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## Development of a Reciprocal Health Care Model for Determination of Safety Level in the Nursing Homes in Estonia

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### Abstract

*The aim of the current paper was to assess the care workers' psychosocial and physical health; patient's safety and examine the variations of care workers' working conditions in the national nursing homes. The NOSACQ-50 questionnaire was used as a research method. The majority of the care workers in nursing homes complain about physical pain, especially low back pain, and work-related stress. The study results show, that several specific features, such as management safety priority, commitment and ability, are found to influence the six dimensions of safety climate. Based on these results, the importance of good communication practices, management commitment and effective safety training to ensure a strong safety climate and safe behaviour among health care workers is highlighted. Mutual support from the employers to the care workers is needed to create safety as an organizational value. Thus, an effective assessment tool for the evaluation of safety level in nursing homes could be proposed based on the results of this study. The current paper presents a Reciprocal Health Care Model for determination the levers of safety improvement in nursing homes. The model refers to the importance of management safety priority and abilities as well as peer safety communication and trust in the safety ability.*

**Keywords:** health care, safety climate, psychosocial health, physical health, workplace safety

### 1. Introduction

#### Theoretical Basis

The health care sector hires a large number of employees with high health risks. Healthcare workers are also at risk of suffering many different types of harm on the job. Even the fatal accidents of employees are possible, but the number of nonfatal occupational injuries, illness and absences are more common, particularly in the nursing homes of ageing people (Tullar *et al.*, 2010). Most of the health care risk managers look forward to the opportunities ahead and are dedicated to managing their organization's risk and enhance patient's safety. Additionally, workers' occupational health and safety (OH&S), which has impact on patient's safety, need to be emphasized. Previous research has also demonstrated that the level of workers' physical and mental health can influence patient's well-being (Flin, 2007). The healthcare systems across the globe continue to experience persistent and unsettled changes, reforms and improvements. The opportunities for healthcare specialists, particularly nurses, to provide effective and visionary leadership to address the challenges and consequences of the system reform have never been greater (Duncan *et al.*, 2014). Economic controls that cause demands for the new models of care in hospitals in order to reduce costs (Aiken & Patrician, 2017) are significant in many countries and contribute to a climate of increased management (Duncan *et al.*, 2014). Persistent concerns about nurses and leaders shortages (Titzer *et al.*, 2014) along with complaints of overloaded and dissatisfied nursing workforces point to the importance of healthy and productive work environments in sustaining the health and well-being of nurses (McHugh *et al.*, 2011). Effective leadership practices to address these tasks should be informed by the current observed conclusions of the

extraordinary effects of nursing management styles on nurse outcomes. Safety management challenges within the different organisations were studied with a special focus on the safety culture, safety knowledge, interrelationships between safety management systems and organizational factors (Järvis, 2013).

It is common understanding, that health care workers in the nursing homes face a wide range of OH&S hazards causing infectious diseases, musculoskeletal disorders, chemical-induced disorders and stress-related illnesses (Andre *et al.*, 2016). Many of them experience fatigue, because of the long shifts and heavy physical work, mental stress, lack of balance between work and family and physical pain – factors that may pose a serious problem, not only for workers' well-being, but can also decrease their ability to provide good quality of patient's care (Yassi & Hancock, 2005, Sundin *et al.*, 2011; Sepp *et al.*, 2015; Andre *et al.*, 2016). Previous research has illustrated, that the work of nurses and care workers in the Estonian hospitals and nursing homes is physically and mentally stressful (Sepp *et al.* 2015). It is clear that supportive environment in the organisation is essential in order to maintain employees' health and motivation, learning and innovation (Kivimäki *et al.*, 2010). Yassi and Hancock (2005) describe a number of studies showing that interventions designed to reduce health care workers' injuries and illness also have positive effects on patient's safety. Katz-Navon with colleagues (2005) state that health care sector has several unique characteristics comparing with other sectors. First, the working environment in health care sector is complex in terms of job and task characteristics and involving high risks. Second, working environment affects not only workers' safety and well-being, but also patient's safety, what is the highest priority in health care sector. In addition, workers' safety behaviour is generally controlled not only by the health care organization, but also by the health care professionals' (nurses, supervisors and physicians) authorities.

Knowing the safety climate ingredients in the organization, there is a possibility to improve the safety system and safety level (Manoukian, 2017), particularly in nursing homes. The research literature discusses several approaches to developing a positive safety culture and climate as well as possibilities to enhance it (Järvis, 2013). At the same time, relatively little is known how healthcare organizations influence and deal with the formation of safety climate with respect to workers' psychosocial and physical health as well as patient's safety. Despite multiple attempts to explain safety climate through competing models, there is limited empirical research to substantiate which dimensions of the safety climate and organisational safety practices have the most demonstrative impact on safety performance within the nursing homes.

