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Work–life interaction and perceived organizational, supervisor, and coworker support among healthcare workers: a cross-sectional study

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Abstract

Objective: This study aimed to examine the relationships between four dimensions of work–life interaction—negative life-to-work, negative work-to-life, positive life-to-work, and positive work-to-life interaction—and perceived organizational, supervisor, and coworker support among healthcare workers employed at a state hospital.

Methods: This cross-sectional study included 619 healthcare workers, representing approximately 90% of the target population at Mustafakemalpaşa State Hospital. Data were collected using a sociodemographic information form, the Work–Life Balance Scale, and scales measuring perceived organizational, supervisor, and coworker support. Descriptive statistics, independent-samples t tests, one-way analysis of variance, Mann–Whitney U tests, Kruskal–Wallis tests, Pearson correlation analyses, and hierarchical linear regression analyses were performed.

Results: Of the participants, 70.4% were women, 62.8% were married, 42.5% held a bachelor's degree, and 59.9% worked 46 hours or more per week. Adding the support variables—perceived organizational, supervisor, and coworker support—significantly increased the explained variance in all four outcomes ($\Delta R^2 = 0.092\text{--}0.131$; $p < 0.001$), and the final models explained 13.5%–17.6% of the variance. Supervisor support was a significant predictor in all four models. Perceived organizational support was consistently associated with the work-to-life interaction dimensions, whereas coworker support showed an independent association only with negative life-to-work interaction.

Conclusion: Work–life interaction among healthcare workers appears to be more strongly associated with modifiable organizational and interpersonal workplace resources than with demographic or occupational characteristics. Strengthening organizational support policies and family-supportive supervisor behaviors in healthcare institutions may help improve work–life interaction.

Keywords: work–life interaction, perceived organizational support, supervisor support, coworker support, healthcare workers

Introduction

The concept of work–life balance emerged in Western societies in the late 1970s and 1980s. It refers to the effort to achieve an appropriate balance between professional responsibilities and personal life [1]. Work–family conflict has been defined as a form of inter-role conflict in which pressures from work and family roles are mutually incompatible [2]. Work–life balance has also been described as the strategic effort individuals make to allocate their resources effectively between professional responsibilities and personal fulfillment [1]. It is influenced by job demands such as high work pressure, emotional demands, and role ambiguity, which may contribute to sleep problems, burnout, and other health problems. In contrast, job resources such as social support, performance feedback, and autonomy may initiate a motivational process that promotes work-related learning, job engagement, and organizational commitment [3].

The amount of time an individual spends at work is an important determinant of work–life balance. The timing and organization of work may also create additional risks. For example, employees in sectors such as healthcare, security, and industry frequently work shifts [4]. The healthcare sector presents particular challenges to achieving work–life balance because of irregular working hours, high-stress environments, emotional labor, and the intrusion of work into personal time [1]. Healthcare workers are also exposed to biological, chemical, physical, radiological, and noise-related occupational hazards [4,5]. A study of healthcare workers in Indonesia similarly reported that 24-hour shift systems and the constant demands of hospital environments make it difficult to maintain a satisfactory work–life balance. Such conditions may contribute to psychological burnout, reduced job satisfaction, and employee turnover [6]. Work–life imbalance among healthcare workers may therefore have serious consequences, including increased burnout, higher turnover, and reduced quality of patient care [7].

Various factors affect work–life balance among healthcare workers, including individual characteristics such as age, income, and work experience; social support; and organizational factors such as working hours, workload, and workplace policies [6]. Personal values, stress-management strategies, and perceptions of professional roles may also shape this balance. While some employees view their work primarily as task completion, others derive a strong sense of purpose from their careers [1].

A key factor shaping work–life balance is the level of support employees perceive in the workplace. From a social exchange theory perspective, perceived organizational support has been shown to improve work–life balance through work engagement [8]. Supervisor support also plays an important role. A systematic review emphasized that the effectiveness of work–family practices depends largely on supportive supervisor behavior and that merely offering such practices is insufficient [9]. However, these relationships may not always be linear. In a study of employees at a higher education institution, supervisor and family support did not significantly moderate the relationship between work–life balance and individual well-being, contrary to expectations [10]. Coworker support is similarly important. A daily survey study showed that work-task conflict negatively affects work–family balance, but that this adverse effect is weaker when coworker support is high [11]. These findings suggest that organizational, supervisor, and coworker support should be considered critical resources in demanding work environments such as healthcare.

Although work–life balance is generally expected to promote well-being, it is particularly important for healthcare workers because it may affect not only personal well-being but also professional performance and the quality of patient care [1,12].

Similarly, Widayana et al. stated that maintaining a satisfactory work–life balance affects healthcare workers, their families and communities, and the quality of care they provide [6].

This study aimed to examine the independent relationships between four dimensions of work–life interaction and perceived organizational, supervisor, and coworker support among healthcare workers employed at a public hospital.

