The Influence of Leadership on Structural Empowerment and Work-Life Balance on Nurses' Burnout and Patients' Assessed Quality of Care During the Covid-19 Pandemic

Papatheodorou Maria[1,2], Panagiotis Kloutsiniotis [3,2] and Mihail Dimitrios[2]

[1] Nursing Department, Papageorgiou General Hospital, Thessaloniki, papatheodorou-maria@hotmail.com.

[2] Human Resources Management Lab , Business Administration Department, University of Macedonia Thessaloniki 546 36, Thessaloniki Greece
mihail@uom.edu.gr

[3] Department of Tourism, Ionian University, Kerkyra, Greece
Kloutsiniotis@ionio.gr

ABSTRACT

Background: Leadership becomes crucial during major crises in which one could expect high levels of burnout and decrease in patient quality of care. The Covid-19 pandemic was a major healthcare crisis where healthcare professional and infrastructure had to cope with unprecedented levels of workload and stressful working conditions. Hence, empirical models for estimating the mitigating role of authentic leadership on nurses' burnout during the pandemic can contribute to the utilization of best practices in managing effectively the scarce nursing personnel resources.

Aims: To model the influence of leadership, through measures on structural empowerment and work-life balance, on nurses' burnout and patients' quality of care, and to measure the nurses´ perception of their leadership, and the opinion of the leaders regarding their role during the Covid-19 pandemic.

Methods: An institution-based cross-sectional study conducted during the third wave of the pandemic (March-July 2021). After implementing measures to enhance structural empowerment and improve work-life balance, four questionnaires referring to Authentic leadership, Structural empowerment, Work life balance, and Work Burnout were distributed to 650 nursing personnel. Moreover, 200 patients were asked to assess the received quality of care.

Results: 530 valid questionnaires included in the study. Using structural equation modeling, we estimated that authentic leadership significantly influences burnout and preserves patients' quality of care by enhancing structural empowerment and work-life balance. In assessing attitudes, leadership was rated high, 56 ± 5 SD (max =80) by the nursing personnel. Head nurses rated their leadership significantly higher compared to the nurses, $62,13\pm10$ SD, ($p<0,001$). Structural empowerment and work-life balance measures were rated $3,55\pm0.6$ SD, and $2,67\pm0,5$ SD, (max =5) respectively. On the burnout subscales, emotional exhaustion and cynicism rated $3,1\pm0,8$ and $2,3\pm0,7$ respectively, and high in professional efficacy, $2\pm0,5$. Patients assessed their quality-of-care $3,8\pm0.48$ SD, (4= very good and 5=excellent).

Conclusion: Our study demonstrates that during major crises, leadership through structural empowerment measures and better work-life conditions mitigates nurses' burnout and lead them to high levels of professional efficacy, thus preserving patients-quality of care. Moreover, team leaders in healthcare services should be modest and aware of their tendency to overestimate their leadership abilities.

Keywords: Work-life balance, nurses, quality of care, authentic leadership, structural empowerment, Burnout, Covid-19

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Introduction

The Covid-19 pandemic has been a severe burden to health care system and personnel. Nursing personnel have been on the front line of care during the successive waves of the pandemic and were exposed to physical and psychological stressors not only in their working place but in their social environment also [1,2]. Many studies in different countries have shown that physical and psychological stressors at work during the pandemic included: lack of information on the epidemic protocols and on the effective protective measures, resource shortages for both-personnel and their patients, rapid changes in nursing responsibilities, care modes, guidelines and protocols, heightened risk of infection and death, involvement in the suffering and high mortality rate of their patients, leading to a feeling of ineffectiveness [1,3,4,5]. All the above stressors, despite the resilience, professionalism, sense of duty and self-sacrifice of the nursing personnel, induce high levels of stress, anxiety and burnout that could ultimately decrease the level of patient's care.

Authentic leadership refers to leaders that know and act upon their true values, beliefs, and strengths, while helping others to do the same. Authenticity as a term date back to the ancient Greeks and means to "be true to oneself". Authentic leadership has been shown to build trust and healthier work environments thus promoting employee engagement, motivation, commitment, and job satisfaction [6]. Trust and identification with the team leader enhances performance by generating positive psychological capacities, emotions and optimism thus resulting in improved care quality, patient outcome and satisfaction [7]. If authentic leadership is important under normal working conditions, it becomes crucial during major crises such as the Covid-19 pandemic in which one could expect high levels of burnout, job dissatisfaction and decrease in the level of patient's quality of care.

Structural empowerment refers to the ability to mobilize resources and achieve goals through access to information, support, resources, and opportunities. Structural empowerment has been shown by numerous studies to influence nurses' job satisfaction, trust in management, burnout, and employee turnover intentions [8,9,10,11]. According to Kanter's model, structural empowerment comprises four organizational structures [12]. Access to information, support, resources needed to do the job and opportunities to learn and grow. Access to information means having knowledge of organizational values and goals, as well as the specialized knowledge and expertise required to be effective at work. Support refers to feedback and guidance from superiors and peers as well as emotional support and advice from colleagues. Resources mean to have access to the materials, supplies, and equipment, necessary to accomplish the organizational goals. Finally access to opportunities to learn and grow refers to enhance employees' professional development and increase knowledge and skills. Modern approaches to leadership emphasize the coaching rather than the controlling aspect of leadership, thus encouraging leaders to create empowering work environments [13].

