

# **The Dutch Essentials of Magnetism II; An adapted instrument for Correctional Nurses**

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# 1. BACKGROUND

Nurses are essential improving the quality of healthcare (Kutney-Lee et al. 2013). The need for nurses will continue to grow, due to an increase in chronic diseases and comorbidities, and a growth in healthcare demands by elderly people (Heinen et al. 2013; Kutney-Lee et al. 2013), while aging of the Dutch population threatens the available number of nurses in the future (Aiken et al. 2014; Velden, Francke & Batenburg 2011). Furthermore the deficit is also caused by a lack of a healthy work environment (HWE), job dissatisfaction and high rates of intention to leave (Aiken et al. 2013, 2014; Schmalenberg & Kramer 2008). By contrast, a HWE is associated with improved patient outcomes and better quality of care (Aiken et al. 2012). Kramer and Schmalenberg (2008) stated: "Healthy means productive, able to give quality care, satisfying, and able to meet personal needs".

In order to create a HWE, it is necessary to understand its essential characteristics. For this purpose, Kramer & Schmalenberg (2004) developed the tool Essentials of Magnetism (EOM©). In 2009, a revised version was translated into the Dutch Essentials of Magnetism II (D-EOM-II) and validated for various Dutch hospitals (De Brouwer et al. 2014). D-EOM-II is able to identify areas in which improvement is needed to create a HWE that attracts and retains nurses.

In this article, the work environment of correctional nurses (CN) is studied. CN provide primary healthcare in correctional institutions (Flanagan & Flanagan 2006, 2002; Weiskopf 2005) which is equal to healthcare provided in the outside world (Council of Europe 2006). Specialized knowledge is required to combine the demands of two ministries, Justice and Healthcare, along with the complex healthcare needs of prisoners in a secure environment (Almost et al. 2013). The Association of Dutch Correctional Nurses (V&VN JV) is concerned about the expected shortage of qualified correctional nurses (V&VN JV 2012). Reasons why CN leave are; increasing workload, more prisoners with extremely complex care, dependency of correctional officers, medicalization of minor problems, and more administrative tasks. In addition, Dutch government recent decided to decrease the number of correctional institutions (DJI 2013). More CN decided to leave, and high numbers of temporarily unqualified CN have to take care for prisoners. Experts of V&VN JV indicate this as a threat to the quality of care in correctional institutions (V&VN JV, 2012).

Little is known about the needs of CN to be able to continue providing quality of care to prisoners. Flanagan and Flanagan (2006, 2002) described workload; (lack of) organisational support and dealing with difficult patients are related to stress. Pay, autonomy and task

requirement are related to job satisfaction. However, Garland and McCarthy (2009) mentioned efficacy with prisoners, organisational operations and supervision as predictors of job satisfaction.

Interviews with nurses (Weiskopf 2005; Maroney 2005) showed that the nature of patients (difficult, manipulative), boundaries of patient care, and relationships with prisoners or correctional officers were perceived positive as well as negative variables of the work environment. It is not described to what extent these variables influence the work environment of CN.

## **2. PROBLEM STATEMENT, AIM AND RESEARCH QUESTIONS**

Results of American studies on CN are not generalisable for the Dutch prison setting due to differences in prison systems. In the Netherlands, investigation in the work environment of CN lacks. No instrument is available to explore essential items of this specific environment, besides a general prison staff questionnaire (TNS-NIPO 2011).

It is however, important to understand essential elements which define the correctional work environment, to be able to increase and stabilize the number of qualified CN. The assumption is that D-EOM-II might be useful to detect the essentials for the Dutch correctional setting.

### **Aim**

Based on the principals of D-EOM-II, the aim of this study is, to develop a reliable and valid instrument to measure the essential characteristics of the CN work environment.

### **Research questions**

The main question of this study is:

What are the psychometric properties of D-EOM-II, when adapted to the work environment of Dutch correctional nurses?

Sub-questions:

- What adaptations are needed in order to make D-EOM-II applicable to the correctional settings?
- How can recommendations to D-EOM-II be translated to achieve clear and acceptable items?

- How valid and reliable is the adapted tool “D-EOM-II, version Correctional Nurses” (D-EOM-II, CN)?

### 3. METHOD

#### Design

The development of scales to assess subjective attributes followed a specific order (Streiner & Norman 2008). After selection the existing scale, suitable for the purpose of this study, the process of review and adjustment of the instrument by experts was performed. The next step was the assessment and determination of the different stages of reliability and validity. To structure and guide this iterative process a Delphi survey technique was used. The Delphi technique is useful to obtain the most reliable and quantifiable consensus of a group of experts (Diamond et al. 2014; Okoli 2004; Hasson et al. 2000). This Delphi study consisted of three mixed methods phases, with three consecutive rounds and interim analysis (Figure 1). Goals of the different phases were (I) assessing relevance on initial characteristics and exploring missing items of the existing tool D-EOM-II, (II) assessing relevance and content validity of new and adapted items, (III) Calculating reliability and validity with supplementary psychometric tests.

[Figure 1 about here]

#### Sample

##### Phase I:

*Participants:* A convenience sample of 141 members of V&VN JV was invited to participate. This sample was estimated to include a minimum of 24 participants who completed all questionnaires (Diamond et al. 2014; Streiner & Norman 2008). Experienced CN, working at least two years in a correctional setting, with minimal a bachelor degree and registered as CN in the Dutch nursing quality register, were included.

*Expert panel:* To obtain maximum variation, eligible nurses (n=6) working in a correctional setting for more than three years, who were not a member of V&VN JV, were invited to answer additional questions.