In the light of the above arguments the aim of the present study was to assess the influence of different dimensions of safety climate on workers' psychosocial and physical health, patient's safety and examine variations among national nursing homes. In addition, the article intends to propose and to discuss a model for a positive safety climate and empirically to test this.

## 2. Materials and methods

The current study investigates the safety climate's level in different nursing homes in Estonia. The Nordic Safety Climate Questionnaire (NOSACQ-50) (Kines *et al.*, 2011) was used for measuring safety climate. A simple random sample was selected from care workers employed at the 19 nursing homes in all four parts of Estonia. Four of the selected nursing home refused to participate in the study and thus, 15 nursing homes were included in the sample. The sample involves nursing homes, rehabilitation and follow-up health care organisations, and workers, who are providing home health care services.

The data were collected during the period of September–December 2016. The questionnaire was sent to 371 care workers and, 233 of them (representing 62.8 % response rate) fulfilled the questionnaire and participated in the study. The highest response rate was in the East (36.9%) and North (31.3%) parts of Estonia. The majority of the nursing homes involved in the study, were financed by the public health care system (46.7%). Table 1 contains additional background information of the participants in the study.

According to NOSACQ-50 questionnaire, the dimensions (Dim) of safety climate are described as follows:

Dim1 - "Management safety priority and ability" (The organizational priorities are largely communicated through the managers. Manager's behaviour would be a main source of the information. If the managers are perceived to be committed to safety and to prioritize safety in relation to other goals, safe behaviour would be expected to be rewarded, and thereby reinforced);

Dim2 – "Management safety empowerment" (One-way for managers to convey trust is empowering the employees. Empowerment is a delegation of power, and as such it demonstrates that trust workers' ability and judgement, and that managers value workers' contributions);

Dim3 – “Management safety justice” (Employee safety responsibility and safety behaviour would be positively influenced by management procedural and interactional safety justice, i.e. just treatment and procedures when handling accidents and near-accidents.);

Dim4 – “Workers’ safety commitment” (Safety motivation is strongly determined by the leadership and safety standards of the leader, but also by the standards and group cohesion. Group standards and cohesion are also determined by safety behaviour).

Dim5 – “Workers’ safety priority and risk non-acceptance” (Safety priority and safety commitment should be assessed regarding separately to management procedures and practice);

Dim6 – “Peer safety communication, learning, and trust in safety ability” (Communication and social interaction are necessary means for the creation of social constructs such as organizational climate. Reason (1997) pointed out a learning culture and a reporting culture as two of the constituting sub-climates. Hofmann & Stetzer (1998) suggested that management encouraging open communication on safety sends a strong signal on how safety is valued.).

Dim7 – “Workers’ trust in the efficacy of safety systems” (The safety climate questionnaire that should assess perceptions of the efficacy of safety systems, but that this should be assessed together with other aspects of safety climate, suggested above) (Kines *et al.*, 2011).

Table 1 General Information

Characteristics of the sample (n=233)	Category	n	%
Gender (n=233)	Female	225	97
	Male	6	3
	Non-specified	2	1
Age (n=233)	Group1 (≥65)	27	12
	Group2 (55-64)	77	33
	Group3 (45-54)	72	31
	Group4 (35-44)	33	14
	Group5 (25-34)	18	8
	Group6 (≤24)	6	3
Language	Estonian	183	79
	Russian	50	21
Demographic/background	North part <sup>1</sup>	73	31.3
	West part <sup>2</sup>	52	22.3
	South part <sup>3</sup>	22	9.4
	East part <sup>4</sup>	86	36.9
Occupation	Group A-Care workers	215	92.3
	Group B-Administrative staff	17	7.3
	Non-specified	1	0.4

Nursing homes <sup>1</sup>in North with codes F,J,G,H,M; <sup>2</sup>in West with codes B,O,E; <sup>3</sup>in South with codes A,K,N; <sup>4</sup>in East C,D,I,L

The NOSACQ-50 questionnaire was used in the Estonian and Russian languages in order to explore the care workers’ shared perceptions and opinions toward safety-related procedures and practices in the nursing homes.

