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CLINICAL STUDIES

The Economic Value of Job Crafting Interventions in Healthcare: An Utility Analysis Based on Romanian Income Data

Adriana COTEL[1,2], Bogdan OPREA[2], Florinda GOLU[2], Claudiu Gabriel IONESCU[1,3], Licu MONICA[1]

Abstract

Objectives: The aim of the study was to estimate the economic value of job crafting interventions for the Romanian medical field. **Materials and Methods:** The utility analysis was used, representing the evaluation of the economic impact of human resource management solutions based on mathematical formulas. Meta-analytical data show that job crafting interventions have a positive impact on the performance of healthcare workers. We estimated the financial value of these psychological interventions in three ways: monetary increase in productivity, percentage increase in productivity, and reduction in labor costs. **Outcomes:** The results indicate substantial benefits for the healthcare field as a result of job crafting interventions, as measured by monetary increases in productivity. The percentage increase in productivity was estimated at 14% for a period of three months. The reduction in labor costs was estimated at 12% over a three-month period. **Conclusions:** Job crafting interventions could have a significant economic value for the Romanian medical sector.

Keywords: job crafting interventions; utility analysis; occupational health; healthcare workers; Romanian medical sector

[1]"Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[2]Department of Psychology and Cognitive Sciences, University of Bucharest, Bucharest, Romania
[3]Clinical Hospital of Psychiatry "Prof. Dr. Alexandru Obregia", Bucharest, Romania

Corresponding author:
Bogdan OPREA, Department of Psychology and Cognitive Sciences, University of Bucharest, 90th Panduri Ave., Bucharest, Romania.
E-mail: bogdan.oprea@fpse.unibuc.ro

INTRODUCTION

The psychological well-being of healthcare workers has become a major issue due to the high prevalence of burnout in this field (Medscape, 2017). Burnout is a state of physical, emotional, and mental exhaustion often caused by prolonged or chronic workplace stress; it is typically characterized by exhaustion, feelings of cynicism, detachment from work, and a sense of reduced personal accomplishment (Maslach, Schaufeli, & Leiter, 2001). More than half of US physicians experience symptoms of burnout, with the rate of burnout being double than that of employees in other professions (Shanafelt et al., 2012). 43% of nurses working in US hospitals report symptoms of burnout (Aiken et al., 2001). A study reported a prevalence of burnout of 37% among nurses providing direct patient care in centers of care and assistance for the elderly and a prevalence of 33% among hospital nurses (McHugh et al., 2011). Several studies have also shown a high prevalence of burnout and depression among medical students and residents (Mata et al., 2015; West, Shanafelt, & Kolars, 2011).

Although burnout has many negative consequences in the medical field, in this paper we focus on the economic costs. The burnout of healthcare employees can lead to financial costs due to lower performance, increased staff turnover, absenteeism or medical errors. For example, in the United States alone, the turnover of physicians from hospitals due to burnout is estimated to result in annual replacement costs of $1.3 billion and $2.1 billion in lost profitability due to understaffing (National Taskforce on Humanity in Healthcare, 2018). Voluntary turnover incurs both direct costs (e.g., the costs of recruitment and staff training) and indirect costs (e.g., the low productivity of new staff and the low morale of the rest of the employees). According to Waldman et al. (2004), the total cost to a newly hired nurse averages $15,825 and the cost to the organization due to reduced productivity ranges from $5,245 to $16,102. The turnover of nurses can result in fewer employees to take care of patients, increased workload for staff who remain, and longer shifts. High employee turnover can also affect nurse morale, resulting in a reduced ability to meet patient needs and provide quality care (Hayes et al., 2012; Whitman et al., 2002).

Considering the high costs of burnout in healthcare, it is important to identify psychological interventions to reduce burnout and to estimate the economic impact these interventions can have. Most often, occupational health psychologists use a model of stress reduction consisting of three types of interventions: primary, secondary, and tertiary interventions (Quick et al., 1997). Primary interventions aim to modify or eliminate stressors in the work environment or to add resources to the workplace that can be used to reduce stress. Very often, in hospitals or other healthcare organizations, employees have to face a lot of stressors (e.g., time pressure, workload, work-family conflict, patient deaths, etc.). At the same time, in order to deal with stressors, employees rely on the job resources they have (e.g., equipment, social support, feedback, training, opportunities for development). Thus, the primary interventions are aimed at reducing demands or stressors and increasing job resources. An important assumption of these interventions is that workplace resources can decrease the negative impact of demands on psychological well-being.

