

Risk of Human Factors in Selected Health Care Sector

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The submitted paper points to a problem that concerns the Czech Republic and almost all of Europe. There is a need for more qualified employees across the Labour market. The author's team set the goal of mapping the spa industry situation in the Czech Republic through a nationwide questionnaire survey. The paper aimed to identify the specifics of the lack of staff in spa facilities in the Czech Republic. Based on the results of the analysis, propose measures that can lead to improvement. The Chi-square test and Cramer's coefficient were used to verify the statistical dependencies.

1. Introduction

The paper is focused on the importance of the human factor (Hoke et al., 2020) and personnel risks in a specific area of healthcare. Deficient staffing is a challenge that most medical facilities deal with concerning the Smart concept. It represents a barrier to sustainable development, and its solution contributes to socio-economic development and increasing citizen satisfaction. Regardless of the organization's size, all hospitals need more staff for to run the organization. This situation is called the capacity crisis, affecting all sectors of the national economy. In the healthcare sector, this problem is even more remarkable as the consequence of the lack of staff can be transferred to patients and their health. A clear impact of the capacity crisis is excessive overwork of staff, which often violates the Labor Code. Because the healthcare sector is vast, the paper is devoted to medical spa facilities (balneal treatments) in the Czech Republic. Spa facilities are integral to professional medical care in the Czech Republic and are inherently one of the main advantages of domestic tourism. The role of the spa is relatively complex to replace in the treatment of some chronic diseases, in the prevention of the transition of diseases to the chronic stage and the emergence of complications. Spa care is essential in rehabilitation after serious illnesses, operations, and injuries. The goal is to stabilize the patient's condition and the course of his illness (Jakubíková et al., 2019). Medical personnel in spas include, for example, doctors, nurses, physiotherapists, and psychologists who provide medical care and therapy to patients in spa facilities. Healthcare workers and professionals are all engaged in actions that aim to enhance health. They study, diagnose, treat, and prevent human illness, injury, and other physical and mental impairments to the needs of the populations they serve (Mohanty et al., 2019). On the other hand, non-medical staff in the field of spas can include, for example, receptionists, hotel workers, masseurs, cooks, or cleaning staff. This staff takes care of the comfort and service of the guests in the spa facilities. For this article, these workers are referred to as support staff. All these staff are exposed to various health hazards because of job characteristics and complex work systems, especially when there is a shortage (Mondal & Ray, 2023).

The leading causes of the capacity crisis were the growth of the world economy and the associated low unemployment. Healthcare is a specific area because workers are not losing their jobs even when the economic cycle is in a downturn. Here, we can see a certain contradiction between healthcare and other sectors.

Another perspective on the investigated issue concerns ensuring the sustainable development of facilities and organizations and building Smart regions. With sufficient staffing, it is possible to develop areas and increase citizens' satisfaction sustainably. One of the barriers to the implementation of Smart concepts is insufficient staffing. With a quality workforce, it is possible to achieve the goal of sustainability. Another big problem is the aging of the population. The study of Grenčíková et al. (2022) draws attention to the problem of population aging and its effect on GDP growth and the labor market. Population aging is the primary global demographic trend of

the 21st century and one of the main factors shaping labor market supply. The aging of the population causes problems mainly in maintaining economic growth and ensuring health care (Grenčíková et al., 2023). A shrinking working-age population causes labor market shortages. Workforce aging resulting from population aging is expected to increase labor market rigidity because older workers have less job mobility than younger workers (Tan et al., 2022). The school and education system, which currently needs to be better set up, must adapt to this demographic development. Given its demographic development, it needs to consider how much the Czech population will need of workers in the healthcare sector. Competition plays a role in the for-profit and non-profit sectors, which weakens the number of medical and non-medical personnel in medical and spa organizations. The competitive struggle is between the state and private sectors, attracting workers for better financial remuneration and working conditions.

Among the main consequences of the capacity crisis in hospitals and spa facilities are the reduction of beds, the closing of departments, and longer waiting times for medical procedures, operations, and rehabilitation. All monitored hospital facilities try to avoid reducing the quality of care or turning away patients. However, these consequences are not the subject of this article. The point of view is focused on the consequences of the capacity crisis for personnel. The elementary consequence is the overloading of medical and non-medical personnel across all hospital facilities. According to Mohanty et al. (2019), little attention is paid to Healthcare workers (HCWs). Some of the HCWs are unaware that they are stressed. They do not have any formal training in de-stressing. However, this situation also applies to auxiliary hospital staff, i.e., non-medical staff. Goel et al. (2023) state that appropriate and timely psychological interventions are needed to address the challenges the ancillary hospital staff faces. Long-term sustainable investments in the health workforce are required to recuperate the health system after the pandemic. New ways to solve the above problems must be constantly sought. New challenges are also posed to HR professionals, who must find ways to attract new workers. How to attract and motivate the new Generation Z is discussed in the publication by Bencsik et al. (2016).