The tool contains positively and negatively formulated 50 items using a four-point Likert scale: strongly disagree-1, disagree-2, agree-3, strongly agree-4. The mean score was calculated for each dimension, respondent and for the groups. A mean score over 2.5 was considered as a positive result, as this is the mathematical mean value of the highest and lowest score. In addition, respondents were asked to provide data about experienced occupational accidents and diagnosed occupational diseases as well as to report possible health complaints (for example, pain in neck, back, arms and knees). Respondents’ opinion and perception towards patient’s safety was assessed using a Likert five-point scale.

Additionally, the Nordic musculoskeletal questionnaire (Kuorinka *et al.*, 1987) was used for assessment the musculoskeletal complaints (pain in the muscles) of workers.

The analyses have been prepared using SPSS Statistics 22.0. The following statistical methods were used: correlation, MANOVA and Factor Analysis Principal Component method (Field, 2013).

### 3. Descriptive analysis

The occupational accidents and diseases rates among respondents were low (occupational accidents 5.6%, occupational diseases 4.3%); however, 76.4% of the respondents reported that their job is stressful and 82.8% of them reported that they have experienced physical pain in different body locations. In order to investigate health care workers' physical health, the average muscular pain locations according to the workers' age were examined (Table 2). The most frequently reported health problem (low back pain), was reported by 48.9% of the respondents.

Table 2 Pain complaints

Age	n	Neck pain (%)	Upper back pain (%)	Low back pain (%)	Arms' pain (%)	Knee pain (%)
≥65	27	18.5	33.3	22.2	29.6	22.2
55-64	77	35.1	22.1	48.1	37.7	40.3
45-54	72	38.9	26.4	56.9	31.9	22.2
35-44	33	45.5	30.3	48.5	15.2	15.2
25-34	18	27.8	11.1	55.6	16.7	27.8
≤24	6	16.7	16.7	66.7	16.7	50.0
Total	233	34.8	24.9	48.9	29.6	28.3

According to NOSACQ-50 questionnaire, the general results reflected positive outcome on different dimensions (Dim) of safety climate.

Dim1. Management's safety priority and ability

Dim2. Management's safety empowerment

Dim3. Management's safety justice

Dim4. Workers' safety commitment

Dim5. Workers' safety priority and risk non-acceptance

Dim6. Co-workers' safety communication, learning, and trust ability

Dim7. Workers' trust in the efficacy of safety systems.

The total scores according to NOSACQ-50 were the following (scale 1-4): Dim1–3.39, Dim2–3.49, Dim3–3.52, Dim4–3.57, Dim5–2.89, Dim6–3.52 and Dim7–3.61.

The comparison of the results of patients who felt pain according to the locations (Table 3) of the nursing home, it is possible to conclude that the results do not vary significantly. However, a slight tendency can be observed that the institutions in north part of the country have lower scores in Dim1, Dim2, Dim4, Dim5 and Dim6; thereby the Dim3 - "Management safety justice" had the highest score in the Estonian north part's nursing homes. Institutions in the east part of the country show the high scores in Dim2, Dim4, Dim5 and Dim7. In the west part of the country, the highest scores were followed in the dimensions 1, 2 and 6. The differences between the regions are too small to draw substantive conclusions based on the regional results. It is seen from the results, that Dim5 - "Workers' safety priority and risk non-acceptance" have the lowest score and Dim7 - "Workers' trust in the efficacy of safety systems" gained the highest score in all the regions. This result might be influenced by the way of thinking from the Soviet times, when the superiors, insured the security of the subordinates in full.

Table 3 Regional results of dimensions

PART	n	Dim1	Dim2	Dim3	Dim4	Dim5	Dim6	Dim7
North part	73	3.3	3.42	3.54	3.45	2.79	3.45	3.61
West part	52	3.45	3.52	3.51	3.62	2.87	3.61	3.53
South part	22	3.32	3.49	3.52	3.63	2.88	3.55	3.45
East part	86	3.43	3.52	3.49	3.63	2.98	3.52	3.69
Total	233	3.39	3.49	3.52	3.57	2.89	3.52	3.61

### 3.1 - The relationships between the safety climate dimensions, stress and patient safety

In order to explore psychosocial health in detail, we examined statistically correlations between stress and occupational diseases and accidents, muscular pain and patient's safety in the unit as well as in the organization in general. The opinion of the leadership and the care workers might be different about the safety level and the use of safety improvement possibilities; therefore, the leadership and the care workers were investigated separately.

Initial data was divided into 2 samples, based on the position of worker (care workers ( $n=215$ ), group A; and administrative staff ( $n=17$ ), group B). Correlations between dimensions and selected variables were calculated within the groups. The results indicate (Table 4) that the care workers (group A) who give a higher score to Dim3 - "Management safety justice" feel that patient's safety in their unit is higher.

