar associations, the point estimate for RR rang-

TABLE 2
Study Characteristics

Study	Year of Publication	Type of Leadership	Outcome	Start of Recruitment	Follow-Up (yrs)	N	Original Effect Measure	Estimated RR
Clinical trials								
Gumuseli and Ergin ¹⁰⁶	2005	Support	Job satisfaction	nr	0.35	64	Diff mean 12.1	1.91
Cohort studies								
Greene ²⁵	1975	Consideration	Job satisfaction	nr	0.5	206	[ρ] 0.61	2.59
Krause et al ¹⁰⁹	1997	Support	Disability pension	1984	4.2	968	OR 0.50*	0.50
Stansfeld et al ¹¹⁹	1997	Support	Sick leave	1985	5.3	4108	RR 0.55*	0.71
Frese ⁷⁰	1999	Support	Job well-being	nr	1.33	90	[ρ] 0.21	1.36
Vahtera et al ¹²³	2000	Support	Sick leave	1990	6.7	522	RR 0.89*	0.89
Ariens et al ⁶¹	2002	Support	Sick leave	1994	3	750	RR 0.73*	0.73
Hoogendoorn et al ⁷³	2002	Support	Sick leave	1994	3	635	RR 0.70*	0.70
Lund and Csonka ¹¹⁵	2003	Leadership	Disability pension	1995	2	2182	RR 0.42	0.42
de Lange et al ¹⁰²	2004	Support	Job well-being	1994	1	668	[ρ] 0.20	1.29
Hätinen et al ¹⁰⁸	2004	Leadership	Job well-being	2000	0.33	111	[ρ] 0.30	1.57
van den Heuvel et al ¹²⁴	2004	Support	Sick leave	1994	3	375	OR 0.37*	0.37
van Dierendonek et al ⁴⁵	2004	Leadership	Job well-being	1996	1.17	562	[ρ] 0.23	1.40
Väänänen et al ¹²⁷	2004	Leadership	Sick leave	1996	1.75	3579	RR 0.76*	0.76
Logan and Ganster ¹¹³	2005	Support	Job satisfaction	nr	0.35	64	[ρ] 0.42	1.91
Cross-sectional studies†								
Beatty and Beatty ⁹⁹	1975	Consideration	Sick leave	nr	na	20	[ρ] 0.20	1.38
Miles and Petty ⁸¹	1977	Consideration	Job well-being	nr	na	235	[ρ] 0.26	1.51
Johns ⁷⁸	1978	Consideration	Job satisfaction	nr	na	232	[ρ] 0.43	1.96
Schriesheim ⁸⁸	1979	Consideration	Job well-being	nr	na	308	[ρ] 0.45	2.02
Sheridan and Vredenburg ⁹¹	1979	Consideration	Job well-being	nr	na	209	[β] 0.35	1.72
Sorrentino et al ⁴²	1992	Consideration	Job well-being	nr	na	103	[ρ] 0.44	1.98
Boumans and Landeweerd ¹⁹	1993	Consideration	Job satisfaction	nr	na	561	[ρ] 0.57	2.44
Smith et al ⁴¹	1994	Transformational	Job satisfaction	nr	na	165	[ρ] 0.17	1.50
Staw et al ⁹²	1994	Support	Job well-being	1972	na	272	[ρ] 0.33	1.65
Larrabee et al ³²	2003	Transformational	Job satisfaction	nr	na	89	[ρ] 0.53	2.34
Vaishali and Kumar ⁵⁷	2003	Transformational	Job well-being	nr	na	127	[β] 0.43	1.95
Drach-Zahavy ⁵⁰	2004	Support	Job performance	nr	na	368	b 0.19*	1.21
Sosik and Godshalk ⁵⁶	2004	Transformational	Job satisfaction	nr	na	217	[ρ] 0.16	1.27
Walumbwa et al ⁵⁸	2004	Transformational	Job satisfaction	nr	na	402	[β] 0.40	1.86
Bogler ⁴⁹	2005	Transformational	Job satisfaction	1997	na	745	[β] 0.33	1.66

Each study might have reported several outcomes.