The paper aims to identify the specifics of the lack of staff in spa facilities in the Czech Republic and, based on the analysis results, to propose measures that can lead to improvement. Based on the study of professional literature, it is known that spa facilities in the Czech Republic are intensively looking for opportunities to improve staff shortages. One possibility could be employing parents on maternity and parental leave, students, or pensioners. Strengthening cooperation with high schools and universities could also be beneficial because that can increase the interest of students and later school graduates in working in spa facilities.

The first research question is: *Is there a connection between the cooperation of spa facilities with secondary schools and the cooperation of spa facilities with universities?*

In small spa establishments, middle management needs to be more specified. It has less time for training and the adaptation process for mothers on maternity and parental leave, students, and pensioners who work on a contract or part-time basis. Therefore, we assume that there is a connection between the size of the spa facility and the solution to the labor shortage by employing mothers, students, and pensioners on maternity and parental leave. The second research question is: *Is there a connection between the variables: the size of the company (I. small or II. medium and large) and the solution to the labor shortage by employing mothers on maternity and parental leave, students and pensioners?*

2. Methodology

The goal of the paper is to identify the specifics of the lack of staff in spa facilities in the Czech Republic using a nationwide questionnaire survey, based on the results of the analysis, to propose measures that can lead to improvement. Data from empirical research are sorted and presented in contingency tables. Selected ordinal variables are described by descriptive statistics. Furthermore, modal categories and ordinal variance are expressed. The modal category of an ordinal variable is the category with the highest frequency. The ordinal variance of a variable is expressed by the relation.

$$no = 2 \sum_{i=1}^{K-1} P_i(1 - P_i) \quad (1)$$

where P_i is the cumulative relative frequency of the i -th variation (Řezanková, 2007).

The Chi-square test of independence was used to verify the hypotheses. The Chi-square test of independence can be used when testing hypotheses in the case of nominal variables. The null hypothesis means that the variables are independent. The alternative hypothesis means the dependence of the variables. When testing hypotheses, it is based on the empirical number in the contingency table. For each empirical number, the expected frequency is calculated. The following applies: the proportion of expected frequencies must be at least 5 in at least 80% of the boxes and the other expected frequencies must be at least 1 (Řezanková, 2007). The Chi-square test statistic is expressed as a relationship

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^s \frac{(f_{b_{ij}} - f_{e_{ij}})^2}{f_{e_{ij}}}, \quad (2)$$

where $f_{b_{ij}}$ are empirical, real frequencies; $f_{e_{ij}}$ are expected frequencies; r is the number of rows and s is the number of columns,

$$f_{e_{ij}} = \frac{(\text{Row } i \text{ Total})(\text{Column } j \text{ Total})}{\text{Sample Size}}. \quad (3)$$

The test statistics has a Chi-squared distribution with $(r-1)(s-1)$ degrees of freedom (Anderson et al., 2014). The strength of the relationship is expressed by Cramer's V, which has values from 0 to 1. If the requirements for using the Chi-square test of independence in a 2x2 contingency table are not met, Fisher's Exact Test is used (Řezanková, 2007).

SPSS software was used for statistical data processing. The questionnaire survey was carried out in November 2022. According to the Ministry of Health, there were 92 spas. All facilities were contacted by phone and email. Sources of contact information were also obtained from publicly available sources of the Ministry of Health. Out of 92 organizations, 16 were eliminated (inactive activity). Questionnaires were sent to 76 facilities, and the research sample comprised 32 facilities (return rate 42%). Data collection took place via the SURVIO online platform.

3. Results and Discussion

First, dividing the respondents according to the company's size was necessary. The division into small, medium, and large enterprises according to the number of employees was used. The number of spa facilities in individual groups by size is in Table 1.

