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The importance of psychosocial work factors, calling at work, and psychological state for nurses' work engagement

SUMMARY OF DOCTORAL DISSERTATION

Social sciences, psychology S 006

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Psichosocialinių darbo veiksmių,
pašaukimo darbe ir psichologinės
savijautos reikšmė slaugytojų
įsitraukimui į darbą

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1. INTRODUCTION

Both in Lithuania and throughout the world, healthcare sector is facing serious challenges. Longer life expectancy in combination with decreased birth rates is changing the demographic structure of the society, and persons 65 years and more become the fastest growing world population (United Nations, 2019). Such changes also mean an increased need for healthcare services, which must be met with limited resources, therefore lack of medical personnel and their increasing workload is observed the world over (Christensen, Doblhammer, Rau, & Vaupel, 2009; NIA, 2011; WHO, 2015). Nurses are the most numerous group of medical staff, and healthcare is hardly conceivable without their contribution (Institute of Hygiene, 2018). Therefore, it is no surprise that the World Health Organization declared 2020 the “Year of the Nurse and Midwife”, acknowledging the importance of this group of workers.

Historically, nursing has been perceived as assistance to medical doctors rather than a field in its own right (Messer, 1914), but this attitude is shifting. Some observe that the institutions which are called on in cases of health problems are mostly nursing institutions, and the doctors’ services are provided there only intermittently (Fasoli, 2010). Therefore, if the healthcare system is to efficiently address the challenges it is facing due to demographic shifts, it is meaningful to examine the extent to which the nurses are prepared to do their job better than minimal requirements. One of possible strategies is increasing the nurses’ productivity by promoting their work engagement (Keyko, Cummings, Yonge, & Wong, 2016).

There is more than one concept of work engagement (Schaufeli, 2013), but most often the phenomenon is understood as a state of work-related well-being that consists of three components: vigor, dedication and absorption (Schaufeli, Salanova, Gonzalez-Roma, & Bakker, 2002). Vigorous workers are highly energetic, psychologically resilient, prepared to put effort and persistent in the face of difficulty. Dedicated workers experience feelings of

significance, enthusiasm, inspiration, pride and challenge in their work. Finally, absorption is characterized as a fully focused state, when perception of time changes (time seems to pass more quickly) and it is difficult to step away from work (Schaufeli et al., 2002).

Engaged workers are useful to any organization, because their positive attitude allows them to perceive work opportunities, they put more effort into their tasks and are able to “spread” their engagement to others (Bakker, 2009). Studies show that such people are quicker to implement new ideas (Demerouti & Cropanzano, 2010), their superiors appreciate them as more creative and observe that they perform their tasks better than adequately more often (Demerouti, Bakker, & Gevers, 2015), they have a stronger tendency to learn actively (Bakker, Demerouti, & Brummelhuis, 2012) and show initiative at work (Hakanen, Perhoniemi, & Toppinen-Tanner, 2008). Some authors also suggest treating work engagement as a condition and indicator of employee well-being, because engaged workers not only do their job more efficiently, but also feel better themselves and have less health problems (Halbesleben, 2010; Salanova, Libano, Llorens, & Schaufeli, 2014).

In nursing, it is also important that work engagement has a moral aspect related to the very essence of the profession (Keyko, 2014). Ever since the emergence of the profession, the ideals of service have been emphasized in nursing, and sincere care for the patient is considered one of the core categories of nursing (Bradshaw, 1998; Boykin & Schoenhofer, 2013). Therefore, unlike in many other professions, quality nursing is impossible without a true relationship between the nurse and the patient, to whom it is important that the nurse is engaged in their activity (Austin et al., 2009; Keyko, 2014). Finally, because it is connected both to healthcare and to productivity, encouraging work engagement of nurses is related to achieving at least two UN (UN General Assembly, 2015) sustainable development goals, i. e., it is associated both with better public health and well-being (Goal 3) and good working conditions (Goal 8). Therefore, it is important to understand what supports work engagement in nursing.

If work engagement is understood as a certain synthesis of vigor and job identity that allow for more absorption in work tasks, then the question that follows is whether these components are results of the same factors. On the one hand, the Job Demands-Resources Theory (JD-R, Bakker & Demerouti, 2014, 2017) only discusses one process, a motivational one that is conditioned by work environment and personal resources and that supports work engagement, and does not differentiate it according to the different components of the phenomenon. Accordingly, empirical studies analyze the connections of various individual and situational factors to the whole phenomenon rather than its separate components. On the other hand, the slightly different nature of the components of work engagement is perceptible. The component of vigor describes a mode of behavior, whereas dedication, signifying the perception of the importance and significance of the work, sounds more like an attitude. Therefore, it seems natural to expect that they may depend on factors that are not necessarily identical, and it is not difficult to imagine a worker who vigorously performs a job that is of little personal significance, or who considers his or her work important, but may not be capable of vigorously performing it for various reasons.

Furthermore, long-term studies of burnout reveal that the components of exhaustion and cynicism, which are the opposites of vigor and dedication, do not necessarily emerge together in the expression of burnout and may dominate in different scopes (Cherniss, 1995; Maslach & Leiter, 2008; Dunford, Shipp, Boss, Angermeier, & Boss, 2012). E. g., the latent profile analysis by Leiter and Maslach (2016) quite clearly distinguished groups of workers who presented with only exhaustion or only cynicism, even though the rates of their other burnout components were close to median. Their study also revealed that the profile with dominant exhaustion was more highly associated with unrealistic workload, and cynicism was more dominant among workers who indicated more frequent value conflicts and interpersonal problems at work. Thus, even though work engagement is understood as a whole consisting of several parts,

analogue expression of its components and the identity of supporting factors should by no means be taken for granted.

Work engagement may be encouraged and supported by various factors, but the weightiest among them are the ones related to what is happening at work. Accordingly, theoretical models emphasize the significance of work circumstances and especially of psychosocial work factors (Maslach & Leiter, 1997, 2008; Bakker & Demerouti, 2014, 2017). However, most of the principles they suggest are not easily convertible to suitable recommendations for practice. Following the JD-R theory, the psychosocial work factors may be classified according to their effect on the workers' health and motivation into job demands and resources (Demerouti et al., 2001). Job demands are all the aspects that require effort, and the resources help meet those demands. It has been established that for work engagement, balance between these groups of factors is important, but the most important demands and resources vary between different groups of workers (Bakker & Demerouti, 2014, 2017), and not necessarily the workers of different sectors will find the same factors significant.

Besides, a job in the healthcare sector is more often mentioned as damaging than motivating (Vinje & Mittelmark, 2007; Sabo, 2011). Throughout the Western world, the lack of nursing staff and the increase in workloads in this sector has been observed (WHO, 2015). Such trends encourage a pragmatic attitude to nursing, which creates value conflicts and a larger emotional charge of the job (Herdman, 2004). Among the challenges that nurses face, relationships with doctors should be mentioned, as they often apply only their own medical model and ignore or underappreciate the contribution from the nursing model (Fasoli, 2010; Hoeve et al., 2014). Equally relevant are relationships with patients which are often conflicting, and many nurses accept violent patients as a natural and unavoidable aspect of their job (Kuodytė ir Pajarskienė, 2015). Finally, nursing provides more opportunities to face potentially traumatic events, like patients' trauma, suffering and death (Sabo, 2006, 2011), and the nurses

themselves mention this factor among the most stressful (Edo-Gual, Tomas-Sabado, Bardallo-Porras, & Monforte – Royo, 2014).