Work-life balance refers to the division of one's time between working and family or leisure activities. Work-life balance is of significant concern among health care workers particularly among females who represent a large proportion of them. Female nurses' greatest burden is to balance employment and family responsibilities especially when caring for children. Staff shortages, work demands, long working hours, shift work particularly night and weekends, are endemic in the health care systems in many countries [14,15]. This work-life interference, where work conflicts with personal life has been associated with negative health and wellbeing outcomes, particularly; low job satisfaction, depression, burnout, and intention to leave [16,17,18]. During the pandemic, work-life balance was under severe threat due to the tremendous number of patients hospitalized in critical condition leading to the need to increase the number of health care workers per shift, and the staff shortages due to the contamination of the personnel leading to fewer days off per month. Research work demonstrated that management support is an important factor to alleviate the perception of work-life conflict, and increase job satisfaction [19,20,21]. Authentic leadership behaviors have been shown to affect staff wellbeing by influencing their work characteristics [22]. Furthermore, leaders by attending to the needs of their team members and acting as coaches and mentors may influence the perception of work-life conflict [7,23].

The aim of our study is to investigate the influence of authentic leadership on employee burnout and thus patients' quality of care, through implementation of measures on structural empowerment and work-life interference during the pandemic. Additionally, we assessed the nurses' perception of their leadership during the pandemic, the opinion of the leaders regarding

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their role, the level of nurses' burnout and the patient's quality of care.

Methods
Setting

Greece underwent four waves of Covid 19 pandemic. March-June 2020, October-December 2020, March-July 2021, October-February 2022. Papageorgiou Hospital is an 800 bed Public General Hospital in Northern Greece. The nursing personnel comprise 600 nurses and 60 midwifes. During the pandemic the nurse-to-patient ratio in a Covid-19 wards was 1:9 per shift. Moreover, the need for ICU beds increased from 16 to 45 with an occupancy rate up to 100% with a nurse-to-patient ratio 1:3 patients per shift.

All the nursing personnel of the hospital invited to participate in the study which was conducted during the third wave from March to July 2021 after supportive measures for the nursing personnel were organized and implemented in the period following the second wave (October-December 2020). These measures addressed to structural empowerment and work life interference, learning from our previous experience and the relevant challenges at other institutions in other countries.

More particularly, the measures that the leadership in nursing personnel management implemented to enhance structural empowerment and suppress the conflict between work and no work demands were the following:

Support: Nursing personnel at risk of Covid-19 complications or with family members at risk were redeployed to non-Covid wards. Recesses from work twice per shift were mandatory in Covid-19 wards. Provision of free snacks and drinks helped avoid fatigue and dehydration from the profuse sweating due to the personal protective equipment (PPE).

Three compulsory seminars for the entire nursing personnel were organized with specialized instructors to promote the resilience and wellbeing of the personnel and learn how to prevent, manage, and resolve conflicts and fear in a high stress environment.

Resources: Personal protective equipment (PPE) was provided in abundance in all isolation wards. To rapidly disseminate information, text messaging groups through mobile phone were instituted between the hospital authority, the medical and nursing direction, the infection control group, the head nurses, and the nursing staff. The information shared included, new guidelines of therapy and control of infection, appointments in meetings between working groups, number of patients admissions, changes, or absences in shifts due to infections of the personnel or urgent family needs, volunteers for shift replacement or emergency aid in personnel from quiet areas to busy wards.
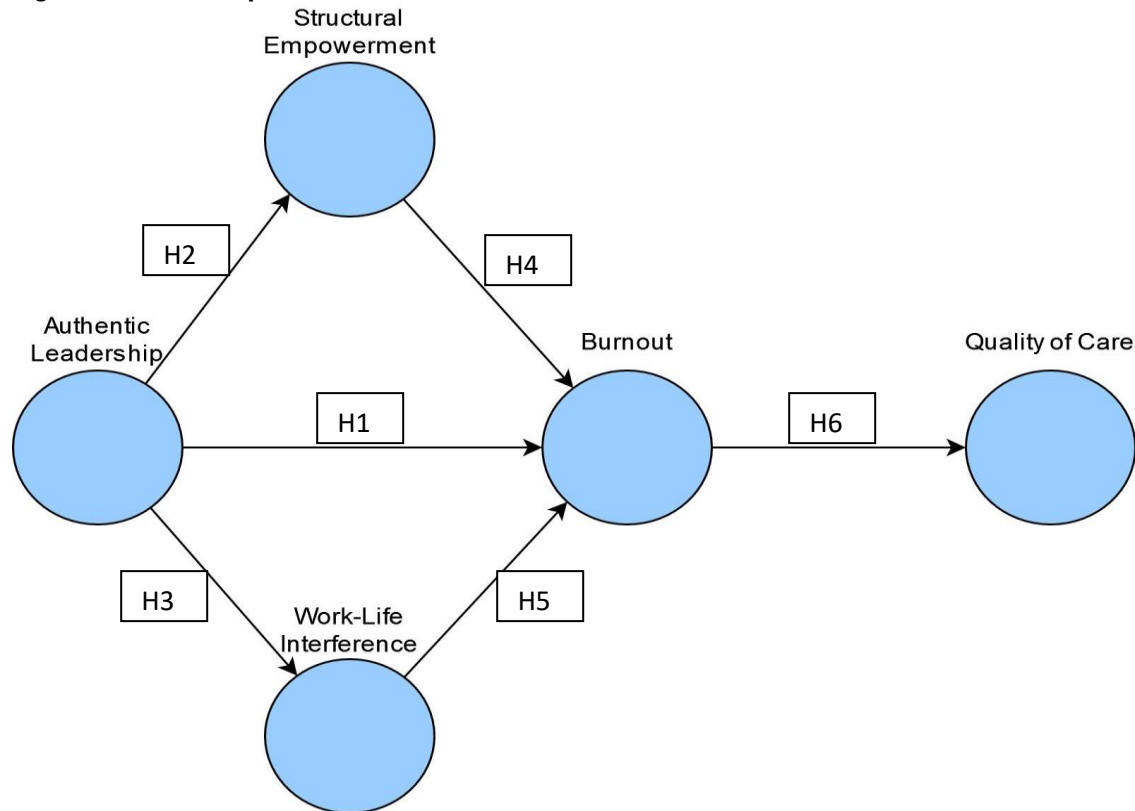
Measures on work -life interference

Head nurses were instructed to pay special attention to the work planning, which was adapted according to the personal and family needs and to promote voluntary rather than compulsory replacement needs through the mobile phone text messaging.