Methods

Research design

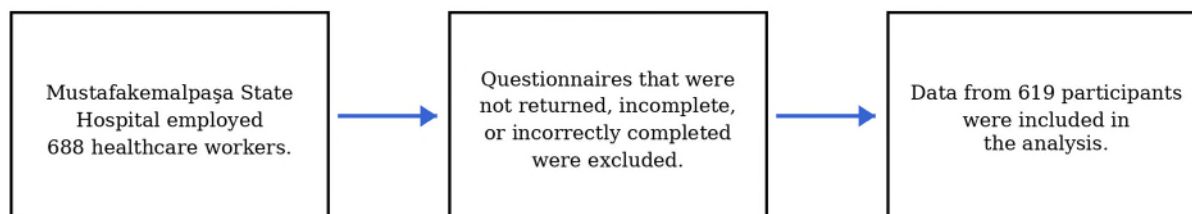
This cross-sectional observational study evaluated work–life interaction among healthcare workers at Mustafakemalpaşa State Hospital in relation to perceived organizational, supervisor, and coworker support.

Data collection procedures and instruments

The study population comprised 688 healthcare workers employed at Mustafakemalpaşa State Hospital. The entire population was invited to participate, and 619 employees responded, yielding a response rate of approximately 89.9%. Questionnaires were distributed in sealed envelopes. Written informed consent was obtained from all participants, and completed questionnaires were returned in sealed envelopes one week later. No personally identifying information was collected to protect participant anonymity and minimize response bias.

Data were collected between June 15, 2025, and May 1, 2026. Individuals were eligible if they were aged 18 years or older, employed at Mustafakemalpaşa State Hospital, and volunteered to participate. No additional exclusion criteria were applied. As shown in Figure 1. Questionnaires that were not returned or were incomplete or incorrectly completed were excluded, resulting in an analytical sample of 619 of the 688 eligible healthcare workers.

Figure 1. Participant flow diagram



Data were collected using a sociodemographic information form, the Work–Life Balance Scale, and three workplace support scales assessing perceived organizational, supervisor, and coworker support. The Work–Life Balance Scale is a Likert-type instrument developed by Fisher, Bulger, and Smith (2009) and adapted into Turkish by Ekinci and Sabancı (2021) [13,14].

Work–life interaction was evaluated across four subdimensions. Negative work-to-life interaction refers to the adverse effects of work-related tasks, responsibilities, and demands on an individual's personal life. In contrast, negative life-to-work interaction refers to the adverse effects of personal responsibilities and demands on working life. Positive work-to-life interaction refers to the transfer of skills, experience, energy, and positive emotions from work to personal life. In contrast, positive life-to-work interaction describes how experiences, social resources, and positive emotions gained in personal life contribute to working life. Each subdimension was scored separately, with higher scores indicating a stronger positive or negative interaction in the corresponding direction. Positive and negative subdimensions were therefore treated as distinct constructs rather than as opposites [13,14].

The 17-item scale comprises four subdimensions: Negative Work-to-Life Interaction (İYOSE; items 3, 2, 5, 4, and 1), Negative Life-to-Work Interaction (YİOSE; items 9, 7, 11, 8, 10, and 6), Positive Work-to-Life Interaction (İYOLE; items 12, 13, and 14), and Positive Life-to-Work Interaction (YİOLE; items 17, 16, and 15). Higher subdimension scores indicate stronger interaction in the corresponding direction.

In the present study, Cronbach's alpha for the total Work–Life Balance Scale was 0.88. The alpha coefficients for the subdimensions were 0.90 for Negative Life-to-Work Interaction, 0.87 for Negative Work-to-Life Interaction, 0.84 for Positive Life-to-Work Interaction, and 0.85 for Positive Work-to-Life Interaction.

The Perceived Organizational Support Scale is a unidimensional instrument developed by Eisenberger, Huntington, Hutchison, and Sowa (1986) and adapted into Turkish by Giray and Şahin (2012) as part of the Workplace Support scale set, together with the supervisor and coworker support scales. It measures the degree to which employees perceive that their organization values their contributions and supports their well-being. Cronbach's alpha was 0.93 in the Turkish adaptation study and 0.86 in the present study.

The Perceived Organizational Support Scale contains 12 items, with possible scores ranging from 12 to 60. Higher scores indicate greater perceived organizational support. The scale has no subdimensions.

The Supervisor Support Scale and Coworker Support Scale, which belong to the same scale set, were also used to assess the support participants perceived from their supervisors and coworkers, respectively [15]. The Supervisor Support Scale contains 11 items, has no reverse-scored items, and yields scores ranging from 11 to 55; higher scores indicate greater supervisor support. Cronbach's alpha was 0.94 in the present study. The Coworker Support Scale contains nine items and yields scores ranging from 9 to 45. Item 5 is reverse-scored, and higher scores indicate greater coworker support. Cronbach's alpha was 0.81 in the present study.