##### Phase II

*Participants:* Only nurses who completed the first questionnaire were invited again.

*Expert panel:* Eligible nurses who participated in the first phase.

##### Phase III

All participants of Phase I were invited to complete the final questionnaire.

## **Instrument**

D-EOM-II consists of eight characteristics that lead to desired patient and nurse outcomes (De Brouwer et al. 2014; Kramer et al. 2008, 2005). Characteristics are: (1) working with clinically competent peers, (2) collaborative nurse–physician relationships, (3) autonomy, (4) nurse manager support, (5) control over nursing practice, (6) perceived adequacy of staffing, (7) support for education, and (8) a culture in which concern for the patient is paramount. These characteristics are operationalised in 58 items with a 4-point Likert scale (1=strongly disagree to 4=strongly agree), and clustered in eight subscales. Item-total correlations ranged from 0.43-0.83; Cronbach's alpha's for the entire scale was 0.92 and 0.58-0.92 for the subscales (De Brouwer et al. 2014).

To explore which items were missing or adaptation needed, open ended questions were added to every phase. Phase I, after each subscale and at the end of the questionnaire; if/what item/characteristic missed? Phase II, after each item; if item needs adjustment, to which extent? Phase I, II and III after the final question, participants were encouraged to make general remarks for improvement.

Demographic data of the participants (e.g. gender, age, education and work experience) were included in the first questionnaire.

## **Data collection**

From March until July 2014, participants received three different digital questionnaires, including instruction letters containing purpose, duration and completion instruction. A Dutch survey program, Meer Weten van Mensen en Markten (MWM2), was used. A follow-up reminder was sent to non-responding participants one week after initial mailing.

### Phase I:

Participants were asked to indicate to what extent the existing D-EOM-II items were essential for their work environment, by means of a 3-point scale (1=essential, 2=important, but not essential, 3=unnecessary). Participants were encouraged to identify missing items.

The perceived answers were discussed with the expert panel and supervisor. Topics were; how to explain low scores; how to cluster remarks and recommendations for adjustments. Best fitting items were collected by reviewing existing questionnaires on the clustered themes.

### Phase II:

Questionnaire, including adjusted and additional items, was submitted to participants. Participants were asked to indicate the relevance of each item using a 4-point scale (1=not relevant, 2=point needed revision, 3=relevant, needed minor modifications, 4=relevant), and to rank subscales. Open ended questions encouraged participants to give suggestions for adaptations.

Remarks were discussed with expert panel. Topic was; to what extent they could agree.

### Phase III:

The adjusted questionnaire was submitted to participants. The extent to which each item applied to their work environment (1=strongly disagree, to 4=strongly agree) was assessed. Participants were asked to rank subscales on relevance.

## **Data analysis**

IBM Statistical Package for Social Sciences (SPSS) version 20 was used for data analysis. According the Delphi criteria, only completed questionnaires were analysed. Descriptive statistics were used to determine the participant's characteristics. Every phase was analysed separately. The first two questionnaires were analysed by means of a qualitative and quantitative content analysis (Mayring 2000; Polit et al. 2007). Additional psychometric tests were performed after the third questionnaire.

### Phase I:

To judge face and content validity, item content validity index (I-CVI) was calculated (Polit et al. 2007). This is the number of participants giving a rating of 2 or 3, divided by the number of participants. A cut-off value 0.78 per item was used to discuss items with the expert panel and supervisor. Items were considered for deletion if value <0.70 and expert panel agreed. Remarks were analysed and clustered in themes. Dutch prison staff and healthcare questionnaires were analysed to detect best suitable items.

### Phase II:

I-CVI was calculated by the proportion of participants giving a rating of 3 or 4. To decide which items remained in the final questionnaire, results were compared with results from Phase I. Remarks were analysed with expert panel, to determine which items needed adaptations. Items were deleted if I-CVI <0.70 in Phase II and I-CVI <0.78 in Phase I, and no recommendations were made to achieve a theoretical I-CVI >0.78; items were adapted if I-CVI scored between 0.70-0.78.

Scale CVI (S-CVI) and subscale CVI (Ss-CVI) was calculated, score >0.80 is acceptable (Polit et al. 2007).

### Phase III:

Negatively formulated items were recoded to give all values the same direction; higher scores mean more positive perception of the item.

Validity and reliability was analysed by the following tests:

- a. Floor and ceiling effects of items and (sub-) scale were assessed to analyse the distribution of scores. Floor and ceiling effects were considered present when more than 15 % of the answers were given to the highest or lowest score (score 1 or 4) (McHorney & Tarlov 1995; Terwee et al. 2007).
- b. Inter-item correlations were calculated. A correlation coefficient  $<0.25$  means no/little correlation,  $0.25-0.50$  =fair/moderate,  $>0.50$  =good/excellent (Portney & Watkins 2009). Item-total correlations were calculated. Item can be eliminated if coefficient  $<0.20$  (Streiner & Norman 2008).
- c. Cronbach's alpha of the entire scale and each subscale was calculated and recalculated if item deleted. An alpha  $\geq 0.70$  is an acceptable level of internal consistency (Streiner & Norman 2008).
- d. Terwee et al. (2007) stated that construct validity was confirmed if 75% of the results correspondent with predefined hypotheses. Based on previous research (Bai et al. 2013; Schmalenberg & Kramer 2008) the following hypothesis were defined:  
Correlation between D-EOM-II, CN and  
1) 'Autonomy' is  $\geq 0.72$ ;  
2) 'Clinically competent peers' is  $\geq 0.58$ ;  
3) 'Patient-centred culture' is  $\geq 0.73$ ;  
4) 'Nurse-physician relationship' is  $\geq 0.57$ ;  
5) 'Control over nursing practice' is  $\geq 0.82$ ;  
6) 'Adequacy of staffing' is  $\geq 0.59$ ;  
7) 'Support for education' is  $\geq 0.65$ ;  
8) 'Nurse Manager Support' is  $\geq 0.72$ ;  
9) 'Secure environment' is  $\geq 0.40$ ;  
10) Correlations between subscales is expected between 0.22- 0.68.