The central method by which employees learn about the demands and resources of the job and the different ways in which they can modify them is by participating in job crafting interventions. Thus, employees can participate in such interventions to learn how to develop a personal job crafting plan (e.g., increasing resources, decreasing highly stressful demands, etc.; Gordon et al., 2018; Van den Heuvel, Demerouti, & Peeters, 2015). The results of a meta-analysis support the effectiveness of job crafting interventions in increasing the well-being of employees in general and in increasing the performance of employees in healthcare in particular (Oprea et al., 2019). In addition, in the same study, Oprea et al. (2019) estimated the economic benefits that job crafting interventions can have for the medical field by increasing employees' performance. However, the economic calculations made were based on some general estimates of the financial value of healthcare employees' productivity. In order to estimate the economic impact of interventions on employees in Romania, it is important to use data from the Romanian healthcare field. Therefore, the purpose of the current study is to estimate the economic value of job crafting interventions for employees in the Romanian healthcare sector based on the income data from Romania.

MATERIALS AND METHODS

To estimate the financial value of job crafting interventions in Romanian healthcare, we used utility analysis.

Utility analysis involves evaluating the economic impact of human resource management solutions based on mathematical formulas (Barrick, Day, Lord, & Alexander, 1991; Roth, Bobko, & Mabon, 2002). Utility analyzes are used in psychology because they have three main benefits. First, managers who make decisions about human resource investments have a more positive attitude toward psychological interventions if they understand the financial benefits of such interventions (Macan & Foster, 2004). Second, with financial estimates available for each type of psychological intervention, decision-makers within organizations can more easily choose the most appropriate intervention, based on financial estimates of the return on investment specific to each intervention. Finally, utility analysis allows industrial-organizational psychologists to explain more clearly to people in other professions the benefits of such interventions (Boudreau, 1991; Highhouse, 1996; Rauschenberger & Schmidt, 1987).

As stated in the introductory section, a primary form of intervention to reduce burnout in healthcare is job crafting intervention. In these interventions, employees learn more about job demands and resources and develop a personal job crafting plan to increase their resources, decrease their demands, or seek new challenges at work (Gordon et al., 2018; Van den Heuvel, Demerouti, & Peeters, 2015). Meta-analytical data showed that job crafting interventions have a positive impact on the performance of healthcare employees (Oprea et al., 2019). According to these meta-analytical data, the effect size for increasing the performance of healthcare employees is $g = .47$ for job crafting interventions. Knowing this value and several other indicators related to the salaries of employees in the Romanian medical sector, we can estimate the financial value of job crafting interventions for the Romanian healthcare field. The financial value of psychological interventions can be estimated in three ways: monetary increase in productivity, percentage increase in productivity, and reduction in labor costs (Cascio & Boudreau, 2011).

First, we calculated the monetary increase in productivity of job crafting interventions for healthcare workers. This estimate of the financial benefits of the interventions refers to the gains that come from the sale of the output of the employees' work, as a result of improved performance. The calculation formula for the monetary increase in productivity was taken from Schmidt (2013):

$$\text{Monetary increase in productivity} = (T)(N)(SDy) - (N)(C)$$

where T is the number of years over which the effect of the intervention extends, N represents the number of employees who benefit from the intervention, SDy represents the standard deviation of work performance measured in money for a single employee, and C is the cost of the intervention for a single employee.

Second, we calculated the percentage increase in productivity. This estimate refers to the percentage difference between the performance of employees who received the job crafting intervention and employees who did not receive such an intervention. The formula taken from Schmidt (2013) for the percentage increase in productivity is:

$$\text{Percentage increase in productivity} = (g)(SDp)$$

where g represents, as we specified previously, the effect size for increased performance as a result of the job crafting intervention, and SDp represents the standard deviation of employee productivity, in the form of a percentage value of the average employee performance.

The last form of estimating the financial benefits resulting from psychological interventions is the reduction of labor costs. This estimate captures the savings that arise from the fact that, as employee performance is increased, fewer paid employees are needed to achieve the same result. In other words, sometimes the effectiveness of interventions does not come from the fact that the productivity of the organization increases, but from the fact that fewer employees are needed to achieve the same level of productivity. The formula for reducing labor costs uses the percentage increase in productivity (Schmidt, Hunter, Outerbridge, & Trattner, 1986):

$$\text{Labor cost reduction} = 100 - 100/(1 + \text{percentage increase in productivity})$$

As we have already stated, a previous meta-analysis calculated the effect size for increasing the work performance of medical personnel as a result of job crafting interventions (Oprea et al., 2019). In addition, the economic value of these psychological interventions was also estimated, but based on some general values, which cannot be particularized to the Romanian healthcare sector. To address this limitation, the present analysis aims to estimate the financial benefits of job crafting interventions using public data on the gross salaries of healthcare workers from Romania.