Data analysis

Descriptive statistics included frequencies, percentages, means, standard deviations, medians, and minimum and maximum values. The normality of continuous variables was assessed using the Kolmogorov–Smirnov test. For approximately normally distributed variables, independent-samples *t* tests were used to compare two groups, and one-way analysis of variance (ANOVA) was used to compare more than two groups. Significant ANOVA results were followed by Tukey's post hoc test. For variables that were not normally distributed, the Mann–Whitney *U* test was used for two-group comparisons, and the Kruskal–Wallis test was used for comparisons involving more than two groups. Significant Kruskal–Wallis results were followed by Dunn's post hoc test. Associations between continuous variables were evaluated using Pearson correlation analysis. Four separate hierarchical linear regression models were constructed, with each work–life interaction subscale entered as the dependent variable. Block 1 included age, gender, marital status, weekly working hours (40–45 hours as the reference category vs. ≥ 46 hours), weekend work, education (dummy-coded; bachelor's degree as the reference category), and occupation (dummy-coded; nurse as the reference category). Block 2 included perceived organizational, supervisor, and coworker support. The same hierarchical modeling strategy was applied to all four outcomes. Linearity and homoscedasticity were assessed using plots of standardized residuals against standardized predicted values. Residual normality was assessed using histograms and normal probability plots. Potentially influential observations were examined using standardized residuals, and multicollinearity was evaluated using tolerance and variance inflation factor (VIF) values. Analyses were performed using IBM SPSS Statistics, version 31. All tests were two-sided, and $p < 0.05$ was considered statistically significant.

Ethics Approval and Consent to Participate

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The study was approved by the Istanbul University Faculty of Medicine Ethics Committee (Approval No. E-29624016-050.99-3327072; May 21, 2025). Written informed consent was obtained from all participants.

Results

Of the 619 participants, 436 (70.4%) were women and 183 (29.6%) were men.

A total of 389 participants (62.8%) were married, and 230 (37.2%) were single.

The largest educational group comprised participants with a bachelor's degree (42.5%; $n = 263$), followed by those with postgraduate (22.3%), associate (18.7%), and high school (16.5%) education.

More than half of the participants (59.9%; $n = 371$) reported working 46 hours or more per week.

Nurses constituted the largest occupational group (35.2%; $n = 218$), followed by physicians (18.1%), cleaning staff/waiters/cooks (15.7%), technicians (11.8%), data entry personnel/medical secretaries (9.0%), midwives (6.6%), and dietitians/psychologists (3.6%).

A total of 431 participants (69.6%) reported working on weekends.

Participants' demographic and occupational characteristics are presented in Table 1.

Table 1. Demographic and occupational characteristics of the participants

Gender	Number	Percent
Male	183	29.56
Female	436	70.44
Total	619	100
Marital status	Number	Percent
Single	230	37.16
Married	389	62.84

Total	619	100
Education	Number	Percent
High school	102	16.48
Associate degree	116	18.74
Bachelor's degree	263	42.49
Postgraduate	138	22.29
Total	619	100
Weekend work	Number	Percent
Yes	431	69.63
No	188	30.37
Weekly working hours	Number	Percent
40–45 hours	248	40.06
≥46 hours	371	59.94
Total	619	100
Occupation	Number	Percent
Physician	112	18.09
Nurse	218	35.22
Midwife	41	6.62
Technician (laboratory, radiology, operating room)	73	11.79
Data entry personnel/medical secretary	56	9.05
Cleaning staff, waiter, cook, etc.	97	15.67
Dietitian/psychologist	22	3.55
Total	619	100

Table 2. Age, body mass index, professional experience, and institutional tenure by gender

Gender		Age§	BMI	Professional experience (years)*	Institutional tenure (years)*
Male	Mean	36.86	26.95	11.68	8.08
	Standard deviation	7.307	3.60	7.32	5.95
	Median	37	26.29	10	7
	Minimum	19	15.57	1	1
	Maximum	60	39.06	33	31
Female	Mean	35.92	25.77	11.31	7.61
	Standard deviation	7.277	4.42	7.09	5.61
	Median	35	25.71	10	6
	Minimum	21	14.69	1	1
	Maximum	65	43.03	40	35

*Mann–Whitney U test; §independent-samples t test.

As shown in Table 2, age, professional experience, and institutional tenure did not differ significantly by gender (all $p > 0.05$).

Table 3. Work–life interaction and perceived organizational, supervisor, and coworker support scores

	Negative life-to-work interaction	Negative work-to-life interaction	Positive life-to-work interaction	Positive work-to-life interaction	Perceived organizational support	Supervisor support	Coworker support
Mean	17.19	16.58	9.56	9.22	35.91	34.17	30.5
Standard deviation	6.14	4.69	3.03	3.22	5.87	10.22	7.02
Median	17	17	10	9	37	35	31
Minimum	6	5	3	3	16	11	9
Maximum	30	25	15	15	56	55	45

Table 3 shows the distribution of work-life balance, perceived organizational support, and supervisor and coworker support scores of the healthcare personnel participating in the study.