Fifteen more days off per year were granted to the Covid-19 nursing staff and 5 days off to the non-Covid-19 personnel.

Study design

We hypothesized that authentic leadership, may directly influence burnout (hypothesis 1). Moreover, authentic leadership positively influences structural empowerment (hypothesis 2). Additionally, authentic leadership provides better work-life balance (hypothesis 3). Furthermore, structural empowerment and better work-life balance ameliorate nurses´ burnout (hypothesis 4 and 5) thus improving patients' quality of care (hypothesis 6). Additionally, we assessed the nurses´ evaluation of their leadership during the pandemic, the opinion of the leaders regarding their role, the efficacy of the structural empowerment and work-life balance measures implemented the level of nurses' burnout and the patient's perception of care quality. The structural model, encompassing and testing all the above-mentioned hypotheses, is illustrated in Figure 1.

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Figure 1. The conceptual model

Instrument and Participants

In July 2021 four anonymous questionnaires referring to Authentic leadership, Structural empowerment, Work-life balance, and Burnout were delivered to the hospital nursing personnel and their team leaders by the researchers. The questionnaires were accompanied by an explicative letter for the purposes of the study. A semi-structured interview was conducted in each ward to ensure that the questions and the rating of each questionnaire were comprehensible, and any ambiguity or personal interpretation was resolved. In each ward a staff member was designated to voluntarily collect the completed questionnaires. No incentive was offered for participation in the survey. Moreover, a fifth questionnaire assessing the quality of care experienced by patients was completed by telephone interviews after their discharge from the hospital. Verbal consensus was obtained from all participants before the interview and all of them eagerly volunteered to participate. The telephone interview was conducted by the authors of the study. Every question, including the rating scale of the questionnaire, was thoroughly explained to each participant. Finally, 650 questionnaires were distributed. Completed questionnaires missing more than 10 item level responses were discarded from the analysis. Finally, 530 valid questionnaires

included in the study (500 from nurses and 30 from head nurses). Participation rate was 81%. Participants' mean age was 41,8±8 years and they had 15,5±8 years of job experience. The majority were female (83,6%), married (65,6%) and 66% had children. 62% were graduated from a university nursing school, 11,6% had a master's degree in health sciences and all of them had a degree in English language

Ethical considerations: The study protocol and the research questionnaires were reviewed and approved by the hospital ethics committee. (Study approval no 339-19/02/2021) Participation in the study was not compulsory. Anonymity and confidentiality were particularly emphasized to all participants

Measures of the instrument

Authentic leadership was assessed with the authentic leadership questionnaire [24] which consists of 16 items that measure four dimensions of authentic leadership behavior: self-awareness, moral-ethical perspective, balance processing, and transparency. Participants rate items on a 5-point Likert scale from 1 to 5 (1=completely disagree and 5 = completely agree). The questionnaire had two versions, one for leaders to answer about themselves (self-report) and another for employees to rate their leaders. Both

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questionnaires were distributed and analyzed separately to detect discrepancies between self-reporting and nurses' perception of their leaders.

Structural empowerment was measured using the Conditions of Work Effectiveness -II questionnaire (CWEQ-II) [9]. The CWEQ-II consists of four subscales (information, support, resources, and opportunities) reflecting dimensions of work empowerment structures. Each subscale consists of three items rated on a 5-scale ranging from 1 to 5 (1=none and 5= a lot) averaged to create subscale scores. It was used in assessing nursing personnel attitudes. A slightly different version of this questionnaire comprised of six subscales (access to opportunity, access to resources, access to information, access to support, job activities scale, and informal power) was used in testing our model [12].

Work-life interference was measured using the Work-life conflict questionnaire [15]. The questionnaire consists of 24 items rated on 5 level scale ranging from 1 to 5 (1=not at all and 5=almost all the time). We used this questionnaire because it measures work-no work interference and enhancement for all workers regardless of their marital or family status. Family is an important part of life, but workers may hold other important no work roles and responsibilities that impact their experiences of work-no work interference. The questionnaire consists of positive and negative answers that they are reverse scored.

Burnout was measured using the Maslach Burnout General Survey (MBI-GS) [25]. The MBI-GS has sixteen items rated on a 7 -point Likert scale ranging from 0 to 6 (0 =never to 6=daily) and comprises three subscales: Exhaustion, Cynicism, and Professional efficacy. Sustained emotional exhaustion results in cynicism and feelings of inefficacy thus leading to poor mental and physical health [26,27,28]. Schaufeli and Bakker suggested that personal efficacy should be considered as a component of work engagement rather than burnout and the main core of burnout is emotional exhaustion [29]. According to MBI-GS, emotional exhaustion is high if rated above 3.2, and cynicism above 2.4. The professional efficacy rating scale is interpreted in the opposite direction compared to the exhaustion and cynicism, and rating above 5 means inefficacy rather than efficacy.

