Translation, culture adaption and psychometric testing of the MISSCARE Survey—Swedish version

Carolin Nymark RN, PhD, Director of Nursing Development 1,2 | Katarina E. Göransson RN, Ass. Professor 3,4 | Fredrik Saboonchi PhD, Professor 5,6 | Ann-Charlotte Falk RN, Ass. Professor 7 | Ann-Christin von Vogelsang RN, CNOR, PhD, Director of Nursing Development 2,8

1 Department of Neurobiology, Care Sciences and Society, Karolinska Institutet, Stockholm, Sweden
2 Heart, Vascular and Neuro Theme, Karolinska University Hospital, Stockholm, Sweden
3 Department of Medicine, Karolinska Institutet, Solna, Stockholm, Sweden
4 Emergency and Reparative Medicine Theme, Karolinska University Hospital, Stockholm, Sweden
5 Department of Health Sciences, The Swedish Red Cross University College, Stockholm, Sweden
6 Division of Insurance Medicine, Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden
7 Department for Health Promoting Science, Sophiahemmet University, Stockholm, Sweden
8 Division of Neuro, Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden

Correspondence
Carolin Nymark, Heart, Vascular and Neuro Theme, Karolinska University Hospital, Norrbacka S3:00, SE-171 76 Stockholm, Sweden.
Email: carolin.nymark@ki.se

Abstract

Aim: To translate the MISSCARE Survey into Swedish and establish its validity and reliability by evaluating its psychometric properties.

Background: Missed nursing care is defined as any aspect of required nursing care that is omitted or delayed. The consequence of missed nursing care is a threat to patient safety. The MISSCARE Survey is an American instrument measuring missed nursing care activities (part A) and its reasons (part B).

Methods: The translation was accomplished according to World Health Organization guidelines, focusing on a culture adaptation. Acceptability, construct validity, test-retest reliability and internal consistency were analysed. The Revised Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) was used as reporting checklist.

Results: The translation and culture adaptation needed several revisions. A total of 126 nurses answered the test and retest which showed acceptability of missing data. The factor analysis revealed a lack of fit to data for the original factorial structure in part B, while further analysis provided results suggesting a modification based on omitting six items. The internal consistency for part B and its subscales showed good results.

Conclusions: The MISSCARE Survey—Swedish version is a reliable and valid instrument, with good psychometric properties.

Relevance to clinical practice: More reliable language versions of the instrument enable national and international comparisons that could be valuable for nursing managers and/or directors of nursing who are responsible for quality of care and patient safety in the strategic care planning process.

KEYWORDS
nursing, patient safety, psychometrics, quality and safety, quality of care, questionnaire, research in practice, survey, team nursing

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1 | INTRODUCTION

Missed nursing care (MNC), also referred to as “care left undone,” is defined as any aspect of required nursing care that is omitted (in part or in whole) or delayed (Kalisch et al., 2009). The consequence of MNC is threats to patient safety. The most frequently found reasons for MNC are lack of staff or material resources, or insufficient communication (Kalisch et al., 2009). Errors can be caused by an act of commission (doing something wrong) or an act of omission (failing to do something properly) and can lead to an adverse outcome for the patient (Kalisch & Xie, 2014). International studies report that MNC is associated with higher 30-day mortality, higher in-hospital mortality, lower assessed quality of life and other negative outcomes such as falls, increased occurrence of pneumonia, urinary infections, sepsis, errors in medical management and an increasing number of pressure ulcers and nosocomial infections (Ausserhofer et al., 2013; Ball et al., 2014, 2018; Kalisch et al., 2012; Schubert et al., 2008, 2012).

2 | BACKGROUND

Sweden has the lowest number of in-hospital beds per capita in Europe, even though it has a growing population with complex healthcare needs (The National Board of Health & Welfare, 2020). From a patient safety perspective, international studies show that insufficient competence among healthcare personnel or underemployment of nurses is a serious problem that causes complications. The results of a study by Needleman et al. (2011) show a significant association between increased mortality in patients where the number of registered nurses (RNs) is below the estimated target level (Needleman et al., 2011), while Aiken et al. (2014) reported that a higher skill level (bachelor’s degree) results in fewer health injuries (Aiken et al., 2014).