Table 4. Work–life interaction scores by gender, marital status, weekly working hours, and weekend work

	Gender	N	Mean	Standard deviation	t	df	Sig. (2-tailed)
Negative life-to-work interaction	Male	183	16.32	6.10	−2.293	617	0.022
	Female	436	17.56	6.12			
Negative work-to-life interaction	Male	183	15.60	4.77	−3.432	617	0.001
	Female	436	17.00	4.59			
Positive life-to-work interaction	Male	183	9.13	3.31	−2.309	617	0.021
	Female	436	9.75	2.89			
Positive work-to-life interaction	Male	183	9.38	3.25	0.763	617	0.446
	Female	436	9.16	3.21			
	Marital status	N	Mean	Standard deviation	t	df	Sig. (2-tailed)
Negative life-to-work interaction	Single	230	16.70	5.85	−1.523	617	0.128
	Married	389	17.48	6.29			
Negative work-to-life interaction	Single	230	16.94	4.39	1.466	617	0.143
	Married	389	16.37	4.84			
Positive life-to-work interaction	Single	230	9.62	3.03	0.365	617	0.715
	Married	389	9.53	3.03			
Positive work-to-life interaction	Single	230	9.10	3.35	−0.766	617	0.444
	Married	389	9.30	3.14			
	Weekly working hours	N	Mean	Standard deviation	t	df	Sig. (2-tailed)
Negative life-to-work interaction	40–45 hours	248	16.42	6.67	−2.588	617	0.01
	≥46 hours	371	17.71	5.70			
Negative work-to-life interaction	40–45 hours	248	15.91	5.05	−2.942	617	0.003
	≥46 hours	371	17.04	4.38			

Positive life-to-work interaction	40–45 hours	248	9.44	3.26	–0.80 7	617	0.42
	≥46 hours	371	9.64	2.87			
Positive work-to-life interaction	40–45 hours	248	9.09	3.29	–0.83 3	617	0.405
	≥46 hours	371	9.31	3.17			
	Weekend work	N	Mean	Standard deviation	t	df	Sig. (2-tailed)
Negative life-to-work interaction	No	188	16.76	6.38	–1.15 6	617	0.248
	Yes	431	17.38	6.02			
Negative work-to-life interaction	No	188	15.93	4.78	–2.32	617	0.021
	Yes	431	16.87	4.62			
Positive life-to-work interaction	No	188	9.60	2.99	0.202	617	0.84
	Yes	431	9.55	3.05			
Positive work-to-life interaction	No	188	9.23	3.11	0.021	617	0.983
	Yes	431	9.22	3.27			

df, degrees of freedom. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

As shown in Table 4, mean scores for negative life-to-work interaction, negative work-to-life interaction, and positive life-to-work interaction were significantly higher among women than among men (all $p < 0.05$).

Work–life interaction scores did not differ significantly by marital status (all $p > 0.05$). Negative life-to-work and negative work-to-life interaction scores were significantly higher among participants working 46 hours or more per week than among those working 40–45 hours per week (both $p < 0.05$).

Participants who worked on weekends had significantly higher negative work-to-life interaction scores than those who did not ($p < 0.05$).

Table 5. Work–life interaction scores by educational level

	Education	N	Mean	Standard deviation	Minimum	Maximum	F	Sig.
Negative life-to-work interaction	High school	102	17.45	6.80	6	30	0.222	0.881
	Associate degree	116	17.24	5.40	6	27		
	Bachelor's degree	263	17.25	6.08	6	30		
	Postgraduate	138	16.84	6.37	6	30		
Negative work-to-life interaction	High school	102	15.59	5.32	5	25	6.208	$p < 0.001$
	Associate degree	116	15.44	4.10	6	25		
	Bachelor's degree	263	17.27*	4.57	5	25		
	Postgraduate	138	16.97*	4.61	5	25		
Positive life-to-work interaction	High school	102	9.25	3.44	3	15	7.772	$p < 0.001$
	Associate degree	116	8.51	2.83	3	15		
	Bachelor's degree	263	9.85	2.88	3	15		
	Postgraduate	138	10.14 [§]	2.94	3	15		
Positive work-to-life interaction	High school	102	9.64	3.57	3	15	1.005	0.39
	Associate degree	116	8.88	2.90	3	15		

	Bachelor's degree	263	9.21	3.15	3	15		
	Postgraduate	138	9.23	3.34	3	15		

*Bachelor's and postgraduate degree holders had significantly higher scores than high school and associate degree holders ($p < 0.05$).

§Postgraduate degree holders had significantly higher scores than high school and associate degree holders ($p < 0.05$).

As shown in Table 5, negative work-to-life and positive life-to-work interaction scores differed significantly across educational levels (both $p < 0.05$).

For negative work-to-life interaction, participants with bachelor's degrees had significantly higher scores than those with high school or associate degrees.

Participants with postgraduate education had significantly higher positive life-to-work interaction scores than those with bachelor's or associate degrees.