N indicates size of the study population; RR, risk ratio; OR, odds ratio; [ρ], correlation coefficient; b, linear regression coefficient; [β], standardized linear regression coefficient; diff mean, difference in means; nr, not reported; na, not applicable.

*Adjusted value.

†Only those cross-sectional studies shown that provide the best available evidence reported in Tables 4 and 5. Other cross-sectional studies ($k = 79$) in the analysis were the references: 20–24, 26–31, 33–36, 37–40, 43, 44, 46–48, 51–55, 59, 60, 62–69, 71–72, 74–77, 79–80, 82–87, 89, 90, 93–98, 100–101, 103–105, 107, 110–112, 114, 116–118, 120–122, 125–126.

TABLE 3
Study Characteristics, Quality and Strength

Study	Country	Setting	Mean Age [Range] (yrs)	Sex	Study Quality	Results Quality	Results Applicability	Study Strength
Clinical trials								
Gumuseli and Ergin ¹⁰⁶	Turkey	Work	nr	nr	Good	Poor	Moderate	Weak
Cohort studies								
Greene ²⁵	USA	Work	nr	FM	Poor	Poor	Moderate	Weak
Krause et al ¹⁰⁹	Finland	Population	[42–60]	M	Good	Good	Moderate	Strong
Stansfeld et al ¹¹⁹	UK	Work	[35–55]	FM	Good	Poor	Good	Weak
Frese ⁷⁰	Germany	Work	nr	M	Good	Moderate	Moderate	Moderate
Vahtera et al ¹²³	Finland	Work	nr	FM	Good	Moderate	Good	Moderate
Ariens et al ⁶¹	Netherlands	Work	36	FM	Good	Good	Good	Strong
Hoogendoorn et al ⁷³	Netherlands	Work	36	FM	Good	Moderate	Good	Moderate
Lund and Csonka ¹¹⁵	Denmark	Population	[18–64]	FM	Good	Moderate	Moderate	Moderate
de Lange et al ¹⁰²	Netherlands	Work	35	FM	Good	Poor	Good	Weak
Hätinen et al ¹⁰⁸	Finland	Health care	51	FM	Good	Moderate	Moderate	Moderate
van den Heuvel et al ¹²⁴	Netherlands	Work	nr	FM	Good	Poor	Good	Weak
van Dierendonck et al	UK	Work	40	FM	Moderate	Moderate	Good	Moderate
Väänänen et al ⁴⁵	Finland	Work	nr	FM	Good	Poor	Good	Weak
Logan and Ganster ¹¹³	USA	Work	nr	nr	Moderate	Moderate	Poor	Weak
Cross-sectional studies*								
Beatty and Beatty ⁹⁹	USA	Work	nr	F	Good	Poor	Moderate	Very weak
Miles and Petty ⁸¹	USA	Work	nr	FM	Good	Poor	Moderate	Very weak
Johns ⁷⁸	USA	Work	nr	nr	Good	Poor	Moderate	Very weak
Schriesheim ⁸⁸	USA	Work	nr	nr	Good	Poor	Moderate	Very weak
Sheridan and Vredenburg ⁹¹	USA	Work	nr	nr	Moderate	Poor	Poor	Very weak
Sorrentino et al ⁴²	USA	Work	31	FM	Good	Moderate	Moderate	Very weak
Boumans and Landeweerd ¹⁹	Netherlands	Work	29	FM	Good	Poor	Moderate	Very weak
Smith et al ⁴¹	USA	Work	42	nr	Good	Moderate	Moderate	Very weak
Staw et al ⁹²	USA	Work	38	FM	Good	Moderate	Moderate	Very weak
Larrabee et al ³²	USA	Work	35	FM	Good	Moderate	Moderate	Very weak
Vaishali and Kumar ⁵⁷	India	Work	[23–58]	FM	Moderate	Poor	Poor	Very weak
Drach-Zahavy ⁵⁰	Israel	Work	37	FM	Good	Moderate	Moderate	Very weak
Sosik and Godshalk ⁵⁶	USA	Work	[21–56]	FM	Moderate	Moderate	Moderate	Very weak
Walumbwa et al ⁵⁸	China, India	Work	[20–51]	FM	Good	Moderate	Poor	Very weak
Bogler ⁴⁹	Israel	Work	nr	FM	Good	Moderate	Moderate	Very weak

Mean age at start of study.