Studies have reported a correlation between RNs being responsible for a high number of patients and an impaired patient outcome and even increased patient mortality (Lankshear et al., 2005), and if the patient–nurse ratio increases by one patient (over the ratio 6:1), the mortality increases by 7% (Aiken et al., 2014). The results also show that is associated with increased mortality (Ball et al., 2014). Moreover, to increase the number of less educated personnel, for example nurse assistants (NA), do not affect or reduce mortality as this seems to be tightly connected to the number of patients per RN (Ball et al., 2014, 2016; Griffiths et al., 2018).

Three questionnaires have been used internationally to measure MNC: “Care left undone” (Ball et al., 2014) “BERNCA” (Schubert et al., 2007) and “MISSCARE Survey” (Kalisch & Williams, 2009). Despite the extensive international research about MNC and its outcomes, the research on MNC in Swedish hospital and emergency settings is limited. When reviewing the existing instruments measuring MNC, the MISSCARE Survey was chosen due to the following advantages: the instrument has been psychometrically tested, it contains a wide range of questions about MNC, and in addition, it elaborates the reasons for MNC (Kalisch & Williams, 2009). Moreover, the instrument has been translated into other languages and contexts (Bragadottir et al., 2015; Kalisch et al., 2012; Siqueira et al., 2017; Sist et al., 2017), which enables international comparisons.

The MISSCARE Survey was developed in the United States through a process that involved both qualitative and quantitative methods (Kalisch & Williams, 2009). The questionnaire has one initial part with background questions, about, for example, age, gender, highest educational level, professional role, highest educational degree for RNs, experience in role, experiences in current unit, and unit type. In the section about MNC, there are two parts. Part A comprises 24 questions on nursing care activities which are answered on a 5-point Likert scale ranging from “always missed” to “never missed.” Part B contains 17 questions about reasons for MNC which are answered on a 4-point Likert scale ranging from “significant reason” to “NOT a reason for missed nursing care.” The original factor analysis for these items resulted in a three-factor solution: “communication,” “labour resources” and “material resources.” Previous research has assessed the psychometric properties of the MISSCARE Survey across countries and in diverse settings and contexts (Bragadottir et al., 2015; Kalisch et al., 2013; Kalisch, et al., 2012; Siqueira et al., 2017; Sist et al., 2017; Willis et al., 2017). The internal consistency and Cronbach’s alpha values have been found acceptable, and the construct validity for part B measured by confirmatory factor analysis (CFA) generally confirms a satisfactory model fit.

All in all, an instrument that measures healthcare professionals’ (RNs’ and NAs’) perceptions regarding MNC in a Swedish context would be valuable to identify and comprehend areas that need development, not least for nursing managers that are responsible for quality of care and patient safety. Therefore, the aim of the present study was to establish the validity and reliability of the translated version of the MISSCARE Survey in Swedish by evaluating its psychometric properties.

3 | METHODS

The Revised Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) directed the presentation of the results. See Appendix S1.
3.1 | Procedure of the translation and adaptation process

The translation of the MISSCARE Survey—Swedish version was accomplished according to World Health Organization (WHO) guidelines (World Health Organization, 2020) including forward translation, expert panel back-translation, cognitive interviewing, pretesting and final version.

3.2 | The translation and adaptation process

The research group (CN, KG, AF, AvV), all RNs, PhDs and hold positions as directors of nursing development, conducted the translation and adaptation process and are experts in nursing and have experience in instrument development and translation. The forward translation was performed within the research group, who were all knowledgeable about English-speaking culture but had Swedish as their primary language. This process was carried out until consensus was reached within the group.

The expert panel consisted of five other RNs at the hospital who had the same position as the members of the research group. The expert panel was contacted and met when there was a need to identify and resolve inadequate expressions/concepts in the translation, and other discrepancies. Nearly all in the panel members had a PhD, and some also had experience in instrument development and translation. The expert panel was contacted throughout the whole translation and adaptation process, when needed. Moreover, when consensus within the research group was reached, the forward translation was sent to a professional translator who translated the Swedish version back into English.