While the significance of the psychosocial work factors for the work engagement of nurses cannot be denied, it is easy to confirm that nursing is not a field that people choose because they expect nice working conditions. Therefore, in studying the factors that motivate nurses, it is hard to avoid the topic of purposeful work, and calling at work, which reflects the idea that the job is done not only because of outside incentives, is one of the central construct in describing purposeful work (Dik & Shimizu, 2018).

It has been established that workers may have different attitudes towards their work related to their personal goals and to convictions regarding the role of work in the context of the whole life (Wrzesniewski et al., 2009). Usually, calling is understood by a reference to the feeling of goal or direction that encourages to take up a job which is personally enriching or socially significant (Dik & Duffy, 2009). Even though the classical concept of calling (vocation) reflected the monastic lifestyle that was favored in the Middle Ages (Arendt, 1958), contemporary definitions have lost the entirely religious meaning and became mostly associated to profession (Hardy, 1990; Dawson, 2005; Elangowan et al., 2010). It has been postulated that calling at work is the attitude characterized by the experience of purposeful work, prosocial orientation and transcendent summons (Dik & Duffy, 2009). Thus, the workers with a calling consider their work to be meaningful and purposeful, contributing to the well-being of others, and chosen not only by personal decision, but also partly determined by the circumstances beyond the control of the individual, like God, family tradition or a good fit between a social need and personal capabilities.

Interestingly, Florence Nightingale (2005), the founder of modern nursing, tended to underestimate the importance of outside motives and emphasized that nursing may only be a calling. And it is not just an historic relic, because contemporary studies also show that purposeful work and experience of nursing as a calling are among the

most important motivations in choosing to work in nursing (Eley, Eley, & Rogers-Clark, 2010; Eley, Eley, Bartello, & Rogers-Clark, 2012). Notably the construct of calling at work has been part of qualitative studies that attempted to find out what motivates the groups of workers who work under unfavorable conditions (Vinje & Mittelmark, 2007; Bunderson & Thompson, 2009). Therefore, considering the conditions in the healthcare sector, calling at work seems to be an important factor that may support the work engagement of nurses even under conditions that are not always favorable.

One of the important work engagement factors to be mentioned is psychological state, i. e., a subjective perception of one's own functioning, including both positive and problematic aspects (Kaliatkaitė, 2015). Readiness to put in some effort at work is related to how the worker feels even for the simple reason that a good psychological state is a necessary precondition for a person's ability to become engaged in their work (Bakker, 2009; Bakker, Demerouti, & Brummelhuis, 2012), and someone who is not feeling very well will hardly be able to work productively. On the other hand, it has been established that work engagement is considered an important indicator of well-being at work and positively affects the workers' psychological state (Ten Brummelhuis & Bakker, 2012; Bakker, Demerouti & Sanz-Vergel, 2014; Salanova et al., 2014). Thus, even though work is not necessarily the most significant part of life to most people, the experience of engagement in it and the psychological state are mutually related.

Notably, just like work engagement, psychological state is inevitably affected by whatever is happening at work. Thus, the psychosocial work factors are significant not only for the worker's motivation to put effort into work, but also to how he or she feels. It has been established that imbalance between demands and resources of a job leads to exhaustion (Bakker & Demerouti, 2017), which inevitably affects the psychological state and is related to a greater risk of health problems (Kristensen, Borritz, Villadsen, & Christensen, 2005). It is therefore important not only to understand how important

psychological state is in supporting the work engagement of nurses, but also to consider the close relationship between these constructs in order to answer the practical question of the extent to which encouraging the nurses' work engagement can be separated from improving their psychological state at work.

The aim of this study is to evaluate the significance of psychosocial work factors, calling at work and psychological state of nurses to their work engagement.

In order to achieve this aim, the following goals are set:

1. Evaluate the significance of demographic factors for the work engagement in nurses.
2. Evaluate the significance of psychosocial work factors in predicting the work engagement in nurses and to identify the main prognostic factors of work environment.
3. Evaluate the significance of calling at work for the work engagement in nurses in the context of their work environment.
4. Evaluate the significance of psychological state for the work engagement in nurses in the context of their work environment.

2. METHODS

2.1 Research procedure

In order to answer the research questions, the chosen method was a 3-stage formal questionnaire with 8 months intervals between the stages. The questionnaire was uploaded on a website created for the purpose, which also provided general information about the study and the use of its data. In the participant consent form the participants were asked for a contact email which was used to contact them in order to invite them to participate in the later stages. In order to boost the participants' motivation to go through with all the stages of the study, the participants took part in a lottery in which they could win small prizes: books on topics of health and work environment, herbal teas, CDs with relaxation recordings, etc.

2.2. Participants of the study

351 participants took part in the first stage, 211 and 154 of them participated, accordingly, in the second and the third stage. 34 respondents only took part in the 1st and the 3rd stage, therefore the number of participants in all stages of the study was 120.

Almost all (98 %) participants of the study were women. The average age of the respondents during the first stage was 40 years, and the average work experience was 19 years, the majority of which had been in the current main place of work. The majority of the first-stage participants worked in a city with the population of 100 thousand or more (62.4 %), were married (60.4 %) and had obtain professional bachelor's degree in nursing (73.6 %). The majority of the respondents worked in adult outpatient and inpatient departments (47 %), administration (15.4 %), departments of anesthesia and intensive care (9.4 %) and in community nursing (9.4 %). Only a smaller half (40.6 %) of the respondents only worked week day shifts (i. e., did not

indicate that they sometimes work nights, weekend or irregular shifts). In terms of demographic shifts between the respondents of the first stage who participated in the later stages and those who refused to participate, only the proportion between the types of departments of those who refused to participate in the 2nd stage was statistically significant, and those who participated in the 3rd stage had spent a little longer at the current workplace.

2.3. Research model and variables

A simplified scheme of the research model is presented in Figure 1. The research model consists of work engagement and its prognostic factors: psychosocial work factors, calling at work, indicators of psychological state and demographic factors. Notably the prognostic connection between the psychological state and work engagement is mutual, i. e., psychological state is understood to be both a pre-condition and an outcome of work engagement.