Table 6. Work–life interaction scores by occupation

	Profession	N	Mean	Standard deviation	Minimum	Maximum	F	Sig.
Negative life-to-work interaction	Physician	112	17.01	6.36	6	30	0.912	0.485
	Nurse	218	17.10	6.07	6	30		
	Midwife	41	18.10	6.18	6	30		
	Technician (laboratory, radiology, operating room)	73	16.18	5.52	6	27		
	Data entry personnel/medical secretary	56	16.84	5.20	6	29		
	Cleaning staff, waiter, cook, etc.	97	18.10	6.88	6	30		
	Dietitian/psychologist	22	17.64	6.26	6	27		
Negative work-to-life interaction	Physician	112	16.74	4.65	5	25	6.046	p < 0.001
	Nurse	218	17.73*	4.19	5	25		
	Midwife	41	17.61*	5.44	7	25		
	Technician (laboratory, radiology, operating room)	73	14.73	4.39	5	25		
	Data entry personnel/medical secretary	56	15.38	4.25	5	25		
	Cleaning staff, waiter, cook, etc.	97	15.71	5.25	5	25		
	Dietitian/psychologist	22	15.64	4.35	8	25		
Positive life-to-work interaction	Physician	112	10.16§	2.96	3	15	3.4	0.003

	Nurse	218	9.88§	2.92	3	15		
	Midwife	41	10.10§	2.58	3	15		
	Technician (laboratory, radiology, operating room)	73	8.77	3.26	3	15		
	Data entry personnel/medical secretary	56	8.75	2.47	3	13		
	Cleaning staff, waiter, cook, etc.	97	9.16	3.44	3	15		
	Dietitian/psychologist	22	8.86	2.83	3	14		
Positive work-to- life interaction	Physician	112	9.28	3.22	3	15	0.39	0.886
	Nurse	218	9.11	3.27	3	15		
	Midwife	41	9.59	2.98	3	15		
	Technician (laboratory, radiology, operating room)	73	9.48	3.03	3	15		
	Data entry personnel/medical secretary	56	8.80	2.71	4	15		
	Cleaning staff, waiter, cook, etc.	97	9.30	3.61	3	15		
	Dietitian/psychologist	22	9.36	3.37	4	15		

*Nurses and midwives had significantly higher mean scores than technicians, data entry personnel, cleaning staff, and dietitians/psychologists ($p < 0.05$). §Physicians, nurses, and midwives had significantly higher mean scores than technicians, data entry personnel, cleaning staff, and dietitians/psychologists ($p < 0.05$).

As shown in Table 6, negative work-to-life and positive life-to-work interaction scores differed significantly by occupation (both $p < 0.05$).

Mean negative work-to-life interaction scores were significantly higher among physicians, nurses, and midwives than among data entry personnel, technicians, cleaning staff, dietitians, and psychologists ($p < 0.05$).

Mean positive life-to-work interaction scores were significantly higher among physicians, nurses, and midwives than among data entry personnel, technicians, cleaning staff, dietitians, and psychologists ($p < 0.05$).

Table 7. Correlations of age and body mass index with work–life interaction scores

	Statistical analysis	Negative life-to-work interaction	Negative work-to-life interaction	Positive life-to-work interaction	Positive work-to-life interaction
Age	Pearson's r	0.068	−0.125**	−0.055	0.068
	p value	0.093	0.002	0.174	0.091
BMI	Pearson's r	0.033	−0.074	0.002	0.04
	p value	0.408	0.066	0.96	0.322

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

As shown in Table 7, age was weakly and negatively correlated with negative work-to-life interaction ($r = -0.125$, $p = 0.002$). No other work–life interaction dimension was significantly correlated with age or body mass index.

Table 8. Correlations of work–life interaction scores with perceived organizational, supervisor, and coworker support

	Statistical analysis	Perceived organizational support	Supervisor support	Coworker support
Negative life-to-work interaction	Pearson's r	0.120**	0.316**	−0.101*
	p value	0.003	$p < 0.001$	0.012

Negative work-to-life interaction	Pearson's r	-0.210**	0.096*	0.133**
	p value	p < 0.001	0.017	0.001
Positive life-to-work interaction	Pearson's r	0.111**	0.287**	0.120**
	p value	0.006	p < 0.001	0.003
Positive work-to-life interaction	Pearson's r	0.285**	0.318**	0.068
	p value	p < 0.001	p < 0.001	0.091

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

As shown in Table 8, negative life-to-work interaction was weakly positively correlated with perceived organizational support and supervisor support and weakly negatively correlated with coworker support.

Negative work-to-life interaction was weakly negatively correlated with perceived organizational support and weakly positively correlated with supervisor and coworker support.

Positive life-to-work interaction was weakly positively correlated with perceived organizational, supervisor, and coworker support.

Positive work-to-life interaction was weakly positively correlated with perceived organizational and supervisor support. Its correlation with coworker support was not statistically significant.