Patient quality of care was measured using the Patient Satisfaction with Nursing Care Quality Questionnaire (PSNCQQ) [30]. The PSNCQQ has 19 items rated on a 5-point Likert scale ranging from 1 to 5 (1=poor and 5=excellent). For general results the scores of all items can be summed and averaged to yield a single value for each patient. A sample of 200 patients, answered the questionnaire. The patients interviewed were not exclusively Covid-19 patients, but it was a random sample of 100 Covid and 100 non-Covid patients. The idea was to detect inequalities of care between Covid-19 and non-Covid patients.

Statistical Analysis

For estimating our model and testing our six hypotheses, we used the Smart Partial Least Squares-Structural Equation Modeling (PLS-SEM) software version 3.2 (Smart PLS 3.2.). PLS-SEM is a statistical method that is usually applied when the model is complex and involves numerous latent variables, including mediating and moderating variables [31,32]. One of the advantages of PLS-SEM is that estimates the measurement model which assess the association between latent variables and their indicators and its structural constituent which measures the causal relationships among latent variables verifying or not the theoretical hypotheses [32]. In assessing our measurement model, we employ three main criteria: construct reliability, convergent validity, and discriminant validity [32].

Construct reliability refers to the level to which certain indicators of a factor are internally consistent. *Convergent validity* estimates the degree to which an indicator correlates with the other indicators of the same factor. While *Discriminant validity* reflects the degree to which a factor is empirically distinct from other latent variables [32,33]. In other words, it measures whether constructs that theoretically should not be related to each other are, in fact, unrelated. Discriminant validity is important because it shows whether your test accurately targets the construct of interest or if it assesses separate, unintentionally related, constructs.

Concerning our measurement model, to assess construct reliability we estimate first the indicators' loadings to each latent variable (Figure 2). Cronbach's alpha is an indicator of scale reliability, which estimates how closely a set of items is related in comprising a latent variable. An alternative measure to Cronbach's alpha is the Composite Reliability, whereas the average variance extracted (AVE) is an indicator of the extent to which items converge to represent a construct [34]. In our study we applied for Cronbach's alpha and Composite Reliability the critical value over 0.7, while for AVE over 0.5 [32]. As far as Discriminant validity of constructs is concerned, the Fornell-Larcker criterion was

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employed. For this criterion it is accepted that the square route of each factor's AVE should be higher than its correlation with any other factor in the model [32].

For descriptive statistics we used the statistical software SPSS version 22 (SPSS Inc. IBM Corp., Chicago, Illinois, USA). Recorded variables are presented as means with their standard deviation (SD). Normality of values distribution was assessed with the Kolmogorov-Smyrnov test. According to the normality of distribution, Group comparisons were performed with chi-square test, student t-test and Mann-Whitney U-test for non-parametrical continuous variables with two degrees freedom. P-values lower than 0.05 were considered statistically significant. Our hypothesis that patients' satisfaction differs between covid and non-covid patients was tested with statistical analysis of comparison of two independent groups. Sample size was calculated in advance with GPower 3.1 statistical program. It was therefore determined at 102 patients for an error probability test of 0.05, statistical power of 0.8, and effect size of 0.5 (medium).

Results
Section I: Estimating the model

Before estimating the structural model, we had to apply Exploratory Factor Analysis (EFA) to evaluate the measurement model. Based on the EFA, we ended up with the factors' subscales presented in Table 1. For instance, in this table the "self-awareness" dimension of the Authentic Leadership scale should be omitted. In estimating the measurement model, we found that the outer model loadings were well above the threshold value of 0.5, and their estimated t-values were significant at the 0.05 level. Besides, outer loadings, we examined the measurement model for construct reliability and convergent validity.

In Table 1, we present the results of main measures of construct reliability such as Cronbach's Alpha, Composite Reliability and the Average Variant Extracted (AVE) for all the subscales of the bolded latent variables. These measures indicate how well questionnaires data represent the model's variables. Cronbach's alpha and Composite Reliability estimations for the subscales of the latent variables exceeded the critical value of 0.7 and the AVE estimation was higher than 0.5. Therefore, the statistical criteria for construct reliability and validity are satisfied in our model.

Table 1. Construct Validity and Reliability of the model			
	Cronbach's Alpha	**Composite Reliability**	**(AVE)**
Authentic Leadership			
Moral perspective-MNG2	0.723	0.826	0.546
Balanced processing-MNG3	0.685	0.864	0.760
Transparency-MNG4	0.769	0.852	0.592
Structural Empowerment			
Access to resources- ACR	0.834	0.900	0.751
Access to Information-INF	0.779	0.900	0.819
Job Activities Scale-JAS	0.793	0.879	0.708
Access to Opportunities-AOP	0.880	0.926	0.807
Informal Power-IP	0.742	0.838	0.566
Burnout			
Exhaustion -EXH	0.876	0.909	0.668
Cynicism-CYN	0.765	0.841	0.519
Professional Efficacy-PEF	0.787	0.849	0.484
Work-Life Interference			
Work Interference with Personal Life -WIPL	0.909	0.908	0.832
Personal Life interference with Work-PLIW	0.865	0.903	0.652
Work Enhancement of PL-WEPLR	0.799	0.908	0.832
Personal Life Enhancement of Work -PLEWR	0.654	0.852	0.743

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In table 2, the Fornell-Larcker test for Discriminant Validity is presented demonstrating the independence of model's variables from each other. The diagonal elements (bolded) are the square root of average variant extracted (AVE).