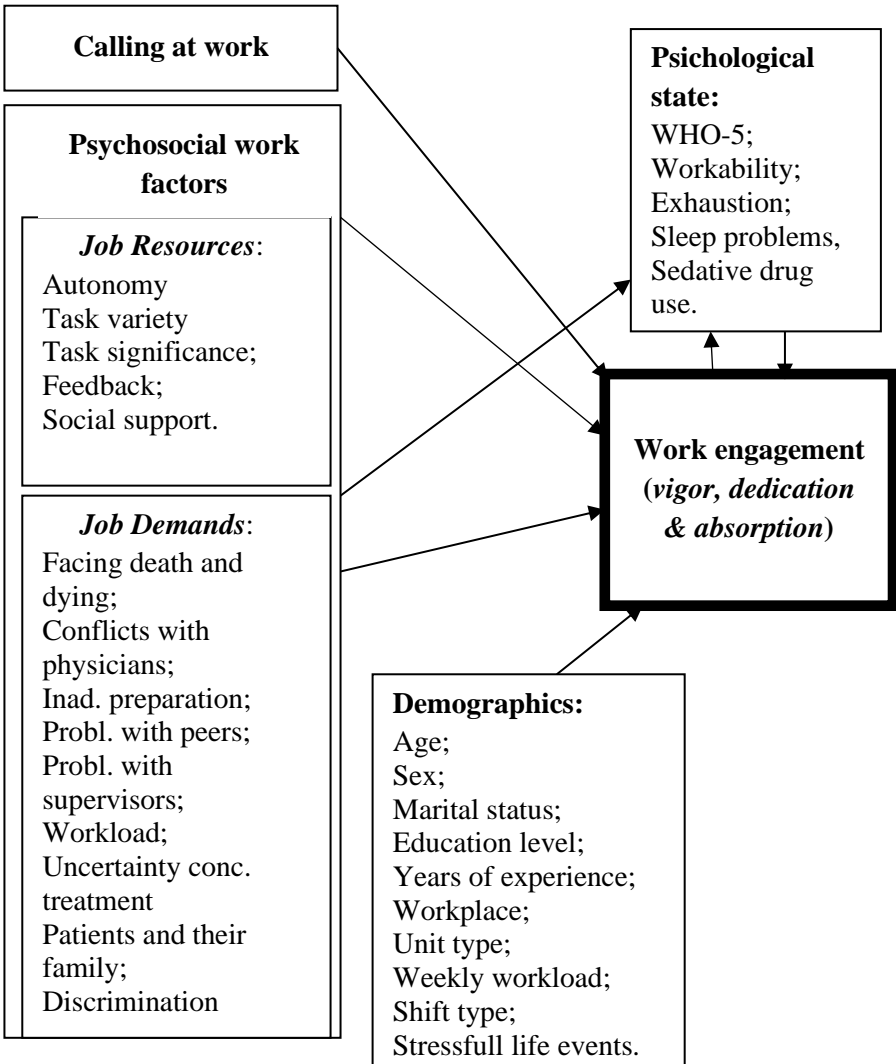


Figure 1. *Research model*

2.4. Research instruments

According to the JD-R theory (Bakker & Demerouti, 2014, 2017), the psychosocial work factors are categorized as either work demands or resources. Work demands were evaluated using **Expanded Nursing Stress Scale** (ENSS; French et al., 2000), which measures 9 demands specific to nursing: death and dying, conflict with physicians, inadequate preparation, problems with peers, problems with supervisors, workload, uncertainty concerning treatment, patients and their families, and discrimination. Each statement is evaluated on 7-point Likert scale. Each subscale had satisfactory internal consistency ($\alpha \geq 0,579$), and the data collected matched the theoretical structure of the scale (RMSEA = 0,054, CFI = 0,918, TLI = 0,901).

The job resources were evaluated using the subscales of autonomy, task variety, task significance, social support and feedback from others from the **Work Design Questionnaire** (WDQ; Morgenson & Humphrey, 2006). The variables were chosen based on the meta-analysis of Christian et al. (2011), which revealed that these variables are the job resources with the best prognostic values regarding work engagement. Each statement is evaluated on a 5-point Likert scale. The results confirmed the prognosis of the 5 factor data structure (RMSEA = 0,074, CFI = 0,932, TLI = 0,920) and a good internal consistency of the subscales ($\alpha \geq 0,803$).

Calling at work was measured using **Calling and Vocation Questionnaire** (CVQ; Dik, Eldridge, Steger, & Duffy, 2012) based on the notion that calling at work is the attitude that one's work is purposeful, socially useful and its choice is at least partly determined by outside influences. The 12 statements of the scale are evaluated on a 4-point Likert scale. The data obtained matched the structure of the 3 interdependent factors (RMSEA = 0,079, CFI = 0,942, TLI = 0,925) and confirmed good internal consistency of all the subscale statements ($\alpha \geq 0,743$).

Work engagement was evaluated using the 17-statement **Utrecht Work Engagement Scale** (UWES; Schaufeli & Bakker,

2003), the most widely used instrument for evaluating the phenomenon. The statements of the scale are evaluated on the 7-point Likert scale and fall into 3 subscales that measure vigor, dedication and absorption. The results obtained using the Lithuanian version of the scale matched the original 3-factor model (RMSEA = 0.080, CFI = 0.955, TLI = 0.939) and confirmed good internal consistency of the statements of the subscales ($\alpha \geq 0,881$).

The psychological state was evaluated using several tools that allow to measure positive and negative aspects of self-perceived functioning. Positive psychological state was measured using the **WHO-Five Well-Being Index** (WHO Regional office for Europe, 1998), presently one of the most widely used tools for measuring positive functioning (Topp, Ostergaard, Sondergaard, Bech, 2015). The tool consists of 5 positive statements, and the respondents are asked to evaluate of a 6-point Likert scale regarding the last two weeks. The results obtained confirmed the single-factor structure of the scale (RMSEA = 0,045, CFI = 0,997, TLI = 0,991) and good internal consistency ($\alpha = 0,843$).

In order to evaluate not only the general positive functioning, but also specifically the positive functioning related to work, a statement from the Finnish Institute of Occupational Health (FIOH) **Work Ability Index** (Tuomi et al., 1998). The tool is intended to evaluate work ability, i. e., the ability to perform work tasks, which depends on both the worker's health and the job demands (Ilmarinen, 2009). The single-statement („Assume that your work ability at its best has had a value of 10. How many points would you give your current work ability? (0 means that currently you cannot work at all)“) work ability evaluation is almost identically prognostically valid as the full instrument of the index (Ahlstrom et al., 2010), which is why it was employed in this study.

Exhaustion is the main mechanism of how the work environment (job demands and the resources that moderate their effect) affects health (Hockey, 1993; Demerouti et al., 2001; Bakker & Demerouti, 2007, 2014, 2017). Therefore, it is also an important

indicator of poor psychological state related to work. To assess exhaustion, this study employed the **Copenhagen Burnout Inventory** (CBI; Kristensen et al., 2005), prepared by the Danish National Institute of Occupational Health. Even though the term used in the title of this tool is burnout, the authors of the CBI define burnout as exhaustion that the respondent may relate to various circumstances (Kristensen et al., 2005). Therefore, the values obtained by this instrument should be interpreted as indicators of exhaustion.