Table 9. Fully adjusted hierarchical linear regression models for the four work–life interaction dimensions

Predictor	M1: $\dot{Y}IOSE$	M2: $\dot{Y}IOSE$	M3: $\dot{Y}IOLE$	M4: $\dot{Y}IOLE$
Age	0.053 (0.063); 0.153	-0.041 (-0.064); 0.144	-0.020 (-0.048); 0.283	0.017 (0.039); 0.386
Gender	0.941 (0.070); 0.079	0.553 (0.054); 0.175	0.387 (0.058); 0.151	-0.146 (-0.021); 0.610
Marital status	0.229 (0.018); 0.670	0.090 (0.009); 0.827	-0.025 (-0.004); 0.928	-0.072 (-0.011); 0.802
Weekly working hours	1.215 (0.097); 0.034	0.556 (0.058); 0.203	0.109 (0.018); 0.706	0.334 (0.051); 0.277
Psychologist/dietitian	1.176 (0.036); 0.383	-1.252 (-0.050); 0.222	-0.963 (-0.059); 0.155	0.421 (0.024); 0.560
Physician	0.515 (0.032); 0.673	-0.649 (-0.053); 0.484	-0.148 (-0.019); 0.810	-0.281 (-0.034); 0.667
Midwife	1.021 (0.041); 0.298	-0.234 (-0.012); 0.754	0.206 (0.017); 0.676	0.700 (0.054); 0.182
Technician	-0.563 (-0.030); 0.600	-1.708 (-0.118); 0.037	0.146 (0.016); 0.787	0.745 (0.075); 0.195
Data entry personnel	0.208 (0.010); 0.862	-0.489 (-0.030); 0.590	-0.238 (-0.023); 0.691	-0.325 (-0.029); 0.610
Cleaning staff	0.826 (0.049); 0.449	-0.618 (-0.048); 0.456	-0.243 (-0.029); 0.657	-0.746 (-0.084); 0.202
High school	-0.135 (-0.008); 0.896	-0.393 (-0.031); 0.617	-0.143 (-0.018); 0.782	0.882 (0.102); 0.111
Associate degree	0.210 (0.013); 0.826	-0.414 (-0.034); 0.568	-1.191 (-0.153); 0.013	-0.411 (-0.050); 0.421
Postgraduate	0.062 (0.004); 0.957	0.167 (0.015); 0.849	0.564 (0.078); 0.332	0.503 (0.065); 0.417
Weekend work	0.513 (0.038); 0.424	-0.258 (-0.025); 0.597	0.484 (0.074); 0.133	0.437 (0.063); 0.203
Perceived organizational support	-0.159 (-0.152); 0.002	-0.309 (-0.386); <0.001	-0.039 (-0.075); 0.140	0.076 (0.138); 0.007
Supervisor support	0.266 (0.443); <0.001	0.144 (0.314); <0.001	0.103 (0.347); <0.001	0.078 (0.247); <0.001
Coworker support	-0.169 (-0.193); <0.001	0.046 (0.069); 0.081	0.004 (0.009); 0.818	-0.000 (-0.000); 1.000
R²	0.168	0.176	0.140	0.135

Predictor	M1: Y _{IOSE}	M2: $\dot{Y}$ _{IOSE}	M3: Y _{IOLE}	M4: $\dot{Y}$ _{IOLE}
Adjusted R ²	0.144	0.152	0.116	0.110
ΔR^2 — support variables	0.131	0.098	0.092	0.117
F(17, 601)	7.124; p < 0.001	7.529; p < 0.001	5.755; p < 0.001	5.515; p < 0.001
Durbin–Watson	1.894	2.023	1.978	1.988

Each cell presents the unstandardized coefficient (B), standardized coefficient (β), and p value, respectively.

Note 1. Bold values indicate statistically significant coefficients at $p < 0.05$. ¹The coefficient represents the difference between the category coded 1 and the category coded 0. ²The occupational reference group was nurses. ³The educational reference group was bachelor's degree holders.

Note 2. Block 1 included age, gender, marital status, weekly working hours, weekend work, education, and occupation. Block 2 included perceived organizational, supervisor, and coworker support. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

As shown in Table 9, all four final models were statistically significant. The negative work-to-life interaction model had the greatest explanatory power ($R^2 = 0.176$). Weekend work was not a statistically significant predictor in any model; among the weekend-work coefficients, the smallest p value was observed in the positive life-to-work interaction model ($p = 0.133$). Supervisor support was significant across all four dimensions, with its largest standardized coefficient in the negative life-to-work interaction model ($\beta = 0.443$). Perceived organizational support was significant in three models but not in the positive life-to-work interaction model.

Coworker support was independently significant only in the negative life-to-work interaction model. The support variables made their largest additional contribution in this model ($\Delta R^2 = 0.131$).

Multicollinearity was assessed using tolerance and VIF values. Across the fully adjusted models, tolerance ranged from 0.228 to 0.892 and VIF values ranged from approximately 1.12 to 4.46, remaining below the commonly used upper threshold of 5. The relatively higher VIF values for postgraduate education (4.392) and physician occupation (4.221) suggested moderate structural overlap between educational attainment and occupation; therefore, the corresponding coefficients were interpreted cautiously. Overall, the diagnostics did not indicate multicollinearity severe enough to compromise the reliability of the regression coefficients.

To identify factors associated with the four dimensions of work–life interaction among healthcare workers, four separate two-stage hierarchical linear regression analyses were performed.

In the first stage of each analysis, age, gender, marital status, weekly working hours, weekend work, educational level, and occupational group were entered as control variables. Body mass index was excluded from the final models because it did not contribute significantly in preliminary analyses. In the second stage, perceived organizational, supervisor, and coworker support were added. The first block, comprising demographic, educational, occupational, and work-related characteristics, explained 1.8%–7.7% of the variance in the dependent variables.