Data on the salaries of healthcare employees were retrieved from the law no. 153/2017 regarding the salary of staff paid from public funds, from sources available to the public. We used data for the salaries of healthcare workers from the following four categories: (1) clinical units; (2) pathological anatomy and forensic medicine; (3) ambulance services, emergency reception departments: UPU-SMURD, UPU, CPU, ATI, neonatal transport unit; (4) sanitary units, except for those included in clinical units, and medical-social assistance units. The first 25 functions are presented for each category. The annual salary was calculated by multiplying the monthly gross salary by 12.

OUTCOMES

To perform the utility analyses, we used an effect size that met three specific criteria: (1) it represented the increased performance of healthcare workers, (2) it was statistically significant, and (3) it was homogeneous from one intervention to another. All these criteria are met by the effect size for increasing the performance of healthcare employees based on job crafting interventions (Oprea et al., 2019). As already stated, the effect size is $g = .47$ (95% CI [0.21, 0.73]; $p < .001$), a medium effect size. This was calculated on the basis of three studies in which the performance of healthcare employees who benefited from job crafting interventions was compared to that of employees who did not participate in any form of intervention. As in the case of the utility analyzes used by Oprea et al. (2019), we used $T = .25$ (representing 25% of a year, i.e. three months), because the longest effect of job crafting interventions is three months (Gordon et al., 2018).

Given that between 10 and 30 people participate in psychological interventions, we made estimates for a minimum number of $N = 10$ employees. To calculate SDy, the standard deviation of job performance measured in money for a single employee, we multiply the effect size ($g = .47$) by .40, representing the standard deviation in monetary value of the normal distribution of employee performance (SDy represents 40% of the average annual salary for a specific position; Schmidt, Mack, & Hunter, 1984; Schmidt, Hunter, Outerbridge, & Trattner, 1986), and by the annual gross salary for each position in the medical field. For example, for a specialist physician in a clinical unit, the annual salary is 118800, therefore, SDy = (g)(.40)(118800) = (.47)(.40)(118800) = 22334. The cost of the intervention per employee was estimated according to Schmidt (2013), being a common value for a psychological intervention, C = 170. To calculate the percentage increase in productivity, as in the previous case, we will use the value of g = .47, taken from the meta-analysis of the effectiveness of job crafting interventions (Oprea et al., 2019). Regarding SDp, the standard deviation of employee productivity as a percentage value of the average employee performance, according to existing studies, we chose the value of .30 (Hunter, Schmidt, & Judiesch; 1990). For mid-level occupations, the SDp is .30, meaning that employees one standard deviation higher than the average employee produce 30% more than the average employee. As in the case of subsequent analyzes (Oprea et al., 2019), we used the SDp value of .30.

As we stated previously, we used data for the salaries of healthcare workers from the following four categories: (1) clinical units; (2) pathological anatomy and forensic medicine; (3) ambulance services, emergency reception departments: UPU-SMURD, UPU, CPU, ATI, neonatal transport unit; (4) sanitary units, except for those included in clinical units, and medical-social assistance units. The first 25 functions are presented for each category. The annual salary was calculated by multiplying the monthly gross salary by 12, the value of T was .25, the equivalent of three months, N was assigned the value of 10 healthcare employees, SDy was calculated with the formula (.47)(.40)(annual salary), and C was assigned the value of 170. The estimation results are shown in the tables below.