The CBI consists of 19 statements grouped into three sections, each of which measures exhaustion subjectively related to different fields. Therefore, the values of these scales are usually not aggregated into a single sum indicator. The first section, which the authors of the tool (Kristensen et al., 2005) refer to as personal burnout scale, only measures the perceived physical or psychological exhaustion, regardless of the sphere of life that it stems from. The second – work-related burnout – and the third – client-related burnout – scales are intended to measure physical or psychological exhaustion that the respondents consider to stem from work or, more specifically, from work with clients. The data obtained confirmed good internal consistency of all scales ($\alpha \geq 0,825$) and matched the theoretical structure of the scale (RMSEA = 0,058; CFI = 0,954; TLI = 0,944).

As one of the most frequent results of work-related exhaustion is disturbed circadian rhythm (Armon et al., 2008), the participants of the study were asked about **sleep difficulties** they are experiencing, and due to their unambiguously negative their effect on everyday functioning they were interpreted as an indirect indicator of poor psychological state. To assess them, four questions based on ICD-10-AM were constructed concerning the symptoms of inorganic insomnia. The respondents were asked to indicate on a 5-point Likert scale the frequency of the following complaints: (1) poor quality sleep and / or duration; (2) difficulty falling asleep; (3) difficulty staying asleep and (4) waking up too early. The analysis of the results revealed that the data match the single-factor structure (RMSEA = 0,034; CFI = 0,998; TLI = 0,995) and have good internal consistency ($\alpha = 0,830$).

Therefore, all 4 questions regarding the symptoms of inorganic insomnia were treated as a single sleep difficulty scale.

As another indicator of negative psychological state was the **consumption of sedative / sleeping medications** over the last 12 months (over the last 8 months in the later stages). It was evaluated using two questions constructed based on the European Model Questionnaire of the European Monitoring Centre for Drugs and Drug Addiction (Drug, tobacco and alcohol control department, 2017). The participants were asked if they had taken any medications of this type (multiple choice options: “yes, only with doctor’s prescription,” “yes, without doctor’s prescription”, “yes, both” and “no”) and, if the fact of consumption was established, how often they did (multiple choice options: “4 or more times a week”, “2-3 times a week”, “2-4 times a month” and “once a month or less often”). For further analysis of the results, both questions were reduced to a single binary variable that indicated the fact of consuming sedative / sleeping medications (0 – not consumed, 1 – consumed).

The results revealed that all the indicators are tightly interrelated, therefore it appeared superfluous to include all of them in the further data analysis. Therefore, an attempt was made to explain those connections by a 2-factor structure of interconnected factors of good and poor psychological state. After the confirmatory factor analysis, the positive state and work ability variables were assigned to the good psychological state factor, and the three exhaustion indicators, sleep difficulties and consumption of sedative / sleep medications to the poor. The results revealed that such theoretical data structure is compatible enough with the empirical data (RMSEA = 0,056, CFI = 0,989, TLI = 0,976) and allows to identify two factors of good and poor psychological state.

3. RESULTS

3.1 Factors supporting work engagement in nurses

This study evaluated 10 demographic traits, 14 psychosocial work factors, calling at work and good or poor psychological state as potential preconditions of work engagement. The amount of the variables and their tight interconnections (in the case of the psychosocial work factors) present challenges in including them all in the regression equation. Therefore it made sense to first reduce the number of these factors by identifying only the variables that have the highest prognostic value for the later work engagement in nurses.

In order to identify the demographic factors that are the most significant to the later work engagement, the relations of the 3rd stage of work engagement and its components were evaluated (Pearson correlation) with the variables like age and work experience, and the differences of the 3rd stage work engagement and its components were compared (using ANOVA) between the various demographic groups of the 1st stage. The results (which are not presented in this summary) revealed that work engagement and each of its components were only significantly related to age, general work experience and work experience in the present workplace, and differed between the respondents based on education (university or non-university) and whether they worked in shifts or not. Therefore out of all the demographic variables that were measured, these were the only ones that made sense to be included in the regression equation. Furthermore, as age and the general work experience were especially strongly related ($r = 0,962$), only the general work experience was selected for further analysis.

Unlike with the demographic factors, the identification of the greatest prognostic value of the psychosocial work factors is problematic due to tight interconnections among these variables. All the job resources measured were interconnected in statistically significant ways, and Pearson correlation coefficients varied from

weak ($r = 0,252$) to medium ($r = 0,560$). The same with job demands: their internal correlation coefficients varied from 0,122 to 0,674. It means that almost all psychosocial work factors are interconnected, and such microlinearity is a serious problem in interpreting the results of regression analysis. Therefore in order to identify a limited amount of factors that may explain the greatest part of the distribution of the later work engagement, a multi-stage hierarchical regression analysis was employed, in which work engagement and its different components were included as dependent variables, and psychosocial work factors as independent ones.

The results (not presented in this summary) reveal that in all cases, only 5 factors are identifiable as significant: autonomy, task variety, insufficient emotional preparedness, problems with colleagues and unpleasant interactions with patients and family members. Therefore they can be selected as the potentially most prognostically significant factors of work engagement. As could be expected based on tight interconnections between these factors, the reduction of the number of prognostic factors reduces the determination coefficient quite insignificantly ($\Delta R^2_{adj} \geq -0,033$). Since the goal was to optimize (i. e., reduce) the number of prognostic variables of work environment, it is grounds for optimism.

Once the number of prognostic factors was reduced to optimal, the attempt was made to evaluate their significance in supporting work engagement in nurses. A hierarchical regression analysis was employed, in which each block of prognostic factors was included in turn. In the first stage, only the most significant demographic factors were included, after that, the most significant psychosocial work factors, then calling at work, and finally, good and poor psychological state. Work engagement and its components were included as dependent variables.

As seen in the results presented in 3.1 Table, the various blocks of the factors evaluated in the study were not equally prognostically significant in the later work engagement in nurses. The demographic factors are of especially low significance. These factors account for

only 6.6 % of the later distribution of work engagement. The prognostic capabilities of the regression equation including calling at work improve slightly ($\Delta R^2_{adj} = 0,033$), but the effect is lesser than in the case of the most significant psychosocial work factors that account for more than 25 % of the distribution of the later work engagement. The weight of the psychological state was also notably great. Including the values for good and poor psychological state in the regression equation accounted for 12.9 % of the distribution of work engagement, but notably, only the regression weight (β) of good psychological state was significant.

The analysis of the various preconditions of the work engagement components is also interesting (Tables 3.2-3.4). It revealed that the significance of both calling at work and psychological state is not consistent in the prognosis of the various work engagement components. Calling at work was quite insignificant for vigor ($\Delta R^2_{adj} = 0,006$) and absorption ($\Delta R^2_{adj} = 0,02$), but was more related to dedication ($\Delta R^2_{adj} = 0,080$). Also the results of psychological state were the weightiest for vigor ($\Delta R^2_{adj} = 0,152$), less so for dedication ($\Delta R^2_{adj} = 0,105$), and least of all for absorption ($\Delta R^2_{adj} = 0,095$). Such results indicate that not all the work engagement components are supported by the same factors.