Nr indicates not reported.

*Only those cross-sectional studies shown that provide the best available evidence reported in Tables 4 and 5. The references for the other cross-sectional studies in the analysis listed in the footnote of Table 2.

ing from 1.39 to 1.95 (Table 5). The standardized beta was reported in 10 studies, the median value being 0.16 (range from 0.05 to 0.43), and the correlation coefficient was reported in 13 studies, the median value being 0.26 (range from 0.12 to 0.47).

Effect of Leadership on Job Performance

There was weak evidence that good leadership is not associated with job performance (RR 1.13, range from 0.55 to 1.20) (Table 4). Consideration and support had similar associations, the point estimate for RR ranging from 1.13 to 1.36; no information was available for trans-

formational leadership (Table 5). The standardized beta was reported in three studies, the median value being 0.09 (range from −0.38 to 0.30), and the correlation coefficient was reported in 19 studies, the median value being 0.22 (range from −0.19 to 0.33).

Effect of Leadership on Sick Leave

There was moderate evidence that good leadership was associated with a decreased risk of sickness absence (RR 0.73, range from 0.70 to 0.89) (Table 4). This result reflected the association with support and sickness absence (Table 5). Instead, there

seems to be no association between consideration and sickness absence (RR 0.96, range from 0.78 to 1.38). The correlation coefficient was reported in five studies, the median value being 0.09 (range from −0.03 to 0.20).

Effect of Leadership on Early Retirement

The evidence on the association between leadership and disability pension was scanty: only two studies were available. Yet the strength of evidence was moderate on that good leadership was associated with a decreased risk of disability pension (RR 0.46, range from 0.42

TABLE 4

The Association Between Leadership, Job Well-Being, and Work Ability

Outcome	Strength of Evidence	RR				RD per 1000 yr Median [Range]	References*
		k/K	N _k	Median [Range]	Mean (95% CI)		
Job satisfaction	Weak	4/77	958	2.23 [1.39 to 3.51]	1.64 (0.95–2.83)	598 [108 to 193] ³	25, 102, 106, 113 [A]
Job well-being	Moderate	3/25	763	1.40 [1.36 to 1.57]	1.43 (0.86–2.36)	94 [77 to 449] ³	45, 70, 108 [B]
Job performance	Weak	3/24	435	1.13 [0.55 to 1.20]	1.20 (0.26–5.54)	242 ¹	25, 91, 106 [C]
Sick leave	Moderate	3/15	1907	0.73 [0.70 to 0.89]	0.84 (0.55–1.27)	–40 ¹	61, 73, 123 [D]
Disability pension	Moderate	2/2	3150	0.46 [0.42 to 0.50]	0.45 (0.22–0.92)	–19 ¹	109, 115

Rate difference cannot be calculated for studies without follow-up. The superscript denotes the number of studies that the effect estimate is based on.

RR indicates risk ratio; RD, rate difference; k/K, number of studies providing best evidence out of all eligible studies; N_k, total number of participants in the studies providing best evidence.

*References for studies providing evidence of lower strength:

A (k = 73): 19–24, 26–28, 30–38, 40–44, 46, 48–49, 51–56, 58–60, 62, 64, 66, 68–69, 71, 72, 74–79, 81–90, 93–97, 100, 103–104, 110–111, 116–118, 120, 125.

B (k = 22): 20, 38–39, 42, 47, 57, 81, 86, 88, 91, 92, 98, 102–105, 111–112, 116–117, 120–121.

C (k = 21): 21, 23, 31, 37, 42, 50–51, 62–63, 65, 67, 69, 74, 76, 80, 88, 90, 92, 101, 103, 114.

D (k = 12): 19, 39, 78–79, 99, 103, 107, 119, 122, 124, 126–127.