Table 1: Spa facilities by size

Size of company	Small	Medium	Large	Total
Total	5	19	8	32

Source: Own research

In connection with the capacity crisis in the spa area, finding out which positions staff are missing in spa facilities was a matter of interest. The answer options were "top management," "middle management," "doctors and medical staff," and "non-medical staff, i.e., support staff." The variables were dichotomous, with the option of answering "yes" or "no." Spa facilities show a sufficient number of top and middle management employees. However, every spa facility stated that they lack the most staff in one of the categories – "doctors and medical staff" and "support staff." 53.1% of all respondents answered that they lack personnel in both categories. 87.5% (28) of spa facilities lacked "support staff." 65.6% of spa facilities said they lack "doctors and medical staff." For both variables, the modal category is "yes." The contingency table with both variables is in Table 2.

Table 2: Contingency table with variables - the most missing support staff and the most missing doctors and medical staff

Most missing support staff	Most missing doctors and medical staff		
	No	Yes	Total
No	0	4	4
Yes	11	17	28
Total	11	21	32

Source: Own research

Furthermore, the subject of interest was what could be behind employee turnover? The average monthly salary was a qualitative variable with the answer options "lower than average," "Equal to the average," and "higher." The average annual turnover rate was a qualitative variable with the answer options "low (up to 5%)," "medium (5-10%)" and "high (10% or more)". Contingency tables sorting data based on average monthly salary and average annual turnover rate are in Table 3 and Table 4.

Table 3: Contingency table with variables - average monthly salary and average annual turnover rate of support staff

Average monthly salary - support staff	Average annual turnover rate - support staff			Total
	Low	Medium	High	
Lower than average	1	2	11	14
Equal to the average	4	5	6	15
Higher	0	1	2	3
Total	5	8	19	32

Source: Own research

The average monthly salary of support staff had the modal category "Equal to the average". The average annual rate of turnover of support staff (Table 3) had the modal category "High". The variability of the variable average monthly salary of cleaners expressed by ordinal variance is lower than in the case of the average annual rate of turnover of support staff. The same procedure was applied to doctors and medical staff (Table 4).

Table 4: Contingency table with variables average monthly salary and average annual turnover rate of doctors and medical staff

Average monthly salary - doctors and medical staff	Average annual turnover rate - doctors and medical staff			Total
	Low	Medium	High	
Lower than average	7	4	4	15
Equal to the average	7	4	1	12
Higher	0	4	1	5
Total	14	12	6	32

Source: Own research

Table 5: Descriptive statistics of variables

Variable	Modal categories	Ordinal variance
Average annual turnover rate of support staff	High	0.746
Average monthly salary of cleaners	Equal to the average	0.662
Average annual rate of turnover of doctors and medical staff	Low	0.797
Average monthly salary of medical specialists	Lower than average	0.762

Source: Own research

Interestingly, the highest variability expressed by the ordinal variance (Table 5) is in the case of the average annual rate of turnover of doctors and medical staff. A possible reason for higher variability is more job opportunities with higher salaries. Since all respondents answered that they need more employees from one of the two mentioned categories, it is clear that spa facilities must find a solution to the lack of staff (One possibility is to employ students and pensioners. In order to obtain personnel with a suitable focus from among students and later school graduates, it is advisable to develop cooperation with schools. 50% of respondents expressed that they cooperate with secondary schools and, simultaneously, with universities within the framework of internships and practice. However, 31.25% of respondents said they do not cooperate with either secondary schools or universities (Table 6). Less-developed cooperation with secondary schools or universities is mainly in the case of small spa facilities (up to 50 employees). It is in this area that we see the possibility of improvement.

Table 6: Contingency table with variables cooperation with secondary schools and universities

Cooperation with secondary schools as part of an internship/practice	Cooperation with the university as part of the internship/practice		Total
	No	Yes	
No	10	1	11
Yes	5	16	21
Total	15	17	32

Source: Own research

Attention was focused on the specifics of spa facilities in cooperation with secondary schools and universities. Above all, do the spa facilities cooperate or not cooperate with both types of schools?

The null hypothesis was tested: the variable cooperation between spa facilities and secondary schools within the internship/practice and between spa facilities and universities within the internship/practice are independent. We will use the Chi-square test of independence to test the statistical hypothesis. (according Řezanková, 2007, 109-114). All expected frequencies are more significant than 5. Pearson Chi-square is 13.052. P value is less than 0.05. The null hypothesis is rejected, and the alternative hypothesis is confirmed. Variables are dependent. Cramer's V (or Phi Coefficient) is 0.64. This is a medium association between variables. Based on the adjusted standardized residuals, it can be concluded that there are statistically significantly more observations in the boxes with "yes"- "yes" and "no"- "no" answers than would be expected (Analysis of contingency tables, 2018). That is, spa facilities that cooperate with secondary schools also cooperate with universities, and spa establishments that do not cooperate with secondary schools also do not cooperate with universities. In cooperation with both types of schools, we still need to find more possibilities for solving the lack of personnel. Cooperation with both types of schools can have two advantages for spa facilities - securing auxiliary staff from the ranks of students and training qualified employees from future school graduates.