3.1 table. *Hierarchical regression models of factors predicting work engagement*

Prognostic factors	Model			
	Most important demographic factors	Most important demographic and psychosocial work factors	Most important demographics, psychosocial work factors, and calling at work	Most important demographics, psychosocial work factors, calling at work, and psychological state
	B			
Years of exp. in current unit	0,109	0,055	0,062	0,044
Total years of exp.	0,099	0,149	0,120	0,136
Education	0,212*	0,117	0,144	0,079
Shift work	-0,117	-0,071	-0,093	-0,045
Autonomy		0,141	0,069	0,008
Task variety		0,220**	0,189*	0,305***
Inad. preparation		-0,244**	-0,229**	-0,217**

3.1 table (cont.). *Hierarchical regression models of factors predicting work engagement*

Probl. with peers		-0,136	-0,136	-0,028
Patients and family		-0,146	-0,127	-0,106
Calling at work			0,214**	0,182**
Good psych. state				0,244**
Poor psyc. state				-0,105
R ²	0,093	0,366	0,402	0,530
R ² adj	0,066	0,322	0,355	0,484
ΔR ² adj		0,256	0,033	0,129
F	3,421*	8,267***	8,588***	11,459***

Note. * $p \leq 0,05$, ** $p \leq 0,01$, *** $p \leq 0,001$; change of adjusted determination coefficient (ΔR^2_{adj}) is calculated in comparison with previous model.

3.2 table. *Hierarchical regression models of factors predicting vigor*

Prognos- tic factors	Model			
	Most important demogra- phic factors	Most important demographic and psychosocial work factors	Most important demographics, psychosocial work factors, and calling at work	Most important demographics, psychosocial work factors, calling at work, and psychological state
	B			
Years of exp. in current unit	0,134	0,079	0,084	0,051
Total years of exp.	0,130	0,189	0,173	0,200
Education	0,216**	0,147*	0,161*	0,085
Shift work	-0,130	-0,085	-0,097	-0,050
Autonomy		0,150	0,112	0,027
Task variety		0,136	0,119	0,242***

3.2 table (cont.). *Hierarchical regression models of factors predicting vigor*

Inad. pre- paration		-0,233**	-0,225**	-0,192**
Probl. with peers		-0,254***	-0,254***	-0,123
Patients and family		-0,115	-0,105	-0,070
Calling at work			0,114	0,075
Good psych. state				0,273***
Poor psych. state				-0,168
R ²	0,119	0,409	0,419	0,568
R ² adj	0,093	0,368	0,374	0,526
ΔR ² adj		0,275	0,006	0,152
F	4,545**	9,932***	9,248***	13,391***

Note. * $p \leq 0,05$, ** $p \leq 0,01$, *** $p \leq 0,001$; change of adjusted determination coefficient (ΔR^2_{adj}) is calculated in comparison with previous model.

3.3 table. *Hierarchical regression models of factors predicting dedication*

Prognostic factors	Model			
	Most important demographic factors	Most important demographic and psychosocial work factors	Most important demographics, psychosocial work factors, and calling at work	Most important demographics, psychosocial work factors, calling at work, and psychological state
	B			
Years of exp. in current unit	0,044	0,003	0,014	0,001
Total years of exp.	0,111	0,139	0,095	0,110
Education	0,205*	0,108	0,148	0,086
Shift work	-0,034	0,004	-0,029	0,022
Autonomy		0,174	0,065	0,007
Task variety		0,213*	0,166*	0,274***

3.3 table (cont.). *Hierarchical regression models of factors predicting dedication*

Inad. pre- paration		-0,194*	-0,171*	-0,169*
Probl. with peers		-0,051	-0,050	0,054
Patients and family		-0,097	-0,069	-0,045
Calling at work			0,322***	0,289***
Good psych. state				0,179
Poor psych. state				-0,148
R ²	0,058	0,254	0,335	0,443
R ² adj	0,030	0,202	0,283	0,388
ΔR ² adj		0,172	0,081	0,105
F	2,065	4,874***	6,449***	8,083***

Note. * $p \leq 0,05$, ** $p \leq 0,01$, *** $p \leq 0,001$; change of adjusted determination coefficient (ΔR^2_{adj}) is calculated in comparison with previous model.

3.4 table. *Hierarchical regression models of factors predicting absorption*

Prognostic factors	Model			
	Most important demographic factors	Most important demographic and psychosocial work factors	Most important demographics, psychosocial work factors, and calling at work	Most important demographics, psychosocial work factors, calling at work, and psychological state
	B			
Years of exp. in current unit	0,128	0,072	0,079	0,077
Total years of exp.	0,036	0,088	0,064	0,066
Education	0,170*	0,070	0,092	0,049
Shift work	-0,157	-0,111	-0,130	-0,094
Autonomy		0,068	0,009	-0,017
Task variety		0,264***	0,238**	0,335***

3.4 table (cont.). *Hierarchical regression models of factors predicting absorption*

Inad. preparation		-0,255***	-0,243**	-0,246***
Probl. with peers		-0,077	-0,076	-0,010
Patients and family		-0,196*	-0,181*	-0,180*
Calling at work			0,175*	0,157*
Good psych. state				0,233*
Poor psych. state				0,027
R ²	0,078	0,338	0,362	0,460
R ² adj	0,050	0,292	0,312	0,407
ΔR ² adj		0,242	0,020	0,095
F	2,820*	7,318***	7,262***	8,666***

Note. * $p \leq 0,05$, ** $p \leq 0,01$, *** $p \leq 0,001$; change of adjusted determination coefficient (ΔR^2_{adj}) is calculated in comparison with previous model.

In order to further examine the specific significance of calling at work and psychological state for the particular components of work engagement, a mediation regression analysis was carried out. It measured whether the inconsistent significance of these factors for the different components may be a function of the fact that some components are related more directly, while others through the mediation of the former ones. The results are presented in Table 3.5.

The mediation regression analysis confirmed the premise that calling at work and psychological state are inconsistently directly related to the various components of work engagement. As seen in the results (Table 3.5), the effect of calling at work is the greatest to

dedication, and including vigor and absorption as mediator variables accounts for only the smaller part of the effect. Also, as dedication is included as mediating variable, the mediation accounts for a greater part of the effect of calling at work on vigor and absorption, however, only in the case of absorption as dependent variable does the indirect effect surpass the direct one in statistically significant way (i. e., the value of the direct effect was lesser than 95 % of the lower value of the confidence interval).

The situation of the psychological state is slightly different. The results indicate that both good and poor psychological state is the most related to the component of vigor, whereas the effect of psychological state on the other work engagement components is mostly explained through the mediation of vigor. However, in measuring the mediation of vigor to the relation between poor psychological state and dedication, the indirect effect surpassed the direct one in statistically insignificant way. Thus, perceiving one's work as a calling is more directly related to dedication, whereas the psychological state is related to vigor.