Items were considered to remove if three or more of the following criteria were met: I-CVI  $<0.78$  (phase II) and Ss-CVI  $<0.80$ ; Floor or ceiling effect was present; inter-item coefficient  $<0.25$ ; Item-total  $<0.20$ ; alpha of subscale  $<0.70$  and alpha if item deleted increases;

### **Ethical considerations**

According to Dutch law (CCMO 2014), approval of an ethic committee was not necessary. V&VN JV has given permission to invite their members to participate in this study. Participants received an instruction letter and gave written informed consent. Participants could withdraw at any time.

## 4. RESULTS

### Demographic characteristics

The questionnaires were completed respectively by 34 (24.1%), 16 (47.1%), and 34 nurses (24.1%). The majority of nurses (76.5%, 87.5%, and 76.5%) were female. Up to 50% had a nursing bachelor degree. Over 80% completed an additional training. Overall, the mean age was nearly 49 years. Nurses' work experience in correctional setting varied from 2–34 years (mean 13.5 y) (Table 1).

[Table 1 about here]

### Phase I

I-CVI of 58 items was calculated (Table 2). I-CVI of 16 items (27.6%) was  $<0.78$ , including 11 negatively formulated items. The expert panel agreed that eight items were not relevant. Four negatively formulated items and four other items were recommended to adapt (participants and experts). Suggestions were; 'medical service' instead of 'organisation'; 'healthcare specific disciplines' instead of 'disciplines'; 'local' organisation instead of 'national' organisation.

Furthermore participants and experts noted the following missing items; boundaries of the secure setting, finding a balance between prisoners' healthcare needs and security, and dependency on prison staff.

The Dutch prison staff questionnaire (TNS NIPO 2011) yielded six best fitting items about 'security and controllability', and 'cooperation with prison staff'. These items constituted a new subscale 'Secure environment'.

[Table 2 about here]

### Phase II

The second questionnaire consisted of 56 items (Table 2). I-CVI of eight items was  $<0.70$ , thereof achieved two items  $\geq 0.78$  if recommendations were counted, and expert panel advised not to remove item 57. I-CVI of five items was between 0.70-0.78; including two items of the

new subscale. Seven items were adapted following recommendations of participants. Recommendations were: 'thinking along' instead of 'decision-making'; 'nurses' instead of 'nurses and carers' (the function of 'carer' does not exist within the correctional setting); 'can and may know' instead of 'know'; add specific correctional functions. Expert panel agreed with these recommendations.

Total S-CVI was 0.82 and Ss-CVI varied between 0.73 and 0.93 (Table 3).

The most relevant subscales were (Table 3): 1) Clinical competent peers; 2) Autonomy and 3) Patient-centred culture. The new subscale 'secure environment' was least relevant.

[Table 3 about here]

[Table 4 about here]

### **Phase III**

The final questionnaire consisted of 51 items (Table 2). Psychometric tests showed the following results:

- a) Item 54 showed a floor effect of 20.6 %. Ceiling effects were present at 13 items varying from 20.6% to 35.3% (Table 2). Subscales 'clinically competent peers', 'nurse-physician relationship' and 'support for education' showed ceiling effects (Table 3).
- b) Inter-item and item-total correlations of the subscales showed mixed results, consisting of negative as well as excellent correlations ( $>0.50$ ) (Table 2, Table 4). This indicates multidimensionality of subscales. Items with a correlations  $<0.50$  had also little inter-item correlations. Item 08, 10, 19, 34, 50 and 62 were more correlated to the total scale, than to its subscale. It is possible that these items are better suited to another subscale. Item 21 and 64 correlated  $<0.20$  and item 37  $<0.25$ , on both scale levels.
- c) Cronbach's alpha of the entire scale was 0.93 (Table 3) which is considered excellent. Alpha of the subscales ranged from 0.60-0.93. Alpha's of subscales increased if one item (resp. 5, 10, 21, 26, 34, 37 and 64) was deleted. After deletion, eight subscales reached the acceptable guiding cut-off level ( $>0.70$ ).
- d) Construct validity of the subscale 'nurse-physician relationship' could be confirmed (Table 5). 'Clinically competent peers', 'adequacy of staffing' and 'secure environment' did not correlate with the total scale. The hypothesis that subscales correlated between 0.22 - 0.68 was confirmed in 39% (Table 5).

Most relevant subscales were (Table 3): 1) Autonomy; 2) Clinically competent peers; 3) Secure environment.

In summary; thirteen items were removed (8 in phase I; 5 in phase II); fifteen items were modified; one subscale with six items was added. After final analyses, four items (20, 21, 34 and 64) remained to consider to be removed.