The only significant correlation ( $p<0.05$ ) for group A is defined between the parameters "Management safety justice" and "Patients' safety in their unit". Positive moderate correlations for the group B are detected between workplace stress and management safety priority and ability, empowerment and justice. Additionally, we can say that rating of patient's safety correlate with "Management safety empowerment". Study results also reveal that those administrative workers (group B) who find their work not very stressful, give higher scores to Dim1 - "Management safety priority and ability", Dim2 - "Management safety empowerment" and Dim3 - "Management safety justice". At the same time, workers who perceive the patient safety in high level in both – in their unit and within the organization, give higher scores to Dim2- "Management safety empowerment".

Table 4 Safety climate dimensions and correlation with perceived stress and patient safety

		Stressful job	Patient safety in the unit	Patient safety in the organization
Group A ( $n=215$ ) Sig. (2-tailed)	Dim3 Management safety justice	0.005	0.138* 0.048	0.104 0.151
Group B ( $n=17$ ) Sig. (2-tailed)	Dim1 Management safety priority and ability	0.566* 0.022	0.465 0.060	0.465 0.060
Sig. (2-tailed)	Dim2 Management safety empowerment	0.570* 0.021	0.568* 0.017	0.568* 0.017
Sig. (2-tailed)	Dim3 Management safety justice	0.570* 0.021	0.333 0.191	0.333 0.191

\*Correlation is significant at  $p<0.05$

There is a positive correlation at significance level 0.05 between the variables "stressful job" and "patient's safety" in the organization for the group A ( $r=0.163$ ). However, this correlation (0.163) is very weak, so we cannot conclude that workers, who feel that their work is not stressful, give higher scores to patient's safety in the organization.

Table 5 describes the assessment for patient safety according to the different nursing homes in different Estonian regions. The average score (1-5 scale) for patients' safety in the unit is 3.69 and in the organization 3.66. So, there is no particular difference between the nursing homes in different regions of the country.

Table 5 Assessment of perceived patient safety

Part	Patient's safety in the unit	Patient's safety in the organisation
North	3.53	3.52

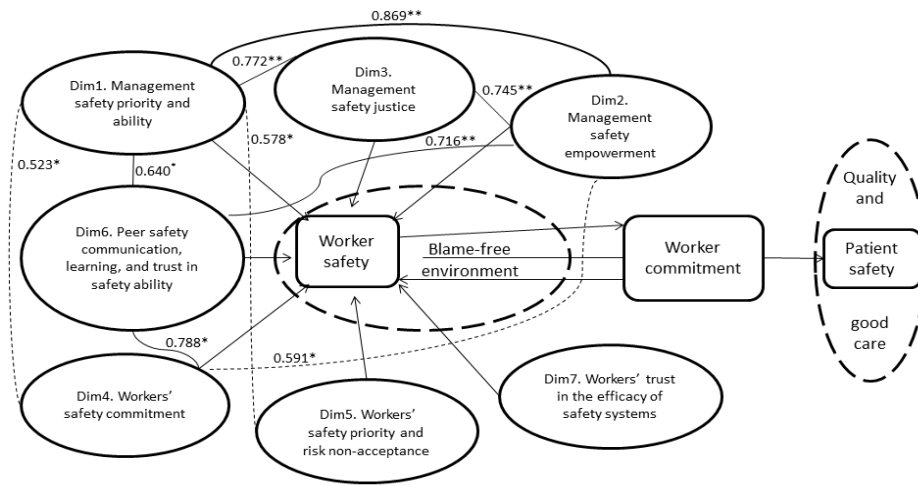
West	3.69	3.68
South	3.86	3.58
East	3.79	3.78
Total	3.69	3.66

3.2 - Development of a Reciprocal Health Care Model for improvement of safety climate in nursing homes

Based on the previous research in the nursing safety area (theoretical part of the current paper), the current research results and the correlations between the safety climate's different dimensions, a Reciprocal Health Care Model for Safety Climate (RHC<sub>Msc</sub>) has been developed. The model integrates the main reciprocal components affecting safety climate that enhance workers' safety commitment and also contribute to good patient's safety. Figure 1 demonstrates the relationship between workers' safety, workers' commitment and patients' safety.

The model proposed takes into account the dynamic interrelationships between different dimensions of safety climate, safety management systems (SMSs), safety behaviour and motivational strategies for safety knowledge exchange and learning within the organisation.