3.5 table. *Mediations of work engagement components*

X	M	Y	Total effect		Direct effect		Indirect effect (a*b)	
			C	PI	c`	PI	a*b	PI
Calling at work	Vigor	Dedication	0,510	0,347-	0,329	0,183-	0,180	0,070-
				0,672		0,476		0,322
	Vigor	Dedication	0,353	0,179-	0,142	-0,008-	0,211	0,085-
				0,526		0,292		0,362
	Dedication	Vigor	0,356	0,182-	0,139	-0,044-	0,217	0,094-
				0,530		0,322		0,370
Dedication	Absorption	0,353	0,179-	0,078	-0,094-	0,274	0,136-	
			0,526		0,251		0,440	
Absorption	Vigor	0,356	0,182-	0,181	0,016-	0,175	0,075-	
			0,530		0,530		0,312	
Good psych. state	Vigor	Dedication	0,427	0,255-	0,116	0,255-	0,310	0,159-
				0,589		0,589		0,474
	Vigor	Absorption	0,451	0,282-	0,132	-0,035-	0,319	0,172-
				0,620		0,300		0,479
	Dedication	Vigor	0,600	0,445-	0,494	0,346-	0,107	0,035-
				0,755		0,641		0,209

3.5 table (cont.). *Mediations of work engagement components*

X	M	Y	Total effect		Direct effect		Indirect effect (a*b)	
			C	PI	c`	PI	a*b	PI
Good psych. state	Dedication	Absorption	0,451	0,282- 0,620	0,305	0,154- 0,456	0,146	0,052- 0,270
	Absorption	Vigor	0,600	0,445- 0,755	0,485	0,343- 0,627	0,115	0,035- 0,216
	Absorption	Dedication	0,427	0,255- 0,589	0,268	0,123- 0,413	0,159	0,052- 0,287
Poor psych. state	Vigor	Dedication	-0,452	-0,626- -0,277	-0,180	-0,351- -0,009	-0,271	-0,429- -0,133
	Vigor	Absorption	-0,397	-0,575- -0,220	-0,091	-0,258- 0,075	-0,306	-0,474- -0,165
	Dedication	Vigor	-0,569	-0,723- -0,406	-0,453	-0,610- -0,296	-0,116	-0,223- -0,041
	Dedication	Absorption	-0,397	-0,575- -0,220	-0,234	-0,394- -0,075	-0,163	-0,289- -0,065
	Absorption	Vigor	-0,569	-0,723- -0,406	-0,464	-0,207- -0,028	-0,106	-0,207- -0,028
	Absorption	Dedication	-0,452	-0,626- -0,277	-0,315	-0,254- -0,040	-0,137	-0,254- -0,040

3.3 The most significant psychosocial factors for the psychological state of nurses

It is quite problematic to analyze the psychological state only as a prognostic factor for work engagement besides psychosocial work factors and calling, because the worker's state is also closely related to the circumstances of his or her work. In order to evaluate which psychosocial work factors are the most significant to the good or poor psychological state of nurses, multi-stage hierarchical regression analysis was applied. In the first stage, only job resources were included as prognostic factors, in the second, only job demands, and in the third, both the resources and the demands. Finally, in the fourth stage, the only factors included were the ones with statistically significant beta-coefficients from the earlier stages in order to evaluate the extent to which these identified factors can account for the distribution of the psychological state indicators.

The results obtained in the attempted prognosis of the later good psychological state based on the psychosocial work factors (not presented in this summary) revealed that the positive aspects of nurses' health have little relation to the psychosocial work environment. The regression determination coefficient ($R^2 = 0,180$) came close to the proposed limit of 0.2 (Čekanavičius ir Murauskas, 2002), but the significantly lower adjusted determination coefficient ($R^2_{adj} = 0,097$) signals that it is probably an outcome of the large number of prognostic variables. Simply put, the psychosocial work environment of nurses can hardly help bring the members of this group of workers closer to optimal functioning, therefore identifying the most significant aspects of the environment is not useful.

The trends were slightly different in evaluating the significance of the psychosocial factors for poor psychological state (not presented in the summary). These results reveal that the psychosocial work environment could prognosticate more than 1/5 of the distribution of the aspects of poor psychological state of the nurses

($R^2_{adj} = 0,211$), which were evaluated 16 months later. They also allowed to identify four most significant psychosocial work factors – autonomy, feedback, conflicts with medics and problems with colleagues – that are the most significantly related to poor psychological state. Also, interestingly, these factors partly correspond to the aspects of work that appeared the most significant for supporting work engagement in nurses. This issue will be further explored in creating the model for the work engagement in nurses and psychological state pre-conditions in the Discussion of Results section.

3.4 Model for pre-conditions of work engagement in nurses and their psychological state

Based on the analysis of literature and the empirical relations obtained, an initial theoretical model explaining the most significant pre-conditions for work engagement in nurses and their psychological state was comprised (Figure 2). The left side of the model contains calling at work and psychosocial work factors that were identified as the most significant in supporting work engagement in nurses (i. e., autonomy, task variety, significance of tasks, problems with colleagues and unpleasant interactions with patients and their family members) and protecting from poor psychological state (autonomy, feedback, conflicts with medics and problems with colleagues).

Notably part of the psychosocial factors were significant both for work engagement and psychological state, therefore in the initial model, they were associated with both constructs. Also, analysis of literature gave grounds to consider the mutual relations between psychological state and work engagement, which was reflected in the initial model.

The model was tested by path analysis. Because all the preconditions of work engagement in nurses and their psychological state were measured in the 1st stage of the study, correlations between

them were allowed (to save space, the correlations and their values are not shown in the model). The model contained 14 variables (77 covariations in the matrix), and only 65 parameters were measured (i. e., the weights of correlations and regressions among the variables). Therefore the model contained 12 degrees of freedom, which allowed to evaluate its quality (Čekanavičius ir Murauskas, 2009). The chosen criteria (RMSEA < 0,001; TLI > 1; CFI > 1) revealed that the model is well compatible with the empirical data.

The analysis revealed that not all the relations previously identify through hierarchical regression analysis are statistically significant. Out of 5 psychosocial work factors that were identified as the most significant for work engagement through the previous data analysis, only task variety (directly) and insufficient emotional preparedness (inversely) accounted for greater engagement in nurses. Whereas the significance of autonomy and problems with colleagues in supporting or discouraging work engagement was only observed through the mediation of poor psychological state, i. e., autonomy is associated with less frequent poor psychological state, and problems with colleagues are associated with a higher risk of such self-evaluation of own functioning, and thus impact the work engagement in nurses.

Path analysis revealed interesting relations among the different aspects of psychological state and work engagement. Even though upon creating the model for path analysis, mutual relations to both positive and negative aspects of psychological state were prognosticated, the data only allow to establish one-directional relations. Even though the sample of the study was small, and therefore not obtaining a statistically significant relation between the variables does not necessarily mean that the relation does not exist in reality, the data indicates that aspects of poor psychological state (or rather, absence of them) are more significant for work engagement than vice versa. It essentially confirms the premise from reviewing literature that in the context of nursing, encouraging work engagement

must go hand in hand with care for their psychological state and especially its problematic aspects. A probable interpretation of such results could be that optimal (or at least surpassing minimal requirement) functioning of nurses at work may be connected to optimal functioning in other fields of life, even though the opposite relation may not be established.