The first block was statistically significant in the negative work-to-life and positive life-to-work interaction models but not in the negative life-to-work or positive work-to-life interaction models. Adding the support variables in the second stage significantly increased the explained variance in all four models. The additional explained variance was 13.1% for negative life-to-work interaction, 9.8% for negative work-to-life interaction, 9.2% for positive life-to-work interaction, and 11.7% for positive work-to-life interaction. All changes in explained variance were statistically significant (all $p < 0.001$). The final models explained 13.5%–17.6% of the variance in the dependent variables.

In the negative life-to-work interaction model, working 46 hours or more per week ($B = 1.215$, $\beta = 0.097$, $p = 0.034$) and supervisor support ($B = 0.266$, $\beta = 0.443$, $p < 0.001$) were positively associated with the outcome. Perceived organizational support ($B = -0.159$, $\beta = -0.152$, $p = 0.002$) and coworker support ($B = -0.169$, $\beta = -0.193$, $p < 0.001$) were negatively associated with the outcome. Weekend work was not independently significant ($B = 0.513$, $\beta = 0.038$, $p = 0.424$). In the negative work-to-life interaction model, technicians scored lower than nurses, the reference occupational group ($B = -1.708$, $\beta = -0.118$, $p = 0.037$). Perceived organizational support was negatively associated with the outcome ($B = -0.309$, $\beta = -0.386$, $p < 0.001$), whereas supervisor support was positively associated with it ($B = 0.144$, $\beta = 0.314$, $p < 0.001$). Coworker support and weekend work were not independently significant.

In the positive life-to-work interaction model, associate degree holders scored lower than bachelor's degree holders, the reference educational group ($B = -1.191$, $\beta = -0.153$, $p = 0.013$). Supervisor support was associated with higher positive life-to-work interaction scores ($B = 0.103$, $\beta = 0.347$, $p < 0.001$). Perceived organizational support, coworker support, and weekend work were not significant in this model.

In the positive work-to-life interaction model, perceived organizational support ($B = 0.076$, $\beta = 0.138$, $p = 0.007$) and supervisor support ($B = 0.078$, $\beta = 0.247$, $p < 0.001$) were positively associated with the outcome. Coworker support and weekend work

were not independently associated with positive work-to-life interaction. Weekend work was not a significant predictor in any of the four models.

Overall, the significant increase in explained variance after the support variables were added suggests that work–life interaction is related not only to demographic and occupational characteristics but also to modifiable organizational and supervisory conditions. Supervisor support had a positive coefficient in all four models. Although this direction was expected in the positive interaction models, the positive coefficients in the negative interaction models should be interpreted cautiously in light of the cross-sectional design, scale scoring, potentially greater support needs among employees experiencing conflict, and variance shared with other sources of support.

Demographic and occupational findings

Weekly working hours ($p = 0.034$), technician occupation ($p = 0.037$), and associate degree education ($p = 0.013$) were each significant in only one model. Because multiple coefficients were tested, these findings should be considered secondary. The strongest and most consistent finding was that the support block provided significant additional explanatory power across all four models. Whereas demographic characteristics are largely non-modifiable, organizational and supervisor support may represent potential targets for workplace interventions.

Discussion

This study examined the relationships between four bidirectional dimensions of work–life interaction—negative and positive work-to-life and life-to-work interaction—and perceived organizational, supervisor, and coworker support among healthcare workers. The most consistent finding was that support resources explained significant additional variance in all four models beyond demographic, educational, and occupational characteristics. The support block increased the explained variance by 9.2%–13.1%, and the final models explained 13.5%–17.6% of the variance in the four outcomes. This incremental contribution is consistent with the Job Demands–Resources model: job demands can promote energy loss and negative interaction processes, whereas organizational and interpersonal resources can limit the adverse consequences of demands and support motivational and developmental processes [3]. Nevertheless, the explanatory power of the final models indicates that unmeasured factors, such as family responsibilities, shift patterns, workload, unit characteristics, and psychosocial demands, are also important.

Supervisor support

Supervisor support was significant in all four models and emerged as the most consistent predictor among the support sources examined. The standardized coefficients indicated that the strongest association occurred in the negative life-to-work interaction model; supervisor support also contributed significantly to both positive life-to-work and positive work-to-life interaction. These findings suggest that emotional support from supervisors, flexibility in work arrangements, problem-solving assistance, and role-modeling behaviors may influence how employees allocate resources between work and personal life. However, general supervisor support and family-supportive supervisor behaviors are conceptually distinct constructs. Meta-analytic evidence indicates that work–family-specific supervisor and organizational support is more strongly associated with work–family conflict than are general support measures [16]. Family-supportive supervisor behaviors include emotional and instrumental support, role modeling, and creative work–family management [17]. In a two-wave study conducted among hospital employees, family-supportive supervisor behaviors were also associated with work–family enrichment, work attitudes, and performance [18].