Table 7: Contingency table with variables involving mothers on maternity and parental leave/ students/ pensioners

Size of Spa	Solving staff shortages by involving mothers on maternity and parental leave/students/pensioners		
	Yes	No	Total
Small	0	5	5
Medium and Large	17	10	27
Total	17	15	32

Source: Own research

Currently, most spa facilities in the Czech Republic solve the labor shortage by employing mothers on maternity and parental leave, students and pensioners (Table 7). However, there is still a large proportion of spa facilities that do not use this approach. In small spa establishments, middle management solves more diverse tasks. For that reason, it has less space for managing the adaptation process for mothers on maternity and parental leave, students and pensioners. The null hypothesis is thus verified: the variable size of spa facilities (I. small or II. medium and large) and the variable solution to the labor shortage by employing mothers on maternity and parental leave, students and pensioners are independent. The Chi-square test of independence is used to test the null hypothesis. However, the requirement to use the test is not met. For that reason, Fisher's Exact Test is used (Řezanková, 2007, 115-117). P value is less than 0.05. The null hypothesis is rejected and the alternative hypothesis is confirmed. There is a dependency between the variables. Above all, small businesses should focus on solving the labor shortage by employing mothers on maternity and parental leave, students and pensioners. The limit of the research is that the size of the sample set is not large for both hypothesis tests and therefore the permissible margin of error is large. Nevertheless, the author's collective considers emphasizing the importance of spa cooperation with both types of schools and emphasizing the need to solve the labor shortage by employing mothers on maternity and parental leave, students and pensioners in spa facilities (especially small ones) very important. So, how do we solve the problems related to the capacity crisis? Bringing up own potential staff or attract new workers. Proposed solutions include, salary increase for medical and support staff, investment in innovation and education to increase productivity, simplified employment of workers from third countries. (Grenčíková et al., 2023) A study by Snack et al. (2022) analyzes how hospitals in Germany perceive the lack of qualified staff and how they deal with this problem. German employers target a wide range of employee benefits. Today's times require the application of new recruitment methods or the management of vocational education of students. Following the situation on the labor market, which forces companies to approach innovative solutions when searching for experts for selected positions, the same problem exists when filling job positions in healthcare facilities. An example is contacting people abroad or cooperating with agencies that focus on selecting and recommending workers. In this company, they target, for example, Slovakia, where there is currently a situation where some medical facilities would not be able to function fully without workers from abroad—a reaction to attracting university students and all applicants. Steps must be taken to ensure sufficient numbers of applicants for medicine. It is necessary to create the conditions for their preparation from the time they study in secondary schools. As in any market environment, the healthcare market is competitive. One of the other possible solutions is implementing a competence management system (CMS) in the healthcare sector. When implemented appropriately, considering the specifics of the healthcare environment, CMS can bring significant benefits in the form of better coordination of education, increased quality of care, and patient safety. It is still necessary to consider the care of the medical and non-medical staff, who provide patients with comprehensive health care. Compared to the general population, these workers have increased morbidity,

psychological deprivation, burnout, high rates of depression, and an increased risk of suicide (Mohanty et al., 2019). It is necessary to take more care of the psychological health of these workers, as stated by Chou et al. (2020) and Elbay et al. (2020).

4. Conclusion

The results confirmed the expectations of the author's team. Balneal treatments are also struggling with a need for more qualified personnel. As the research confirmed, the way to solve problems related to the capacity crisis is to cooperate with secondary schools and universities and thus employ part-time workers. Another recommendation is to simplify the employment of professional employees from among foreigners, to simplify the entry into the labor market for employees from third countries, to make working in spas more attractive, to attract young workers, or to ensure the availability of housing in spa towns and the surrounding area for employees. Promotion, employer/state contributions to wellness stays, high-quality destination marketing of regions, high-quality preparation of students for their field, better information and promotion of treatment in the spa industry, or a better visa policy would contribute to solving the problem of the lack of employees in the health sector, and thus the spa industry. The proposed measures have the potential to contribute to improving the quality of spa facilities, increasing citizen satisfaction, removing barriers to the sustainable development of regions, and removing obstacles related to the application of Smart concepts.

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