TABLE 5

The Association Between Leadership Type, Job Well-Being, and Work Ability

Outcome Leadership Type	Strength of Evidence	RR				RD per 1000 yr Median [Range]	References*
		k/K	N _k	Median [Range]	Mean (95% CI)		
Job satisfaction							
Consideration	Weak	1/38	206	2.59	nr	—	25 [A]
Support	Weak	2/12	732	1.63 [1.39 to 1.91]	1.49 (0.84–2.66)	353 [108 to 598] ²	102, 113 [B]
Transformational	Very weak	5/5	1618	1.66 [1.27 to 2.34]	1.65 (1.15–2.39)	—	32, 41, 49, 56, 58
Job well-being							
Consideration	Very weak	4/4	855	1.85 [1.51 to 2.02]	1.98 (0.68–5.77)	—	42, 81, 88, 91
Support	Weak	2/8	758	1.32 [1.29 to 1.36]	1.31 (0.75–2.29)	81 [77 to 84] ²	70, 102 [C]
Transformational	Very weak	1/1	127	1.95	nr	—	57
Job performance							
Consideration	Weak	2/11	415	0.78† [0.55 to 1.13]	nr	—	25, 91 [D]
Support	Very weak	2/2	640	1.36 [1.21 to 1.54]	1.35 (0.77–2.35)	—	50, 92
Sick leave							
Consideration	Very weak	3/3	679	0.96 [0.78 to 1.38]	nr	—	19, 78, 99
Support	Moderate	3/6	1907	0.73 [0.70 to 0.89]	0.84 (0.55–1.27)	–40 ¹	61, 73, 123 [E]
Disability pension							
Support	Weak	1/1	968	0.50	0.50 (0.15–1.66)	—	109

Rate difference cannot be calculated for studies without follow-up. The superscript denotes the number of studies that the effect estimate is based on.

RR indicates risk ratio; RD, rate difference; nr, not reported, not enough information was provided for calculation of a weighted mean risk ratio; k/K, number of studies providing best evidence out of all eligible studies; N_k, total number of participants in the studies providing best evidence.

*References for studies providing evidence of lower strength:

A (k = 37): 19, 22, 24, 26, 28, 30, 34, 35, 42, 46, 54–55, 59–60, 62, 64, 68–69, 72, 74–75, 77–79, 81–85, 87–90, 93–96.

B (k = 10): 29, 40, 48, 66, 71, 97, 104, 116, 118, 120.

C (k = 6): 92, 104, 112, 116, 120, 121.

D (k = 9): 42, 62–63, 67, 69, 74, 76, 88, 90.

E (k = 3): 107, 119, 124.

†The result is against expectations.

to 0.50) (Table 4). The RR was 0.50 for the one study on support (Table 5); there were no studies on consideration and transformational leadership with regard to early retirement.

Discussion

Leadership predicts job well-being and the risk of sick leaves and early retirement and also seems to be associated with job satisfaction, having no

association with job performance. The strength of evidence was moderate for the first three associations and weak for the latter ones. The findings fit well with what was expected based on the job well-being pyramid model.

None of the meta-analyses concerning leadership we found in MEDLINE and PsycINFO databases examined the same predictor-outcome relationships as we in this study. One analysis showed a positive relationship between leadership-member exchange and citizenship behaviors,¹²⁸ and another one that direct leaders, ie, the nearest supervisors, appeared to be important determinants of trust in leadership.¹²⁹ One meta-analysis indicated that beneficial treatment received by employees, eg, fairness and supervisor support, were associated with employees' well-being.¹³⁰ Well-being, in turn, was associated with positive outcomes for the employees such as job satisfaction and positive mood, and for the organization such as commitment and performance. Even though leadership was not associated with work performance in our meta-analysis, job satisfaction and mental well-being have been found to correlate positively with job performance.¹³¹ Lastly, one review examined the relationships between different organizational justice dimensions and job satisfaction and performance in terms of their implications for future research.¹³²

One of the cornerstones in evaluation of evidence is that literature should be searched extensively. It is not likely that the two literature databases we used in this review cover all the studies ever done on these topics. Nevertheless, the hierarchical nature of the method we used partly compensates this weakness; it is essential that all the studies providing strongest evidence have been included. We believe that we have found at least the major part of those studies. On the other hand, weak evidence does not become stronger by adding more studies with poor quality. One also has to keep in mind that a study quality can be high and yet the strength of evidence it provides can be weak.