[Table 5 about here]

## 5. DISCUSSION

This study was conducted to develop a reliable and valid instrument to measure the essential characteristics of the CN work environment. Using the iterative process of the Delphi technique, the Dutch Essentials of Magnetism II for Correctional Nurses (D-EOM-II, CN), consisting of 51 items, was developed. First, existing items were assessed on their relevance, adapted (if necessary) and missing items were added. After calculation of I-CVI, S-CVI and Ss-CVI, the latest recommendations were processed at eight items (I-CVI <0.78). S-CVI of 0.82 was acceptable and Ss-CVI of three subscales was just below the recommended guideline. Finally, reliability and validity of D-EOM-II, CN was extensively tested at item and subscale level. Floor and ceiling effects, correlations between items, total scale and subscales were calculated, and the correlations between the subscales themselves. Construct validity was evaluated by testing hypotheses. Results of the psychometric tests were mixed. An excellent Cronbach's alpha of 0.93 for the entire scale, the new sub-scale with a moderate alpha (0.60). Item correlations ranged from 'no correlation' up to 'good correlations'. Some items had higher correlations with the entire scale than the subscale. Revision of the subscales and item reduction should be considered, especially since there are indications of multidimensionality (negative correlations) and construct validity could not be confirmed. 'Secure environment' had no correlation to the entire scale, while Ss-CVI was acceptable (0.86) and ranked 3<sup>th</sup> on relevancy and importance. This can be explained as the items are not related to patient care, but as a precondition for adequate healthcare within this setting. This corresponds with the findings of Droes (1994) and Flanagan & Flanagan (2001, 2002). Ranking of the subscales is comparable to the findings of Flanagan (2006) and Heinen et al. (2013).

The age of Dutch CN (47.8 y) is similar to American and Canadian nurses (Flanagan 2006; Almost et al. 2013a), but is 10 years older than Dutch hospital nurses (Heinen et al. 2013). The CN has, as compared with the above groups, by far the most working experience. This indicates no high rates of intention to leave, but also that the correctional setting is not attractive to new and younger nurses.

### **Strengths and limitations**

According to literature, this is the first study to develop an instrument to measure the work environment of the CN in the Netherlands, and the first study to adapt EOM- II © for use outside the original healthcare setting.

In order to translate a healthcare questionnaire into the domain of the CN, specific knowledge of this complex setting is needed. The researcher is fortunate enough, to draw from personal experience working in this complex environment.

The response rate (24.1%) seems low, but the final number of 34 nurses is within the margins (11-25 participants) to obtain consensus (Diamond et al. 2014), to calculate Cronbach's alpha and correlations (Streiner & Norman 2008). In addition, supplementary opinions of an expert panel were used to discuss and validate the response. To obtain a fair CVI, the aim was to include participants working within institutions throughout the nation. Therefore, the data is not homogeneous, which has an adverse effect on correlations.

Cronbach's alpha is comparable to the original Dutch, Turkish (Yildirim et al. 2012) and Chinese version (Bai et al. 2013), while item reduction had occurred and another 4 item can be considered to remove. Six subscales have higher alphas than D-EOM-II, and can even be increased. Strikingly, all negatively formulated items of D-EOM-II perceived a low CVI. These items were difficult to interpret, certainly in light of relevance for practice. Although a comprehensive instruction was given to expert panel, they agreed to remove these items. According to the presence of ceiling effects, the probability that the so-called halo-effect occurred, is present (Streiner & Norman 2008).

This instrument is developed for the specific population of CN, to measure their specific work environment and to identify areas where change is required. D-EOM-II, CN can help policy-makers of the Custodial Institutional Agency to administer adequate intervention to create HWE and improve patient and nurse outcomes. In addition, this instrument offers the possibility to acquire insight in the differences in work environment of CN and traditional healthcare organisations.

## **6. CONCLUSION**

D-EOM-II is adapted for the correctional setting. Most original items (35) were applicable, and 10 items were re-operationalized. The security perspective justifies an additional subscale: 'secure environment'. Psychometric evaluation is sufficient, so this instrument can be used in practice.

## **7. RECOMMENDATIONS**

To clarify ambiguities about negatively worded items, it is recommended to achieve focus group interviews. Using the instrument, more data can be generated to expand psychometric tests to test-retest, intraclass correlation coefficient, and inter-rater reliability procedures.

Exploratory factor analysis can contribute to restructure items on the subscales and confirmed by re-testing the construct validity.

Further development of D-EOM-II, CN, can demonstrate the possibility of adapting EOM-II© for other non-traditional health care settings.

An interesting research hypothesis remains to confirm: "A healthy work environment for correctional nurses is also associated to nursing outcomes such as increased job satisfaction and improved patient outcomes."