To validate the back-translation with the original version, five RNs with clinical expertise were contacted; one of them was a Swedish native with good knowledge of English, and the rest were English native speakers with Swedish as their second language, and their academic degrees varied between bachelor and PhD. The RNs were asked to rate the items one by one and indicate if they perceived the translation as "exactly the same meaning (content and wording were the same)," or "almost the same meaning (content was the same with different wording)," or "different meaning (content and wording were not the same)." The cognitive interviewing was conducted by the first author. Three RNs and two NAs who worked clinically with patients were selected and asked to take part in this individual interview. The participants read the items one by one and were then told to say out loud if there was anything that was not clear about the questions or that they did not understand. As the last step, a consensus within the research group was obtained after scrutinising the rating of the back-translation together with the results from the cognitive interviewing. Seven questions in both part A and part B were slightly changed due to the content and/or context, and a final version for the pilot testing was obtained. This translation and adaptation process took about 16 months.

3.3 | Pilot testing and participants

RNAs and NAs at a large university hospital in Sweden were asked to answer the pilot version of the MISSCARE Survey—Swedish version on two occasions within two weeks as a test and retest between October–December 2019. The questionnaire was given as a web survey sent to each participant's work email address.

3.4 | Statistical analysis

Acceptability, indicating ease of use (Waltz et al., 2010), was evaluated for both parts A and B of the MISSCARE Survey—Swedish version, measured by frequency of missing data.

A confirmatory factor analysis (CFA) with maximum likelihood estimation and robust standard errors (MLR) was performed to examine the fitness of the original factorial structure in part B. The fit of this model was assessed by a combination of fit indices: the Satorra–Bentler scaled chi-square test statistics, Comparative Fit Index (CFI), root mean squared error of approximation (RMSEA), and standardised root mean square residual (SRMR). Cut-off values of 0.95 for CFI, 0.08 for SRMR, and 0.06 for RMSEA and non-significant chi-square statistics indicated fit of the model to data (Hu & Bentler, 1999). Justification for modifications to the model was approached first by examining Modification Indices (MI). If the results indicated a need for extensive model re-specifications (i.e. too many model modifications), exploratory factor analysis (EFA) with Geomin rotation within the framework of exploratory structural equation modelling (ESEM) was used, as recommended by Asparouhov and Muthén (2009) to examine the factorial structure of Part B. Test–retest reliability was checked to evaluate the stability of item response over time, using the intraclass correlation coefficient (ICC) with confident intervals (CI) of 95%. Cronbach's alpha coefficient was calculated to determine the internal consistency for part B and for the subscales in part B. The statistical software used was IBM SPSS Statistics version 25 (IBM, US, 2017). For the CFA and EFA, Mplus V8.3 software was used.

3.5 | Ethical considerations

The study followed the principles outlined in the "Declaration of Helsinki: 1964" and its later amendments and was approved by the National Ethical Review Authority, reference number 2019-04080. Written information about the study was given as an introductory text to the web survey, where voluntariness was emphasised, and confidentiality guaranteed. By answering the questionnaire, the participants consented to participation. The web survey tool compiled a code list that only the administrators of the survey tool had access to. The researchers had access only to unidentified data.
4 | RESULTS

4.1 | Participants

A total of 915 RNs and NAs at different units were invited to participate in the pilot test, that is the test–retest. Of the 248 RNs or NAs who answered the survey on the first occasion, 126 participated in both the test and retest. The demographics are shown in Table 1.

4.2 | Acceptability, test-retest

4.2.1 | Part A

In the test, there were 113 missing items in total (0–11 missing answers per item), and in the retest, the total was 115 (4–9 missing answers per item).

4.2.2 | Part B

In the test, there were 134 missing items in total (0–13 missing answers per item) and a total of 114 in the retest (4–11 missing answers per item).