The study strength was mostly weak or very weak, which was mainly because of cross-sectional

design or poor results quality. The study quality as defined in this review was good to moderate. The low results quality was mainly because of the effect measure used (correlation coefficient reported without information on distributions of the predictor and outcome), small sample size, and large losses to follow-up ($\geq 50\%$). The quality of a study is not always truly reflected by the reporting. Some studies might have obtained better scoring, had the reporting been more thorough. For example, we considered correlation coefficient a poor effect measure because it is, by definition, confounded by the distributions of the predictor and outcome. If the authors did not report any measures on those distributions, any recalculations (however loaded with assumptions) were impossible. The cross-sectional study design, on the other hand, does not allow inferences on causal relationships. Thus, the main reasons for the weakness of evidence were low study strength and heterogeneity of studies.

The theoretical context and the objectives of a study affect the selection of the analysis methods both in original studies as well as in this systematic review. We mirrored the evidence against the pyramid model, and the point estimates we used were detached from their original context. The strength of evidence would be easiest to evaluate if the studies were identical in terms of all the factors taken into account.

Leadership was measured based on the information given mostly by the employees. This is probably the most adequate way, because the perceptions of the employees most likely are the ones that matter as compared to some "objective" measure. Measures on job satisfaction and job well-being seemed to behave consistently irrespective of differences in study characteristics. We aimed the job performance to reflect the employee's work ability. Currently, popular Balanced Score Card¹³³ practices in companies do refer to the importance of different

facets of company success: customer satisfaction with work processes and competence to financial result. Part of the competence is the skills and motivation of the personnel. Yet, the job performance measures that are based on economic productivity measures and comparisons between employees or workgroups do not probably reflect the health aspect in a way we desire and what would be essential for the pyramid model.

Kotter¹³⁴ argues that leadership is most important in an environment with large change. Leadership can provide vision and understanding of the strategy, energizing people and satisfying basic needs of achievement, recognition, self-esteem, and living up to one's ideals. Organizations can utilize multiple levels and roles of leadership. Ideal leaders with high energy and intelligence with good mental health and integrity cannot be found in every foreman's post. Challenging and broadening assignments and visible role models promote leadership. Narrow jobs, vertical career movement, rapid promotions, and rewards on short-term results inhibit leadership growth. Corporate culture can encourage leadership in managerial practices, in hiring people, and functions of informal network. Leadership can be a crucial factor in explaining the mechanism that produces health inequalities in work organizations.

Our findings are mostly consistent with the job well-being pyramid model. If the association between leadership and health and well-being described in this review presents a true relationship, it would be extremely important that leadership function was considered, measured, and evaluated, and good leadership practices were promoted in all work environments. The evidence concerning the other relationships presented in the model still needs to be evaluated. The pyramid model is a visually attractive means to illustrate the important psychosocial and physical factors, including leadership, and their longitudinal relationships

with the employees' work ability, well-being and health in work environments. It is a simple, yet reasonably comprehensive presentation that can be used as an understandable framework when occupational health issues are approached in organizations, occupational health practices, and in their mutual cooperation. If well-being at work is followed up routinely in organizations by questionnaires, those results, absenteeism, occupational accidents and disability pensions, and any actions taken in order to improve working conditions or work ability can be evaluated and observed in a meaningful manner in the context of the pyramid model.

Conclusions

Good leadership seems to improve job satisfaction and job well-being as well as decrease sickness absenteeism and disability pensions. The relationship between leadership and job performance is unclear. More well-founded prospective studies with good quality are needed to strengthen and clarify the evidence concerning the relationship between leadership and employees' well-being and health at work.

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