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## 9. TABLES AND FIGURES

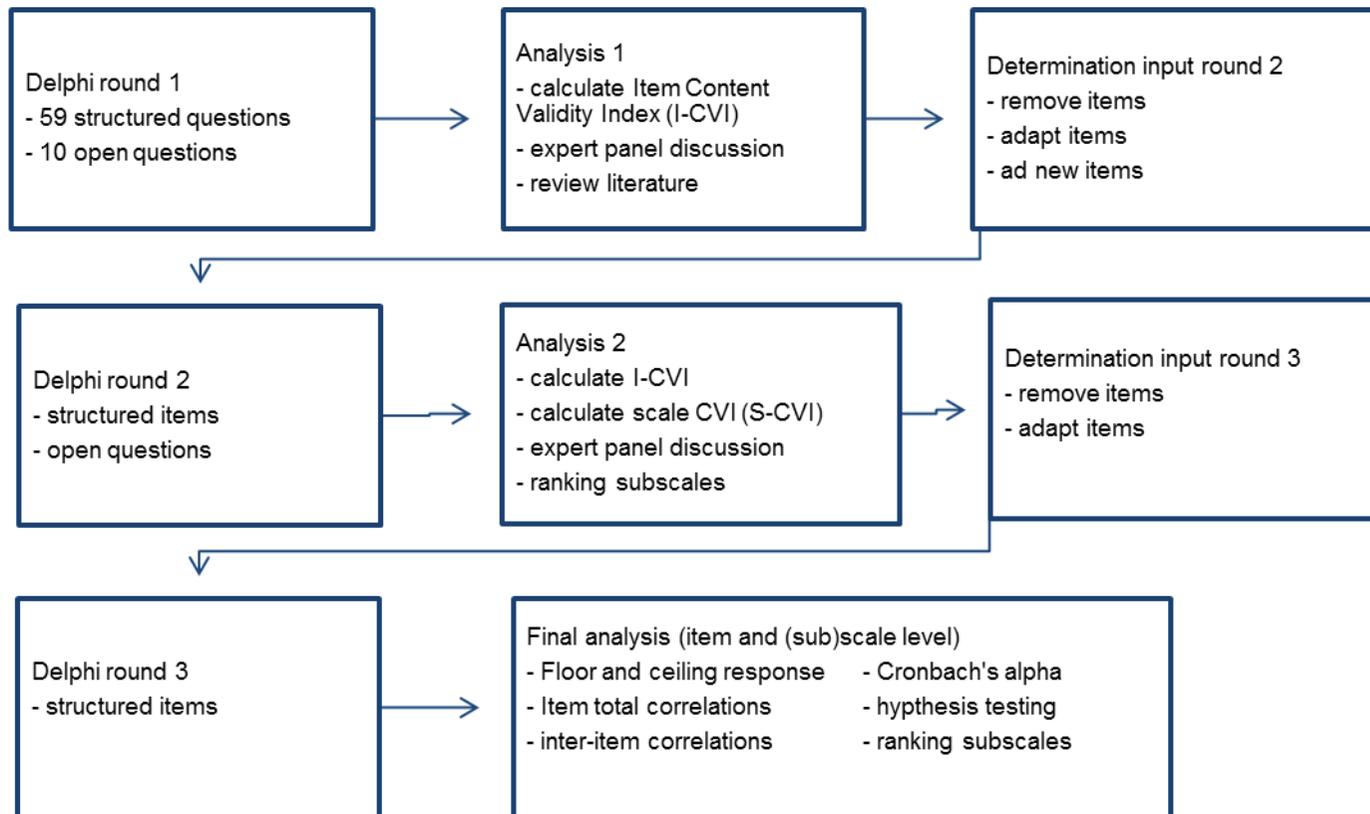


Figure 1 Flowchart Delphi survey

**Table 1 Demographic characteristics correctional nurses Phase 1 (P1, N=34), Phase 2 (P2, N=16), Phase 3 (P3, N=34)**

Correctional nurses	P1			P2			P3		
	N (%)	Mean	Range	N (%)	Mean	Range	N (%)	Mean	Range
Gender									
Female	26 (76.5)			14 (87.5)			26 (76.5)		
Age (years)	33	47.8	25-61	15	49.8	27-59	33	47.2	27-61
Education									
Bachelor	15 (44.1)			5 (31.3)			17 (50)		
Associate	19 (55.9)			11 (68.8)			17 (50)		
Additional	28 (82.4)			13 (81.3)					
Nursing experience (years)									
Total Healthcare		24.1	3-44		25.25	3-40		25.50	3-44
Custodial Institutional Agency		13.6	2-34		14.6	3-31		12.81	3-34
Employment (hours a week)		31.3	18-36		30.4	18-36		31.4	20-36
Quality register									
General	33 (97.1)			16 (100)			34 (100)		
Correctional Nurse	31 (91.2)			16 (100)			34 (100)		

**Table 2 Items, content validity Index, floor and ceiling effects, item-total correlations and Cronbach's alpha's ( $\alpha$ )**

Items Dutch Essentials of Magnetism II (D-EOM-II)	Phase I & II		Phase III (n=34)				
	I-CVI <sup>a</sup> n=34	I-CVI n=16	Floor response (%)	Ceiling response (%)	Item –total correlation	Item-total subscale	$\alpha$ if item deleted
<b><i>Autonomy</i></b>							
01. Autonomy is risky – nurses fear getting into trouble <sup>+</sup>	0.59 <sup>1</sup>						
02. Know that nurse manager wants us to make decisions	0.97	0.88	5.9	20.6	0.61	0.61	0.72
03. Must get permission before making independent or interdependent decisions <sup>+</sup>	0.44 <sup>1</sup>						
04. Practice spheres decision-making	0.97	1	2.9	23.5	0.43	0.63	0.72
05. Evidence-based practice provides knowledge base	1	0.94	2.9	8.8	0.34	0.41	0.79
06. Bureaucratic rules inhibit <sup>+</sup>	0.62 <sup>1</sup>						
07. Must do things against better judgment <sup>+</sup>	0.56 <sup>1</sup>						
08. Positive accountability	0.85	0.81 <sup>2</sup>	0.0	2.9	0.68	0.66	0.72
09. Administration sanctions staff nurse clinical autonomy	0.88	0.88	8.8	5.9	0.57	0.53	0.75
<b><i>Clinically competent peers</i></b>							
10. Work with other nurses who are clinically competent	0.97	0.88	2.9	14.7	0.42	0.33	0.90
11. High clinical competence is rewarded	0.82 <sup>2</sup>	0.44 <sup>1</sup>					
12. Degree education is evidence of competence	0.97	0.88	2.9	23.5	0.50	0.71	0.41
13. Certification is evidence of competence	1	0.81 <sup>2</sup>	0.0	23.5	0.55	0.62	0.52
<b><i>Patient-centred culture</i></b>							
14. Organization takes swift action	0.76 <sup>2</sup>	0.81	2.9	2.9	0.54	0.56	0.76
15. People are enthusiastic	0.97	0.94	0.0	8.8	0.43	0.54	0.77
16. High performance and productivity are expected	0.94	0.94	0.0	11.8	0.33	0.37	0.78
17. Inter- and intra-disciplinary teamwork	0.91	0.81 <sup>2</sup>	2.9	8.8	0.41	0.54	0.76
18. Cost is important, but the patient comes first	0.85	0.81	2.9	5.9	0.56	0.76	0.74
19. Contributions of all are valued	0.94	0.81	2.9	20.6	0.75	0.58	0.75
20. Proactive, anticipating changes	0.74 <sup>2</sup>	0.69 <sup>3,2</sup>	11.8	2.9	0.06	0.33	0.79
21. Organization is value driven; values are known and shared	0.85	0.75 <sup>2</sup>	5.9	2.9	-0,08	0.18	0.81
22. Transmits cultural values	0.94	0.88	2.9	5.9	0.51	0.69	0.74