The value of SDp was .30, as stated previously, and the value of .47 was used for the effect size.

$$\text{Percentage increase in productivity} = (.47)(.30) = 14\%/\text{three months}$$

To calculate the cost reduction, the previously calculated value of 14% was used:

$$\text{Labor cost reduction} = 100 - 100/(1 + .14) = 12\%/\text{three months}$$

Table 1. Estimating the economic value of job crafting interventions for clinical units

Job	Gross annual base salary	T (the period of the intervention effect)	N (no. of employees)	SDy (SD of performance)	C (intervention cost per employee)	Economic utility of the intervention
Primary physician	150000	.25	10	28200	170	68800
Primary dentist	150000	.25	10	28200	170	68800
Specialist physician	118800	.25	10	22334	170	54136
Specialist dentist	118800	.25	10	22334	170	54136
Resident physician year VI-VII	94800	.25	10	17822	170	42856
Resident physician year IV-V	87600	.25	10	16469	170	39472
Resident dentist year IV-V	87600	.25	10	16469	170	39472
Resident physician year III	80400	.25	10	15115	170	36088
Resident dentist year III	80400	.25	10	15115	170	36088
Resident physician year II	73200	.25	10	13762	170	32704
Resident dentist year II	73200	.25	10	13762	170	32704
Resident physician year I	68400	.25	10	12859	170	30448
Resident dentist year II	68400	.25	10	12859	170	30448
Physician	76800	.25	10	14438	170	34396
Dentist	76800	.25	10	14438	170	34396
Primary pharmacist	66336	.25	10	12471	170	29478
Specialist pharmacist	63780	.25	10	11991	170	28277
Pharmacist	53700	.25	10	10096	170	23539
Resident pharmacist year III	52656	.25	10	9899	170	23048
Resident pharmacist year II	52140	.25	10	9802	170	22806
Resident pharmacist year I	51624	.25	10	9705	170	22563
Physiokinetotherapist, medical bioengineer; primary	57828	.25	10	10872	170	25479
Physiokinetotherapist, medical bioengineer; specialist	51624	.25	10	9705	170	22563
Physiokinetotherapist, medical bioengineer	49044	.25	10	9220	170	21351
Physiokinetotherapist, medical bioengineer; beginner	47400	.25	10	8911	170	20578

Table 2. Estimating the economic value of job crafting interventions for pathological anatomy and forensic medicine

Job	Gross annual base salary	T (the period of the intervention effect)	N (no. of employees)	SDy (SD of performance)	C (intervention cost per employee)	Economic utility of the intervention
Primary physician	195000	.25	10	36660	170	89950
Specialist physician	154440	.25	10	29035	170	70887
Resident physician year IV-V	87600	.25	10	16469	170	39472
Resident physician year III	80400	.25	10	15115	170	36088
Resident physician year II	73200	.25	10	13762	170	32704
Resident physician year I	68400	.25	10	12859	170	30448
Primary pharmacist	86232	.25	10	16212	170	38829
Specialist pharmacist	82908	.25	10	15587	170	37267
Pharmacist	61620	.25	10	11585	170	27261
Medical assistant, radiology technician; primary	67788	.25	10	12744	170	30160
Medical assistant, radiology technician	65100	.25	10	12239	170	28897
Medical assistant, radiology technician; beginner	61620	.25	10	11585	170	27261
Medical assistant, assistant medical specialist; primary	63756	.25	10	11986	170	28265
Medical assistant, assistant medical specialist	60840	.25	10	11438	170	26895
Medical assistant, assistant medical specialist; beginner	60060	.25	10	11291	170	26528
Nurse, primary	60840	.25	10	11438	170	26895
Nurse	58500	.25	10	10998	170	25795
Nurse, beginner	57720	.25	10	10851	170	25428
Nurse, primary	60060	.25	10	11291	170	26528
Nurse	57720	.25	10	10851	170	25428
Medical assistant, beginner	56316	.25	10	10587	170	24769
Nurse, primary	58500	.25	10	10998	170	25795
Nurse	56940	.25	10	10705	170	25062
Nurse, primary	56316	.25	10	10587	170	24769
Anatomist, primary	58500	.25	10	10998	170	25795

Table 3. Estimating the economic value of job crafting interventions for ambulance services, emergency reception departments