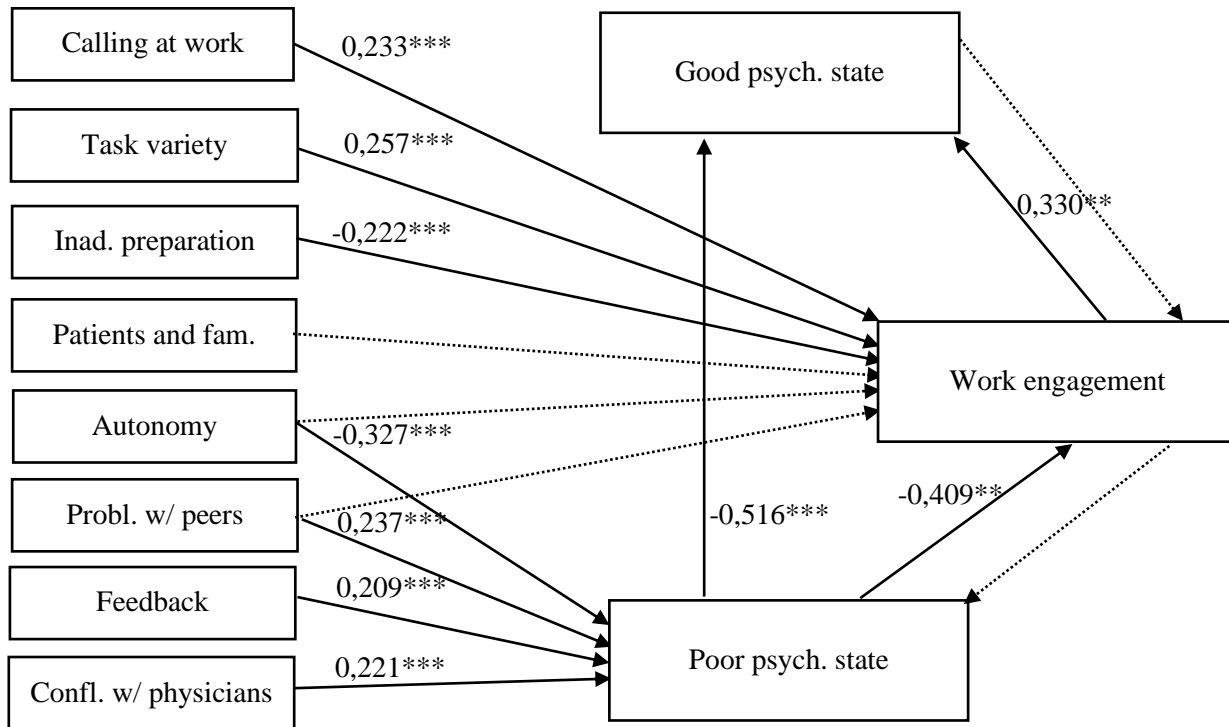


Figure 2. Model of antecedents of nurses' work engagement and psychological state

4. DISCUSSION

Engaged workers are an important resource for any organization, and healthcare sector should be no exception. It becomes even more relevant in the face of the challenges stemming from demographic changes, and as the nurses are the largest group of medical personnel, they may significantly contribute to an effective solution of such problems (Keyko, 2014). Furthermore, nursing work is essentially impossible without sincere concern for the patient (Austin et al., 2009), and that may not be achieved by outside control means alone. Therefore it is important to understand what helps nurses stay engaged in their work.

As expected, the results of the study revealed that the majority of the demographic traits evaluated has no significance for work engagement. Work engagement varied little and statistically insignificantly depending on different marital status, the size of the city or town of the workplace, the different working department profiles and the varying working hours of the respondents. Of all the demographic traits examined, only age, work experience (both general and in the present workplace), the presence or absence of work shifts and education were connected with a greater determination of the nurses to do their job better than minimally. However, these relations were rather weak, therefore work engagement should not be associated only with a certain demographic profile of nurses.

In providing practice and decision making guidelines for greater work engagement in nurses, the most attention should doubtlessly be paid to the work environment and its psychosocial aspects. The results of the study that revealed the significance of these factors for work engagement fit the JD-I theory (Bakker & Demerouti, 2017) which emphasizes the importance of work environment in creating and supporting the motivation of workers.

Among all the psychosocial work factors, the data analysis identified 5 that are the most significant. The results indicate that

nurses remain more engaged in their work – perform their work tasks with more vigor, perceive their job as important and are absorbed in their work more frequently – if they are provided with enough autonomy and task variety, and if they face emotional demands of work that do not correspond to their emotional preparedness, conflicts at work and unpleasant interactions with patients and their families less often. Even though the tight relations among the psychosocial factors allow to consider that adjustment of each aspect of work environment may be beneficial for work engagement, it is worth beginning with these 5 identified factors in creating interventions in a sample of nurses.

The identified most significant psychosocial work factors allow to consider the mechanisms that might explain their motivational potential. The number of psychosocial factors is potentially indefinite, and the decision about which aspects of the nurses' work should be evaluated in this study was made from the ground up, by including the specific job demands of nurses and the job resources most often identified with work engagement, as indicated by previous research. Therefore it is interesting that the most significant factors supporting work engagement identified here are precisely close to what was postulated by the Self-determination theory (Ryan & Deci, 2017), which explains the motivational potential of the work environment by its ability to satisfy the basic needs of autonomy, competence and connectedness . In our case, the aspect of autonomy at work is directly related to satisfying the need of autonomy. It is also easy to understand how the need of competence may be met by task variety, and how it may be frustrated by work demands that surpass preparedness. In the same way, the conflicting relationships with colleagues or patients may hinder the need of connectedness.

The results of this study have revealed that even regardless of the significance of the work environment factors, calling at work may be considered a personal resource related to a greater work engagement in nurses. Notably, the average participant of this study

had more than 20 years of work experience, which indicates that the significance of calling at work should not be only associated with the idealism of beginner specialists who soon lose steam. On the other hand, the results do not allow for overestimation of this personal resource. As the JD-R theory suggests (Bakker & Demerouti, 2014), the demands and resources of the work environment remain noticeably more significant in supporting work engagement. Practically speaking, it means that even though perceiving one's profession as a calling may be associated with greater work engagement in nurses, it is not in itself sufficient to make the nurse work with vigor and absorption in their activities. A work environment that is beneficial and satisfies the basic needs as well as psychological state that empowers effort at work are more significant for that.