**Table 2 Continued**

Items Dutch Essentials of Magnetism II (D-EOM-II)		Phase I & II		Floor response (%)	Ceiling response (%)	Phase III (n=34)		$\alpha$ if item deleted
		I-CVI n=34	I-CVI n=16			Item –total correlation	Item-total subscale	
<b><i>Nurse –Physician relationship</i></b>								
23.	Student-teacher: medical doctors teach nurses	1	0.88	0.0	32.4	0.21	0.62	0.78
24.	Collaborative: willing cooperation based on mutual power	1	1	0.0	32.4	0.16	0.69	0.75
25.	Negative: frustrating and hostile <sup>+</sup>	0.09 <sup>1</sup>						
26.	Student-teacher: registered nurses teach/influence medical doctors	1	0.94	0.0	11.8	0.30	0.44	0.85
27.	Friendly stranger: formal, courteous, information exchange only <sup>+</sup>	0.18 <sup>1</sup>						
28.	Collegial: physicians treat nurses as equal	0.97	0.88	0.0	29.4	0.34	0.85	0.66
<b><i>Control over nursing practice</i></b>								
29.	Control over nursing practice structure in place	0.74 <sup>2</sup>	0.88	5.9	8.8	0.42	0.44	0.58
30.	Input and decision-making into practice issues/policies	0.97	0.94	0.0	23.5	0.36	0.47	0.56
31.	Recognition by medical doctors, administrators and others	0.97	0.88	2.9	5.9	0.47	0.49	0.55
32.	Structure is present but mostly ‘talk’ <sup>+</sup>	0.74 <sup>2</sup>	0.38 <sup>1</sup>					
33.	Structure is interdisciplinary	0.76 <sup>2</sup>	0.50 <sup>1</sup>					
34.	Personnel policies and issues	0.85	0.75 <sup>2</sup>	2.9	5.9	0.33	0.23	0.67
35.	Can describe outcomes as a result of shared decision-making	0.91	0.75 <sup>2</sup>	0.0	14.7	0.29	0.39	0.60
36.	Management and others decide nursing issues <sup>+</sup>	0.53 <sup>1</sup>						
<b><i>Adequacy of staffing</i></b>								
37.	Staffing is adequate for quality care	0.82 <sup>2</sup>	0.88	5.9	2.9	0.17	0.24	0.78
38.	Not enough competent nurse <sup>+</sup>	0.50 <sup>1</sup>						
39.	Must vary care delivery system because there is not enough staff <sup>+</sup>	0.53 <sup>2</sup>	0.69 <sup>1</sup>					
40.	Adequate for safe care	0.88	0.88	5.9	0.0	-0,008	0.47	0.65
41.	Teamwork helps in staffing adequacy	0.91	0.88	2.9	2.9	0.43	0.62	0.56
42.	Not enough even if all positions filled <sup>+</sup>	0.62 <sup>2</sup>	0.44 <sup>3</sup>	11.8	5.9	0.27	0.67	0.50
<b><i>Support for education</i></b>								
43.	Nurses' pursuing education is valued in organization	0.97	0.94	0.0	26.5	0.68	0.76	0.73
44.	Support to attend continuing education programs	0.97	0.88	5.9	35.3	0.72	0.75	0.73
45.	Few rewards for pursuing education <sup>+</sup>	0.67 <sup>2</sup>	0.56 <sup>1</sup>					
46.	Financial assistance or time off	1	0.88	5.9	23.5	0.54	0.62	0.84