Table 2. Fornell-Larcker test for Discriminant Validity (Square Root of AVE on diagonal)

	ACR	INF	CYN	AOP	EXH	JAS	MNG2	MNG3	MNG4	PLEWR	PLIW	CARE	PEF	IP	WEPLR	WIPL
ACR	**0.9**															
INF	0.7	**0.9**														
CYN	-0.3	-0.3	**0.7**													
AOP	0.6	0.6	-0.4	**0.9**												
EXH	-0.3	-0.3	0.6	-0.4	**0.8**											
JAS	0.7	0.7	-0.3	0.7	-0.3	**0.8**										
MNG2	0.4	0.5	-0.2	0.4	-0.2	0.4	**0.7**									
MNG3	0.2	0.4	-0.2	0.3	-0.2	0.3	0.6	**0.9**								
MNG4	0.4	0.4	-0.2	0.4	-0.2	0.4	0.7	0.5	**0.8**							
PLEWR	-0.1	-0.1	0.2	-0.1	0.1	-0.1	-0.1	-0.2	-0.1	**0.9**						
PLIW	-0.1	0.0	0.3	-0.1	0.3	0.0	0.0	0.1	0.0	0.0	**0.8**					
CARE	0.3	0.3	-0.3	0.3	-0.2	0.2	0.2	0.1	0.1	0.0	-0.2	**1.0**				
PEF	0.2	0.2	-0.4	0.2	-0.2	0.2	0.2	0.2	0.2	-0.3	-0.3	0.3	**0.7**			
IP	0.6	0.6	-0.3	0.7	-0.4	0.7	0.4	0.3	0.4	-0.2	-0.1	0.3	0.3	**0.8**		
WEPLR	-0.3	-0.3	0.4	-0.4	0.5	-0.3	-0.3	-0.3	-0.3	0.2	0.0	-0.1	-0.2	-0.3	**0.9**	
WIPL	-0.3	-0.2	0.4	-0.2	0.7	-0.3	-0.1	-0.1	-0.1	0.1	0.3	-0.1	-0.1	-0.2	0.4	**0.9**

Note: Abbreviated Variables of Table 2: *ACR - Access to resources, INF- Access to Information, CYN-Cynicism, AOP-Access to Opportunities,*
EXH- Exhaustion, JAS-Job Activities Scale, MNG2 Leadership's Moral Perspective, MNG3- Leadership's Balanced Processing, MNG4-
Leadership's Transparency, PLEWR- Personal Life Enhancement of Work, PLIW- Personal Life interference with Work, CARE-Quality
Care, PEF-Professional Efficacy, IP-Informal Power, WEPLR- Work Enhancement of Personal Life, WIPL-Work Interference
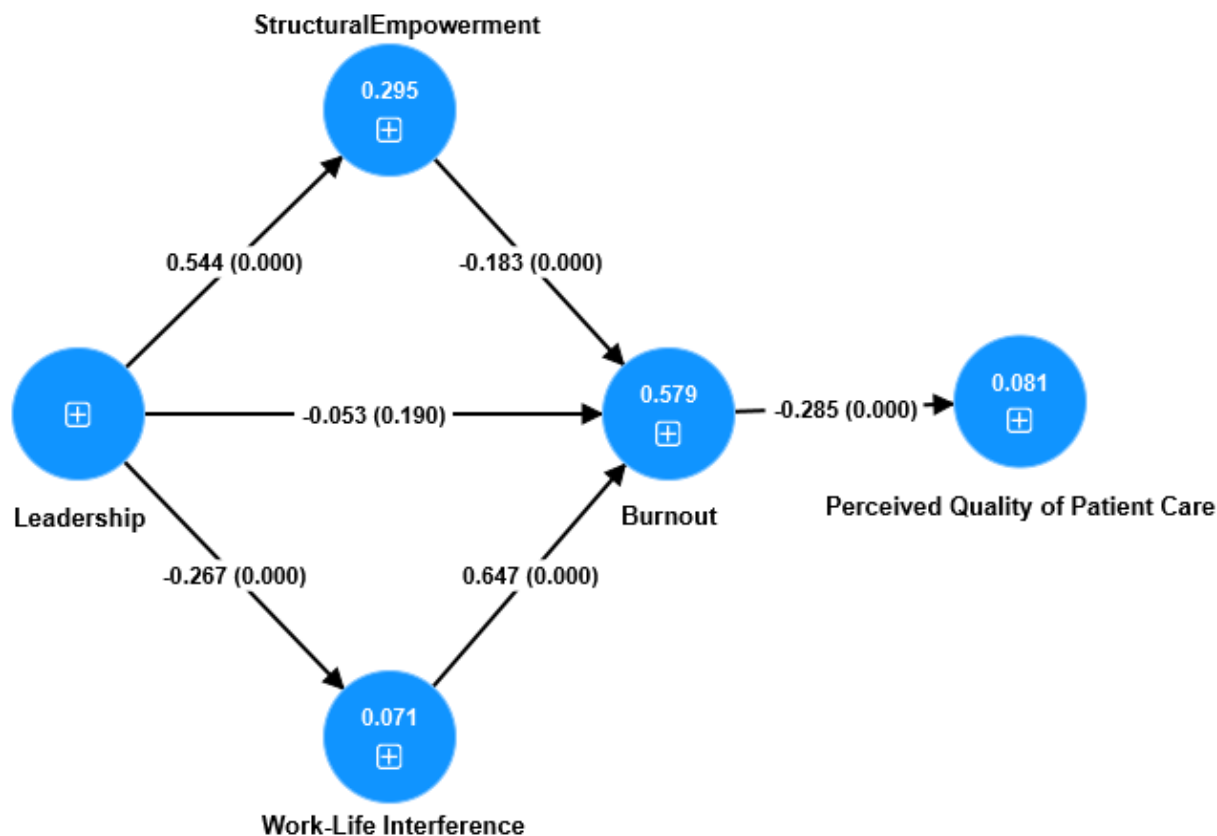
Off-diagonal elements are the correlations among constructs. All coefficients in the diagonal are larger than the values in the table, therefore Discriminant Validity of the variables is guaranteed.