Positive and negative aspects of psychological state were evaluated separately in this study. It revealed interesting patterns. It has been established that work environment may have both positive and unwanted effects on the mental state of workers (WHO, 2006; O'Driscoll & Brough, 2010). However, the results of the study only fit this conclusion in the case of poor psychological state. In our sample, the psychosocial work factors were only minimally related to the aspects of the functioning of nurses that surpassed absence of difficulty. Also notably, the JD-R theory (Bakker & Demerouti, 2017) widely quoted in this paper only connects the demands and resources of work with health (and thus, psychological state) through a process detrimental to health and initiated in by the work environment, regardless of its potential to encourage good health. In other word, within this theory, work environment may only cause difficulties or not cause them, but has no influence on the functioning beyond absence of difficulty. The results of this study fit this, as they confirm that work has little to offer to help nurses feel good if that is understood in the positive sense.

The same cannot be said about the negative aspects of psychological state. The results revealed that in the sample of nurses,

the ones who feel worse are those who experience problems with colleagues and conflicts with doctors more often in their work, and the presence of autonomy and feedback have a protective effect. Just like with the most significant factors of work engagement, there is also a parallel with the basic psychological needs proposed in the self-determination theory (Ryan & Deci, 2017). It may be reasoned that a greater autonomy and feedback are beneficial for psychological state because they help meet the needs of autonomy and competence, whereas conflicting relationships with colleagues and doctors may frustrate the need for connectedness, thus increasing the risk of poor psychological state.

Also notably, the theoretical mechanism in which the basic psychological needs in work environment are either met or frustrated is not the only thing that connects work engagement with the mental state of the worker. The general conditions of these phenomena are noticeable already at the level of the most significant psychosocial work factors, when factors like autonomy and problems with colleagues stood out as the most significant to both the psychological state of nurses and their work engagement. It once again confirms the premise of the beginning of this work, that encouraging work engagement and efforts to improve the psychological state of nurses are tightly connected.

The premise also matches the model of the pre-conditions of the psychological state of nurses and their work engagement, which reveals several things. First, including the variable of poor psychological state in the model, the relation between work engagement and the psychosocial work factors like autonomy and problems with colleagues is insignificant. The most likely explanation is that these factors are significant for work engagement precisely because they protect in the case of autonomy and increase the risk of poor psychological state in the case of problems with colleagues. It means that in adjusting the work environment and encouraging greater work engagement in nurses, some of the most effective strategies

might be related to eliminating the factors that harm the psychological state and strengthening the ones that are protective of it.

The model revealed interesting connections between the various aspects of psychological state and work engagement. The data analysis only allows to confirm one-directional relations between these variables. Even though in literature there are some explanations that workers who feel better are better able to engage in work (Bakker, 2009), the results of this study revealed that it only applies to the psychological state in the negative sense. In other words, it appears that the mental state of the nurse is only a significant factor of work engagement to the extent that the various difficulties do not interfere with their efforts in their work tasks. The opposite trend is observed in terms of psychological state in the positive sense. It has been established that engaged workers feel better, because work engagement encourages proactive adjustment of work environment and is associated with greater engagement in the restorative after-work activities (Sonnentag et al., 2012; Tims et al., 2013). The results of the study revealed that it is only true if the psychological state is understood as something more than absence of difficulty, and the significance of work engagement as protection from poor psychological state was not confirmed. Thus, even though there is a mutual connection between how the worker feels and how much engaged in the work he or she is, these connections are very dependent on the aspects of psychological state that are studied.

In the field of study of the factors of work engagement in nurses cross-section studies prevail (Keyko et al., 2016), therefore this study's strategy is one of the rare attempts to view the engagement of nurses in a more long-term perspective. The complex view that covers various factors of work engagement allows to understand what has the best prognostic value on whether the nurse will perform their job better than minimally, and which factors are secondary at best. However, it must be noted that the study contains some limitations that must be considered in the final analysis of the results. The correlational

strategy of the study does not allow to discuss causal links between variables, even though there is certainly the temptation to do so, and it is also supported by the analysis of literature. Therefore in the future, it might be useful to observe the work engagement dynamics of beginner nurses and its likely connections to the changes that naturally occur in work environment or personal life. As another limitation, only self-reporting tools of the study must be mentioned. In the future it would be useful to combine subjective and objective indicators in evaluating such variables as work environment or observable expressions of work engagement. In order to include the widest possible variety of nurses in this study, a convenience sample was used, and all the nurses in Lithuania were asked to fulfill the questionnaire. However, without the data about the various reasons that might have determined the refusal to fulfill the questionnaire, it is difficult to evaluate how representative the sample is.

It is also notable that the internal consistency indicators of some of the subscales of the Expanded Nursing Stress Scale (French et al., 2000) were below optimal. Among the problematic ones, the subscale of conflicts with medics stands out, as its Cronbach alpha indicator in every stage of the study varied between 0,504 and 0,579, and uncertainty concerning treatment subscale, in which 3rd stage Cronbach alpha (0,512) fell below the 0.6 value that is considered satisfactory (Pakalniškienė, 2012). Such lack of reliability of the evaluation tools could have meant that these factors were underestimated.

Among the methodological limitations, the close interconnections of the prognostic variables must also be mentioned. It is a challenge, as the general variation among the variables makes it difficult to determine which factors are the most significant. In the future, the already mentioned research strategy of studying the dynamics of work engagement over a longer period of time from the beginning of nursing career could help fix that.

Even though the results allow to postulate the inconsistency of the significance of the factors supporting work engagement for the different components of the phenomenon. Even though the same idea is developed in the field of burnout studies (pvz. Dunford et al., 2012; Leiter & Maslach, 2016), it has never been studied in work engagement studies. A further analysis of the factors of different components could help better understand the expression of work engagement, its possible inconsistencies, when only some components of the phenomenon prevail, and also the possible diversification of interventions based on the types of work engagement.

CONCLUSIONS

1. Work engagement and psychological state of nurses are significantly supported by the work environment that meets the basic psychological needs of autonomy, competence and connectedness.

1.1. Work engagement in nurses is mostly associated with greater autonomy and task variety, sufficient emotional preparation for performing work tasks, less frequent interpersonal problems with colleagues, patients and their family members.

1.2. Poor psychological state of nurses is mostly associated with lesser autonomy and received feedback, more frequent conflicts with medics and problems with colleagues.

2. The positive aspects of psychological state of nurses are hardly related to their work environment. The work environment of nurses is only significant to psychological state to the extent that the psychological state is understood as absence of subjectively perceived difficulties to function.

3. Good psychological state is an important condition for the nurses to remain engaged in their work, but only if it is understood as absence of functioning difficulties. The positive aspects of psychological state are more credibly considered to be a result rather than a pre-condition of work engagement.

4. The factors of work engagement and psychological state of nurses as well as the probable mechanisms that explain their significance are to a great extent overlapping. Therefore in this sample, encouraging work engagement may not be meaningfully separated from care to reduce the harm of work environment on psychological state.

5. The attitude that their work is purposeful, socially valuable and chosen not only because of personal choice (i. e., calling at work) may be considered to be a personal resource of nurses associated with greater dedication at work. However, its significance for other

components of work engagement (i. e., vigor and absorption) is lesser and more indirect.

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