Figure 1. Reciprocal Health Care Model for safety climate (RHC<sub>Msc</sub>)



\*\*Correlation is significant at  $p < 0.01$   
\*Correlation is significant at  $p < 0.05$

The author suggests that healthcare organizations should pay more attention to how create blame-free environment in the nursing in order to develop a positive safety climate and to change employees' safety behaviour.

Figure 1 demonstrates, that the main factors to create the blame-free environment in the nursing home and the positive safety climate, are "management safety priority and ability" and "management safety empowerment". Those factors ensure "workers' safety commitment" and improve "peer safety communication, learning, and trust in safety ability". The correlations between the different ingredients (dimensions) in the safety climate model are high. Exceptional is the Dim7 that do not suit to the model ("workers' trust in the efficacy of safety systems). If we "invest" into management's and care workers' safety knowledge, where the priority is good safety culture, the effective patient's care is guaranteed.

The further development of the model is needed in order to test the usability of it and to validate it. The author emphasizes that the vital part of the implementation of the proposed model is the proactive integration of safety management systems into organizational structure and processes as well as employers' commitment, employees' involvement in health and safety activities as well as their commitment to safety.

#### 4. Discussion and Conclusions

In the light of the above arguments, the present nationwide study was the first step in the assessment of safety climate and relevant factors in Estonian nursing homes. The results of the study indicate that the care workers' job is psychologically and physically stressful. Earlier, Sepp *et al.* (2015) demonstrated similar results in the Estonian nursing homes. Our results showed that low back pain is reported as the main physical problem. From the other researchers, the musculoskeletal disorders of health care workers have been attributed in the large part to the patient's transfer and lifting activities (Hignett, 2003).

The results show that the care workers evaluate their safety climate higher than the patient's safety. The care worker is a key person in the nursing home and their safety behaviour depends on their perceptions and beliefs towards safety as well as shared values and norms within the organization. The results indicate that when the management is committed to safety and demonstrates that safety is a value and priority for the organisation, then workers' involvement in health and safety activities, safety decision-making process and good safety practice are increased. This result is supported by Kines *et al.* (2011) who concluded that if managers are perceived to be committed to safety and to prioritize safety in relation to other goals, safe behaviour would be rewarded, and thereby reinforced. This commitment can be reflected by the training programs, management involvement in the safety committees, consideration of safety in job design etc.

The results of the present study also demonstrate that the management plays the main role in order to improve safety climate in nursing homes. These results are in a line with Griffin and Hu (2013) who have found the certain leadership aspects that influence on safety behaviour, and Flin (2007) who has also revealed that one of the essential factors to the construct of safety climate in healthcare is the senior managers and supervisors' commitment to safety.

The results of the current study show that the number of reported occupational accidents and diseases in Estonian nursing homes is low. It can be explained by the underreporting in general (due to the various political and legislative shortages in Estonia) and by the fact that risk is perceived as a normal part of care workers' job and as the people tend not to report about minor accidents and near-misses. It is supported by our study results - low score of Dim5 (questions concerned attitudes to risk taking, considering minor accidents as a part of daily routine, accepting dangerous behaviour as long as no accidents occur, breaking safety rules while on time pressure). Results by Eklöf *et al.* (2014) indicate the similar: if the management do not accept to consider the risks as a part of health care workers' job, then it does not support the improvement of workplace health and safety. Alameddine *et al.* (2015) found that the main barrier for improving safety and a high-quality care is a lack of mutual trust between employers and employees, which may cause hiding of errors and near-misses. West with the colleagues (2006) demonstrated that 'high-performance human resource managements systems, which include several essential aspects - workers employment security, investments in workers training, workers participation in decision making processes as well as relevant and adequate feedback to workers - facilitates better to their health, commitment and well-being'.

As the final result of the study in progress, the researchers developed a Reciprocal Health Care Model for safety climate which refers to the importance of management's safety priority and abilities as well as peer safety communication and trust in the safety ability. This is in a line with other researchers' results: e.g. Firth-Cozens (2002) states that effective leadership and line managers' commitment play a critical role in the maintaining of a good safety culture, commitment of workers (Laschinger *et al.* 2000), trust (Prause *et al.* 2013; Stulova *et al.*, 2017) and effective safety communication (Nadzam, 2009). Additionally, workers' professionalism, cooperation and support are essential for good safety in workplace and those factors promote workers' health, motivation, learning and innovation (Kivimäki *et al.*, 2010).

Employers must pay close attention to risk analysis and risk assessment that affects both employees and nursing home clients (patients). Risk management and prevention are a proactive component of safety management.

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