**Table 2 Continued**

Items Dutch Essentials of Magnetism II (D-EOM-II)	Phase I & II		Phase III (n=34)				
	I-CVI n=34	I-CVI n=16	Floor response (%)	Ceiling response (%)	Item –total correlation	Item-total subscale	$\alpha$ if item deleted
<b><i>Nurse manager support</i></b>							
47. Nurse manager represents unit	0.94	0.88	5.9	11.8	0.62	0.64	0.92
48. Provides needed resources	0.97	0.94	5.9	5.9	0.58	0.60	0.93
49. Resolves nurse–physician conflicts	0.85	0.88	14.7	2.9	0.82	0.89	0.91
50. Nurse manager supports interdisciplinary team	0.94	0.88	8.8	14.7	0.76	0.66	0.92
51. Nurse manager provides competent staff	0.88	0.81	5.9	2.9	0.72	0.78	0.92
52. Nurse manager provides constructive feedback	0.85	0.81	8.8	0.0	0.60	0.74	0.92
53. Nurse manager support facilitates teamwork	0.88	0.81	14.7	2.9	0.69	0.80	0.92
54. Nurse manager is visible and approachable	0.94	0.81	20.6	2.9	0.69	0.80	0.92
55. Nurse manager walks the talk	0.88	0.94	8.8	5.9	0.77	0.89	0.91
56. Nurse manager asks for best practice evidence	0.91	0.81	5.9	2.9	0.53	0.71	0.92
57. Try new things	0.91	0.63 <sup>2</sup>	5.9	8.8	0.53	0.42	0.93
58. Concern for patient is paramount	0.82 <sup>2</sup>	0.88	2.9	11.8	0.22	0.36	0.93
<b><i>Secure environment</i></b>							
59. Collaborative: willing cooperation based on mutual power		0.75 <sup>2</sup>	0.0	2.9	0.15	0.53	0.48
60. Penitentiary workers: calamity support.		0.94	2.9	20.6	0.38	0.38	0.54
61. Collegial: penitentiary workers treat nurses as equal		0.75 <sup>2</sup>	0.0	2.9	0.22	0.56	0.47
62. Safety: we ensure each other's safety		1	0.0	14.7	0.36	0.21	0.60
63. Nurses' advising health care issues is valued by penitentiary workers		0.81 <sup>2</sup>	0.0	5.9	0.21	0.60	0.43
64. Working in a secure environment is topic conversation		0.88	2.9	0.0	-0,03	-0.13	0.72

<sup>a</sup> I-CVI Item Content Validity Index; + negatively formulated items; 1 item deleted; 2 item adapted; 3 item achieved >0.83 if recommendations counted;

**Table 3 Subscales; Ranking, Content Validity Index, Floor and Ceiling response and Cronbach's alpha ( $\alpha$ )**

Subscales	Rank round 2	Rank round 3	Ss-CVI <sup>a</sup>	Floor response (%)	Ceiling response (%)	$\alpha$ subscale	$\alpha$ if item deleted	No items
Autonomy	2	1	0.90	1.7	5.1	0.78	0.79	5
Clinically competent peers	1	2	0.75	2.0	20.6	0.72	0.90	3
Patient-centred culture	3	4	0.83	3.3	8.5	0.79	0.81	9
Nurse-physician relationship	4	5	0.93	0.0	25.7	0.82	0.85	4
Control over nursing practice	6	6	0.73	2.4	11.8	0.65	0.67	5
Adequacy of staffing	5	7	0.75	6.6	2.9	0.70	0.78	4
Support for education	8	8	0.82	3.9	28.4	0.84	0.84	3
Nurse manager support	7	9	0.84	9.1	6.1	0.93	0.93	12
Secure environment	8	3	0.86	1.0	7.8	0.60	0.72	6
Total			0.82			0.93		

<sup>a</sup> Ss-CVI, subscale content validity index

**Table 4 Subscale inter-item correlations**

Items autonomy					Items clinically competent peers				Items nurse-physician						
	2	4	5	8	9		10	12	13		23	24	26	28	
2.						10.				23.					
4.	0.56					12.	0.35			24.	0.60				
5.	0.30	0.36				13.	0.26	0.82		26.	0.28	0.28			
8.	0.42	0.54	0.49							28.	0.64	0.75	0.57		
9.	0.52	0.40	0.18	0.51											
Items patient-centred culture							Items control over nursing practice								
	14	15	16	17	18	19	20	21	22		29	30	31	34	35
14.										29.					
15.	0.38									30.	0.43				
16.	-0.01	0.44								31.	0.41	0.43			
17.	0.56	0.27	0.31							34.	0.13	0.04	0.18		
18.	0.48	0.35	0.48	0.60						35.	0.18	0.33	0.25	0.32	
19.	0.51	0.44	0.38	0.51	0.64										
20.	0.26	0.19	0.04	0.12	0.30	0.08									
21.	-0.11	0.30	0.08	-0.05	0.15	-0.03	0.44								
22.	0.52	0.42	0.34	0.44	0.65	0.49	0.28	0.26							
Items adequacy of staffing				Items support for education											
	37	40	41	42		43	44	46							
37.					43.										
40.	-0.04				44.	0.76									
41.	0.39	0.42			46.	0.58	0.59								
42.	0.25	0.64	0.54												
Items secure environment															
	59	60	61	62	63	64									
59.															
60.	-0.04														
61.	0.62	0.24													
62.	0.25	0.16	0.26												
63.	0.56	0.46	0.49	0.23											
64.	-0.15	-0.03	0.03	-0.25	-0.08										

**Table 4 Continued**

Items nurse manager support	47	48	49	50	51	52	53	54	55	56	57	58
47.												
48.	0.28											
49.	0.67	0.54										
50.	0.63	0.44	0.61									
51.	0.55	0.67	0.69	0.57								
52.	0.41	0.52	0.71	0.39	0.62							
53.	0.48	0.49	0.78	0.57	0.59	0.62						
54.	0.55	0.46	0.83	0.49	0.62	0.69	0.76					
55.	0.52	0.61	0.81	0.61	0.77	0.75	0.83	0.77				
56.	0.47	0.47	0.72	0.30	0.60	0.77	0.63	0.66	0.69			
57.	0.28	0.26	0.43	0.58	0.30	0.22	0.39	0.32	0.46	0.29		
58.	0.40	0.29	0.27	0.16	0.39	0.40	0.27	0.38	0.35	0.23	-0.05	