Path coefficients and hypotheses testing
To test the validity of our six research hypotheses we ran the structural model with a bootstrapping procedure that used 5,000 randomly drawn samples with replacement. In Figure 2 and in Table 3, we present the estimated path coefficients and the corresponding P-values. More particularly, in Figure 2 we display the estimations of our structural model. Positive or negative sings of path coefficients (see the arrows among the circled variables in Figure 2) demonstrate the positive or negative influence between variables. For example, Authentic Leadership is hypothesized to have a positive influence on Structural Empowerment and a negative effect on Burnout, while Burnout is expected to have a negative effect on patients' quality of care.

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Figure 2. Estimating the structural model

All the path coefficients of the structural model have the hypothesized sign. Relatively high path coefficients and corresponding low P-values (in parentheses, Figure 2) are observed with the only exception the direct impact of authentic leadership on burnout which seems relatively weak, and not statistically significant at a 0.05 level of significance (p-value=0.19). Based on these results, we observe in Table 3 that all the other research hypotheses are supported.

Table 3. Estimated path coefficients and research hypotheses

Hypothesized Construct Paths	Path Coefficients	T- Statistics	P-Values	Hypothesis Support
Leadership→Burnout	-0.053	1.310	0.190	**H1:** not supported
Leadership→Structural Empowerment	0.544***	15.618	0.000	**H2:** supported
Leadership →Work-Life Interference	-0.267***	5.668	0.000	**H3:** supported
Structural Empowerment→Burnout	-0.183***	4.237	0.000	**H4:** supported
Work-Life Interference→Burnout	0.647***	21.381	0.000	**H5:** supported
Burnout→Health Care Quality	-0.285***	5.649	0.000	**H6:** supported
Notes: (1) N=500; (2) Level of Significance *p-value < 0.05; **p-value < 0.01; ***p-value < 0.001; T-Statistic >1.96 at 0.05 level of significance				

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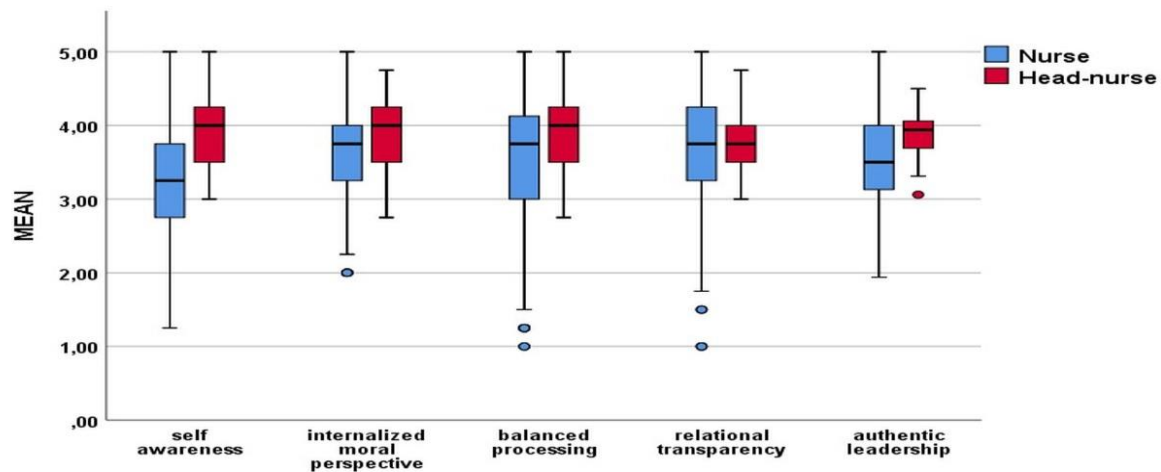**Section II: Assessing nurses´ perception of their leadership during the Covid-19 pandemic**

Indicating the importance of authentic leadership in improving nurses' work burnout in our empirical model, we sought to investigate further the attitudes of nursing personnel towards the quality of leadership at their work. Indeed, in Table 4, part 1, we present the nurses' and head nurses' opinion for their leadership in total and on subscale scores of self-awareness, internal moral perspective, balanced process, and relational transparency. Additionally, in part 1, we show the rating of leadership among nursing personnel along four categories (very high, high, low, very low). According to this ranking, among the 500 nurses, 81,6% score their leadership as high or very high, and quite interestingly 18,4% score their leaders low or very low (Table 4 Part 1 and Fig. 3). Table 4, part 2, and Figure 3 demonstrate that head nurses score their leadership significantly higher in all leadership subscales except for relational transparency.