Job	Gross annual base salary	T (the period of the intervention effect)	N (no. of employees)	SDy (SD of performance)	C (intervention cost per employee)	Economic utility of the intervention
Primary physician	160056	.25	10	30091	170	73526
Primary dentist	160056	.25	10	30091	170	73526
Specialist physician	126756	.25	10	23830	170	57875
Specialist dentist	126756	.25	10	23830	170	57875
Resident physician year IV-V	87600	.25	10	16469	170	39472
Resident physician year III	80400	.25	10	15115	170	36088
Resident physician year II	73200	.25	10	13762	170	32704
Resident physician year I	68400	.25	10	12859	170	30448
Physician	78108	.25	10	14684	170	35011
Dentist	72984	.25	10	13721	170	32602
Primary pharmacist	70776	.25	10	13306	170	31565
Specialist pharmacist	68052	.25	10	12794	170	30284
Resident pharmacist year III	56184	.25	10	10563	170	24706
Resident pharmacist year II	55632	.25	10	10459	170	24447
Resident pharmacist year I	55092	.25	10	10357	170	24193
Pharmacist	57288	.25	10	10770	170	25225
Physiokinetotherapist, medical bioengineer; primary	61704	.25	10	11600	170	27301
Physiokinetotherapist, medical bioengineer; specialist	55092	.25	10	10357	170	24193
Physiokinetotherapist, medical bioengineer	52332	.25	10	9838	170	22896
Physiokinetotherapist, medical bioengineer; beginner	50580	.25	10	9509	170	22073
Primary dentist	52332	.25	10	9838	170	22896
Dentist	49932	.25	10	9387	170	21768
Dentist, beginner	49296	.25	10	9268	170	21469
Nurse, primary	49932	.25	10	9387	170	21768
Nurse	48012	.25	10	9026	170	20866

Table 4. Estimating the economic value of job crafting interventions for sanitary units, except for those included in clinical units, and medical-social assistance units

Job	Gross annual base salary	T (the period of the intervention effect)	N (no. of employees)	SDy (SD of performance)	C (intervention cost per employee)	Economic utility of the intervention
Primary physician	147000	.25	10	27636	170	67390
Primary dentist	147000	.25	10	27636	170	67390
Specialist physician	116424	.25	10	21888	170	53019
Specialist dentist	116424	.25	10	21888	170	53019
Physician	75264	.25	10	14150	170	33674
Dentist	75264	.25	10	14150	170	33674
Primary pharmacist	63012	.25	10	11846	170	27916
Specialist pharmacist	60588	.25	10	11391	170	26776
Pharmacist	51012	.25	10	9590	170	22276
Physiokinetotherapist, medical bioengineer; primary	54936	.25	10	10328	170	24120
Physiokinetotherapist, medical bioengineer; specialist	50400	.25	10	9475	170	21988
Physiokinetotherapist, medical bioengineer	49044	.25	10	9220	170	21351
Physiokinetotherapist, medical bioengineer; beginner	47400	.25	10	8911	170	20578
Primary dentist	47400	.25	10	8911	170	20578
Dentist	46800	.25	10	8798	170	20296
Dentist, beginner	46200	.25	10	8686	170	20014
Nurse, primary	46800	.25	10	8798	170	20296
Nurse	46200	.25	10	8686	170	20014
Nurse, beginner	45000	.25	10	8460	170	19450
Nurse, primary	46200	.25	10	8686	170	20014
Nurse	45000	.25	10	8460	170	19450
Nurse, primary	43320	.25	10	8144	170	18660
Dental technician, primary	46200	.25	10	8686	170	20014
Dental technician	45000	.25	10	8460	170	19450
Dental technician, beginner	43320	.25	10	8144	170	18660

CONCLUSION

The objective of the present study was to evaluate the financial benefits of psychological interventions for employees in the medical field. Job crafting interventions are a form of primary interventions to reduce burnout in the medical sector. During these interventions, physicians and nurses learn more about job demands and resources and develop a personal job crafting plan to increase their resources, decrease their demands, or seek new challenges at work (Gordon et al., 2018; Van den Heuvel, Demerouti, & Peeters, 2015). Meta-analytic data show that job crafting interventions have a positive impact on work engagement and performance of employees in the medical field (Oprea et al., 2019).

The method used to estimate the financial value of psychological interventions was utility analysis. Utility analysis represents the evaluation of the economic impact of human resource management solutions based on mathematical formulas. According to meta-analytic data for job crafting interventions, the effect size for increasing the performance of healthcare employees is $g = .47$. Knowing this value and several other indicators related to the salaries of employees in the Romanian medical sector, we estimated the financial value of job crafting interventions for the Romanian medical sector. We estimated the financial value of psychological interventions in three ways: monetary increase in productivity, percentage increase in productivity, and reduction in labor costs. The results indicate substantial benefits for the medical sector as a result of job crafting interventions, as measured by monetary increases in productivity. The percentage increase in productivity was estimated at 14% for a period of three months. The reduction in labor costs was estimated at 12% over a three-month period. In conclusion, job crafting interventions could have a significant economic value for the Romanian medical sector.

Conflict of interest statement

I undersign, certificate that I do not have any financial or personal relationships that might bias the content of this work.

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