The positive association between supervisor support and the two negative interaction dimensions was unexpected and should be interpreted cautiously. Employees experiencing high levels of conflict may request more support, or supervisors may increase their support for employees who are experiencing difficulties, creating the possibility of reverse causation in the cross-sectional data. The scale measured general supervisor support and did not directly assess behaviors specifically intended to reconcile work and family responsibilities, which may also have contributed to this finding. Although weekend work was included in the models, its lack of significance across all four interaction dimensions suggests that the unexpected supervisor-support findings cannot be explained solely by weekend work. Unmeasured factors such as workload, night shifts, shift frequency, hospital unit, schedule predictability, and child or dependent-care responsibilities may have contributed to residual confounding. The findings should therefore not be interpreted as indicating that supervisor support increases negative interaction. They should be examined in multicenter longitudinal studies that distinguish general from family-specific supervisor support and establish temporal ordering.

Working hours and weekend work

Women had higher scores on three dimensions in the unadjusted comparisons, and participants working 46 hours or more per week had higher scores on two negative interaction dimensions. These findings suggest that work–life interaction may be related to societal roles and time demands. However, gender was not significant in the fully adjusted models, and long working hours showed a small but statistically significant association only in the negative life-to-work interaction model. This attenuation suggests that the unadjusted group differences may be partly explained by occupation, education, and perceived support, although it does not imply that gender or working hours are unimportant. The finding regarding long working hours should be considered exploratory because it was observed in only one model and numerous coefficients were tested.

Weekend work was not a significant predictor in any of the four fully adjusted models. This finding suggests that weekend work alone may be insufficient to explain the direction and nature of work–life interaction. The frequency of weekend work, number of consecutive workdays, whether weekend work is voluntary or mandatory, shift length, availability of compensatory leave, and schedule predictability were not assessed. Consequently, a binary indicator of weekend work may not fully capture the burden of this work arrangement. Future studies should examine not only whether employees work on weekends but also the intensity, duration, predictability, manageability, and recovery opportunities associated with their schedules.

Strengths and limitations

The strengths of this study include the participation of approximately 90% of hospital staff, the inclusion of diverse healthcare occupations, the evaluation of bidirectional positive and negative work–life interaction, and the comparison of three support sources within the same theoretical model using a common set of control variables. Using the same variables across all four regression models facilitated comparisons across dimensions. In addition, examining the incremental contribution of organizational and interpersonal support beyond demographic and occupational characteristics strengthened the analysis. VIF values ranged from approximately 1.12 to 4.46 and remained below 5, indicating no multicollinearity severe enough to compromise the reliability of the regression coefficients.

This study also has several limitations. First, it was conducted at a single center and used a cross-sectional design; therefore, temporal ordering and causality cannot be established. Second, all variables were measured by self-report at a single time point, which may have introduced common method bias and social desirability bias. Potential confounders—including the number of children, dependent-care responsibilities, spouse's employment status, income adequacy, workload, night shifts, shift predictability, hospital unit, and patient load—were not included in the final models. The Supervisor Support Scale assesses general workplace support rather than family-specific supportive supervisor behaviors. Although the VIF values were within acceptable limits, theoretical and structural overlap between educational and occupational groups and among the different support sources may have increased the standard errors of some coefficients or contributed to changes in coefficient magnitude or direction after shared variance was accounted for. The coefficients should therefore be interpreted as conditional associations after adjustment for the other support sources, rather than as total or causal effects. Because numerous group comparisons and regression coefficients were tested, demographic or occupational associations observed in a single model should be considered exploratory. Finally, the models explained 13.5%–17.6% of the variance, indicating that a substantial proportion of work–life interaction may be attributable to unmeasured individual, family, and organizational factors.

Conclusion

This study showed that work–life interaction among healthcare workers was more consistently associated with modifiable organizational and interpersonal workplace resources than with demographic or occupational characteristics. Perceived organizational support was particularly associated with lower negative work-to-life interaction and higher positive work-to-life interaction, whereas supervisor support was among the most significant and consistent predictors across all four dimensions. However, the unexpected positive associations between supervisor support and the negative interaction dimensions should be interpreted cautiously because of the cross-sectional design, the general rather than family-specific nature of the support measure, shared variance among the support variables, and residual confounding by unmeasured working conditions. Weekend work was not independently significant in any model, suggesting that work schedules should be evaluated not only using a binary indicator but also in relation to duration, intensity, predictability, and opportunities for recovery. Organizational support policies, family-supportive supervisor behaviors, predictable work schedules, and support mechanisms tailored to the needs of different hospital units may help improve work–life interaction.

Declarations

Ethics Approval and Consent to Participate

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The study was approved by the Istanbul University Faculty of Medicine Ethics Committee (Approval No. E-29624016-050.99-3327072; May 21, 2025). Written informed consent was obtained from all participants.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and analyzed during the present study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

OK designed the study. OK, GO, and HI designed the methodology. OK collected the data. GO and HI performed the statistical analyses. OK drafted the manuscript. HI and GO critically revised the manuscript. All authors read and approved the final manuscript.

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