Table 4. Nurses' assessment of authentic leadership at work			
Part 1: Total scores for Leadership (Max=80) and for leadership components (Max =20) Comparison of evaluations between nurses and head-nurses			
	Nurses (n=500)	**Head-nurses (n=30)**	**p-values**
Authentic Leadership – Total Score	56.73±10.04	62.13±5.53	<0.001
Self-awareness	13.15±2.90	15.60±1.96	<0.001
Internalized Moral Perspective	14.48±2.56	15.87±1.91	0.001
Balanced Processing	14.44±3.15	15.67±2.29	0.009
Relational Transparency	14.66±3.16	15.00±1.70	0.319 (NS)
Rating Authentic Leadership (categorical Max=80)			
Very high (64-80)	112 (22.4%)	8 (26.7%)	
High (48-64)	296 (59.2%)	22 (73.3%)	
Low (32-48)	88 (17.6%)	0	0.082 (NS)
Very low (16-32)	4 (0.8%)	0	
Part 2: Means of Authentic leadership and its components (Max=5)			
Self-awareness	3.29±0.73	3.90±0.49	<0.001
Internalized Moral Perspective	3.62±0.64	3.97±0.48	0.001
Balanced Processing	3.61±0.79	3.92±0.57	0.009
Relational Transparency	3.66±0.79	3.75±0.43	0.319 (NS)
Authentic Leadership (mean)	3.55±0.63	3.88±0.35	<0.001
Note: Part 1.Total score of authentic leadership was calculated as the sum of 4 subscales, each subscale maximum score =20 (4 questions per subscale min=1 and max=5), The categorical scale max = 80 (4 subscales with a max of 20 per subscale). Part 2. Mean value per subscale. 1 =minimum, to 5 =maximum			

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Figure 3. Comparison of authentic leadership dimensions between nurses and head-nurses

Note: Assessment of authentic leadership by nurses (no=500) and head nurses (30) are expressed as categorical variable

Table 5 reports the mean scores of burnout, and structural empowerment along with their dimensions or subscales, work/life balance and patient assessment quality of care.

Table 5: Assessment of Structural Empowerment, Burnout, Work-life balance, and Patient Quality

		Means±SD
	Structural empowerment total score (Max=20)	13.09±2.24
Subscales (Max=5)	Opportunities	3.92±0.66
	Access to information	2.61±0.78
	Access to support	3.44±0.84
	Access to resources	3.12±0.81
	Burnout	
Subscales (Max=6)	Emotional Exhaustion	3.15±0.82
	Cynicism	2.31±0.77
	Professional efficacy	2.08±0.52
	Work-life balance (Max=5)	2.67±0.54
	Patients Quality of Care (Max=5)	3.8±0.48
	Note: Structural Empowerment total score =20 (4 subscales, each subscale ranges from 1 to 5). Burnout: three subscales from 0 to 6. Work life balance and Patient quality of Care one scale, rate from 1 to 5	

Discussion
The model

The results of our model estimation show the mechanism through which authentic leadership influenced nursing personnel's quality of healthcare services during the challenging period of the Covid-19 pandemic. Furthermore, the findings underscore the necessity of suppressing workplace burnout among healthcare professionals, especially during extremely adverse working conditions. The model showed that effective leadership is not capable on its own to mitigate employee burnout. There is no direct impact of leadership on nurses' burnout. Fortunately, and quite expectedly, leadership seems to suppress burnout through two channels: nursing personnel empowerment and positive work-life arrangements. These two influences, in turn, tend to reduce the burden of workplace burnout, allowing professionals to meet high standards of healthcare services, even under healthcare crisis conditions, like those in the Covid-19 pandemic.

More specifically, according to the estimation of our model (Figure 2 and table 3), one observes that the impact of authentic leadership on nurses' burnout is mediated through structural empowerment and work-life interference. This model estimation sheds light on the mechanism through which quality leadership mitigates nursing personnel's workplace burnout, a very important development indeed for the quality of healthcare services under the pandemic pressing working conditions. Precisely, according to our model authentic leadership seems to influence positively structural empowerment thus diminishing burnout at work. On the other hand, authentic leadership tends to alleviate work-life interference thus leading to lower levels of burnout. Finally, low levels of nurses' burnout significantly tend to improve patients' quality of care.

As mentioned above, our model demonstrates that there is no direct mitigating effect of leadership on personnel's burnout. This means that the main impact of leadership on employee burnout is mediated though its positive effect on structural empowerment and work-life interferences, indicative of our model's significance as a managerial tool in managing human resources in healthcare services. An additional practical implication of our model is that healthcare organizations should focus on employing and promoting the most qualified people for team leading positions. Indeed, the preceding discussion highlights the vital role of the team leaders who have the responsibility of empowering healthcare personnel and facilitating their work-life arrangements, benefiting thus patients' healthcare quality.

Nurses' attitudes

Leadership has been more difficult in challenging times. Leaders who develop a clear sense of their principles, values and ethical boundaries are better prepared to find the right path through difficult decisions and dilemmas [35]. Moreover, supportive nurse leaders have both direct and indirect influence on nurses' work-related well-being [36]. Under stressful situations, such as during Covid-19 pandemic, authentic leaders greatly influence their team members' psychological capital providing them with confidence, optimism, hope, resilience, and self-efficacy [37]. Authentic leaders showing empathy for their collaborators might increase their positive rating and support [38]. Our results are in accordance with those found in previous studies [6,7]. However, these effects were not tested during the Covid-19 pandemic where leadership is under stress. Precisely, the nursing personnel of our hospital evaluate their leadership as high (59,2%) or very high (22,4%), and only 18.4% low or very low. Moreover, on the subscales of the authentic leadership the evaluation results are very constant, all of them being above average as a sum of the four subscales and as a mean per subscale. Interestingly, head nurses, as part of the leadership team, evaluate themselves significantly higher in all subscales, as a sum of the four subscales and as a mean per subscale, except for relational transparency (Table 4). These results show that leaders may correctly evaluate themselves concerning their relational transparency (presenting ourselves as we truly are), however concerning the other three leadership characteristics they may overestimate their job performance. This finding provided by our study, may be seen as a common characteristic of human behaviour, and should be considered from leaders when they rate their job performance to avoid overestimating themselves.