**Table 5 Pearson's correlations between the subscales and total score of D-EOM-II, version Correctional Nurses**

Subscales	1	2	3	4	5	6	7	8	9	10
1. Autonomy	1									
2. Clinically competent peers		1								
3. Patient-centred culture	0.26**	0.30**	1							
4. Nurse-physician relationship	0.25**			1						
5. Control over nursing practice	0.26**	0.20*	0.16*		1					
6. Adequacy of staffing						1				
7. Support for education	0.34**	0.33**	0.27**		0.32**		1			
8. Nurse manager support	0.29**	0.36**	0.26**		0.23**	0.18*	0.48**	1		
9. Secure environment								0.23**	1	
10. D-EOM-II, CN	0.30**		0.18**	0.89**	0.18*		0.23*	0.19**		1

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

## SAMENVATTING

**Titel:** Nederlandse magneetkenmerken; een aangepaste vragenlijst voor justitieel verpleegkundigen

**Doel en onderzoeksvragen:** Ontwikkelen van een betrouwbaar en valide instrument om de magneetkenmerken van de Justitieel Verpleegkundigen (JV) werkomgeving te kunnen meten. Wat zijn de psychometrische eigenschappen van dit nieuwe instrument?

**Inleiding:** In het verlenen van zorg aan gedetineerden combineert de JV de voorschriften van de ministeries van Veiligheid en Justitie en van Volksgezondheid, Welzijn en Sport. Er wordt een tekort aan JV voorspeld. Dit kan voorkomen worden als er sprake is van een gezonde en aantrekkelijke werkomgeving. Een gezonde en aantrekkelijke werkomgeving leidt ook tot hogere arbeidstevredenheid, productiviteit en betere kwaliteit van zorg. Van ziekenhuizen zijn de magneetkenmerken bekend, maar niet van de JV werkomgeving.

**Methode:** Een Delphi-survey bestaande uit drie fases met tussentijdse analyses, werd uitgevoerd. Ervaren JV ( $n_1=34$ ,  $n_2=16$ ,  $n_3=34$ ) werd gevraagd om ontbrekende kenmerken te beschrijven, om bestaande en aangepaste vragen te beoordelen. Daarnaast werd een expert panel ( $n=6$ ) geraadpleegd. De inhoudsvaliditeit, vloer en plafond respons, correlaties en Cronbach's alpha werd berekend op item en (sub) schaal niveau.

**Resultaten:** De aangepaste vragenlijst bestaat uit 51 items, inclusief een nieuwe sub schaal 'beveiligde omgeving'. Psychometrische testen toonden een inhoudsvaliditeit van 0.82 (sub-schalen 0.73 tot 0.93) en Cronbach's alpha van 0.93 (sub schalen 0.60 - 0.93). Item-totaal correlaties varieerden van 0.33 tot 0.89. Sub schaal correlaties varieerden van 0.16 tot 0.48.

**Conclusie en aanbevelingen:** Er werd succesvol een vragenlijst voor de JV werkomgeving ontwikkeld, met een acceptabele betrouwbaarheid en validiteit. Deze vragenlijst kan een bijdrage leveren aan een gezonde en aantrekkelijke justitiële werkomgeving. Hiermee wordt een substantiële bijdrage geleverd aan het behoud van gekwalificeerde justitieel verpleegkundigen. Om de betrouwbaarheid en validiteit van dit instrument te bevestigen, worden aanvullende psychometrisch testen aanbevolen.

**Trefwoorden:** Justitieel verpleegkundige, justitiële inrichtingen, gedetineerden, werkomgeving, excellente zorg.

## ABSTRACT

**Title:** The Dutch Essentials of Magnetism II; an adapted tool for correctional nurses.

**Aim and Research questions:** Develop a reliable and valid tool to measure the essentials of the Dutch correctional nurses' (CN) work environment. What adaptations to the Dutch Essentials of Magnetism II (D-EOM-II) are needed, and what are the psychometric properties of this new tool?

**Background:** Dutch CN balance the demands of two ministries, Justice and Healthcare. A shortage of CN is forecasted, an attractive and healthy work environment (HWE) can help to reduce this shortage. HWE leads to more job satisfaction, productivity and quality of care. The essential characteristics of a HWE are known for hospitals, but not for CN environment.

**Method:** A Delphi-survey, consisting of three phases and interim analyses, was performed. Experienced CN (n1=34, n2=16, n3=34) were invited to describe missing characteristics, and to judge existing and adapted items. Additionally, a panel of experts (n = 6) was consulted to advise on the adjustments made. Content validity, floor and ceiling response, correlations and Cronbach's alpha were calculated on item and (sub) scale level.

**Results:** The adapted questionnaire consists of 51 items, including a new sub-scale 'secure environment'. Psychometric tests showed a content validity of 0.82 (subscales 0.73-0.93) and a Cronbach's alpha of 0.93 (subscales 0.60-0.93). Item-total correlations ranged from 0.33 to 0.89 and subscale correlations ranged from 0.16 to 0.48.

**Conclusions and recommendations:** D-EOM-II, version CN was successfully adjusted with acceptable reliability and validity. This questionnaire can be useful to distinguish areas where changes are needed to create a healthy and attractive correctional work environment, and substantially contribute to retain qualified CN. To confirm reliability and validity, additional psychometric tests are recommended.

**Keywords:** Correctional nurse, prisoners, work environment, essentials of magnetism