Structural empowerment plays an important role in employee effectiveness [12]. This fact has been evaluated in nurses' population concerning their job satisfaction, commitment, trust, productivity, and burnout [9,10,11]. Empowerment is a means of mitigating the deleterious effects of stressful working conditions and it is reasonable to believe that leadership plays an important role in establishing empowering conditions in the workplace [12,38]. Laschinger et al. demonstrated that nurses' perceptions of structural and psychological empowerment are predictive of

burnout and job satisfaction suggesting that empowerment may have protective effects against burnout [11]. Authentic leadership theory is a promising approach for nurse leaders to impede the development of burnout among nurses by implementing empowering measures [13]. Our study demonstrates that authentic leadership has a positive effect on structural empowerment thus impeding burnout (figure 2 and table 3). Moreover, as we analytically stated in the methods section of our study, our measures were implemented in the fields of support and resources to boost the nurse's empowerment during the pandemic. Have these measures been positively evaluated by the nursing staff? In fact, according to our data total empowerment was rated high, and in each subscale the mean value was above average except for access to information (Table 5). This may be explained by the fact that not specific measures were implemented to improve the access to information.

Work-life conflict has been reported as a major factor contributing to work stress especially for those working in the health sector due to increased work hours and demands, shift work, and staff shortages [14,39,41]. We can assume that this should be particularly true in public health crises, such as the pandemic, when health care personnel underwent all the above-mentioned challenges. Few studies have directly examined the influence of leadership behaviours on the perceptions of work-life conflict. Leaders may influence perceptions of work-life conflict by attending to the needs of their team members listening to their concerns and fostering a supportive climate [17,42,43]. In their study Munir et al. found that transformational leadership was associated with work-life balance which in turn was associated with psychological wellbeing in healthcare employees [44]. Our study demonstrates that the nursing personnel of our hospital rated the work-life balance just in the moderate (2,67±0,5). If we consider that the lower the rating in the questionnaire (1 is not at all and 3 is sometimes) the better the equilibrium between work and personal life, we can assume that the nursing personnel are quite satisfied with the balance between work and personal life during the pandemic and the measures that had been implemented were supportive.

According to our results on burnout, emotional exhaustion and cynicism are rated on the top of moderate for both, and high in professional efficacy. We presume these results apparently demonstrate the efficacy of the implemented protective measures to boost the nurses' empowerment and work-life balance during the pandemic. Considering our results, we can assume that despite the heavy workload during the pandemic, the high mortality due to the disease (roughly 50% among patients in the ICU), the burden of PPE and shifts, the nursing personnel perceived that they performed to a high level of professional efficacy, and they suffered moderate emotional exhaustion and cynicism.

Our study also demonstrated that patients rated the overall quality of care received in the hospital close to very good and no difference in the quality of care was found between covid and non-covid patients. These results are in accordance with the results of our burnout inventory concerning the nurses' feeling of professional efficacy. Nurses' perception on their professional efficacy was very high and this to a lesser extent mirrored the patient's perception of the quality of care. Van Bogaert found an association between the nurses' burnout and patient quality of care due to the reduction in nurses' capacity to deal effectively with high workloads [45,46]. Aiken et al. also demonstrated that burnout had a negative effect on patients care and satisfaction [47]. One can argue that the patients' rating on the quality of care is biased because we interview Covid-19 patients who had a satisfactory outcome compared to unfavorable outcome of their fellow patients who did not survive. However, no statistical difference was found between covid and non-covid patients in whom the health status was less critical. Another bias one can address is that the patient's quality of care questionnaire was conducted by telephone interview and not by an anonymous letter. An attempt to conduct the questionnaire by an anonymous letter at the hospital discharge failed, especially in the Covid-19 patients for many reasons. A high proportion of the Covid-19 patients were elderly with poor understanding how to answer the questions, on the other hand the telephone interview provides us with the necessary time to explain all the questions and the rating of the questionnaire. Moreover, at hospital discharge patients were in a rush to meet their families after days in isolation, in critical condition and without visits during their hospitalization. Furthermore, another reason for bias could be the fact that the questionnaire was completed after the patients' discharge from the hospital. Nobel laureate Daniel Kahneman in his memorable book "Thinking fast and slow" explains how the human memory operates when we are dealing with stressful or painful situations [48]. When we are rating retrospectively no matter how stressful or painful the experience, if the end is

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good or favorable, we have the tendency to neglect the pain and rate high. This phenomenon is called "Duration Neglect" and this neglect is adopted by a vast majority of people to reduce the memory of pain.

Limitations: There are some limitations in our study. First, it is a single hospital study and not a national survey. However, it was impossible to interfere with other hospitals' administration to implement the same measures. Another limitation is that we conducted the study after implementing actions on empowerment and work-life balance to decrease burnout and we lack data before the implementation. We consider the option to leave unprotected our personnel just to record the expected high level of nurses' burnout during the previous waves of the pandemic quite unethical. Fear of anonymity could be another limitation, but anonymity was specifically emphasized to the personnel and if anonymity was a real concern, participation in the study would have been low.

Conclusion

Our results emphasize the positive effect of authentic leadership through empowerment and work-life balance to protect nurses from burnout and provide evidence of an increase in patients' perception of quality of care. Our study also demonstrates that during difficult times, like the pandemic, if leaders implement supportive measures on work-life balance and structural empowerment in the work they can lead their associates to high levels of professional efficacy. On the other hand, leaders should be aware of their tendency to overestimate their leadership abilities.

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