4.3 | Confirmatory factor analysis

In the CFA, 248 RNs or NAs were included. The analysis outlined a three-factor model of the preliminary 17-item instrument with notably insufficient fit to the data by a highly significant Satorra–Bentler scaled chi-square ($S-B \chi^2 = 351.40; df = 116; p < .0001$) and CFI markedly lower than 0.95 (CFI = 0.798), an excessively high value of SRMR = 0.112, and RMSEA = 0.092 (90% CI = 0.081–0.10). Upon two iterative runs of re-specifications, the fit indices still failed to approximate adequate fit (chi-square ($S-B \chi^2 = 292.32; df = 114; p < .0001$, CFI = 0.847, SRMR = 0.105, and RMSEA = 0.07, 90% CI = 0.081–0.093), so EFA within ESEM was implemented as a follow-up analysis.

On the basis of four iterations of EFA within ESEM with Geomin rotation, five items were omitted as follows: “medications were not available when needed” (substantive significant cross-loadings), “inadequate hand-off from previous shift or sending unit” (low overall factor loading < 0.3 and significant cross-loadings), “caregiver off unit or unavailable,” “unbalanced patient assignments” and “heavy admission and discharge activity” (significant cross-loading). The results of the EFA on the remaining 12 items indicated evidence of fit of the model for both a four-factorial model and a three-factorial model. However, the four-factorial model contained a factor with no significant item-loadings and was, consequently, discarded. The three-factorial model showed a non-significant Satorra–Bentler scaled chi-square ($S-B \chi^2 = 42.96; df = 33; p = .11$), CFI = 0.988, SRMR = 0.028, and RMSEA = 0.036, 90% CI = 0.00–0.063. These fit indices indicated an excellent fit to data, so the three-factorial model was selected. The factorial loadings of the items are displayed in Table 2. The overall pattern of loadings indicated a similar distribution of items to the original model with the exception of the item “other departments did not provide the care needed (e.g. physical therapy did not ambulate).” However, due to that the factor “communication” was not interpretable when this item was included, all
proceeding reliability analyses were performed while excluding this item.

4.4 | Reliability

The test-retest reliability was completed with 126 participants who completed both the test and retest. The overall test-retest ICC for part A (24 items) was 0.907 with CI 95%, indicating a good reliability. The overall test-retest ICC coefficient for part B was based on the results of the CFA and EFA (i.e. 11 items were omitted) and was 0.514 with CI 95%, indicating a moderate reliability. The three sub-scales had an ICC coefficient ranging from 0.560–0.710 with CI 95% (Table 3).

4.5 | Internal consistency

The internal consistency was calculated with Cronbach’s alpha, including the 248 participants. It was based on the results of the CFA and EFA, excluding six items. For the total scale of part B, Cronbach’s alpha was 0.769. The three-factor Cronbach’s alpha is given in Table 3 and indicates acceptable to good internal consistency.

5 | DISCUSSION

The present study describes the validity and reliability of the translated version of the MISSCARE Survey into Swedish by evaluating its psychometric properties. The internal consistency and construct validity were assessed, and the translation showed satisfactory psychometric properties.

5.1 | Translation and adaptation process

When translating and culturally adapting an instrument, it is of the utmost importance to be as close to the instrument in origin as possible. As the instrument was developed approximately 15 years ago and in the United States, there were difficulties in the translation and adaptation process in finding equivalent words, both in content and semantic terms, in Swedish. One problematic item was “unbalanced patient assignments,” where in the Swedish version the text “due to caring needs” was added. In a Swedish context, “caring needs” or “workload” is an important topic that is discussed daily among the nurses and within the nursing teams on the wards. To date, we have not had a valid and reliable instrument to determine the workload within the nursing teams. Therefore, to clarify that it is not just the number of patients that counts, but also the patient dependency, this text was added.
Another item that was culturally adapted was "nursing assistant did not communicate that care was not provided," where in the Swedish version the words "nursing assistant" were changed to "nursing staff" as it is not just the NAs who do not communicate that care is not provided; sometimes, it is the other way around and we did not want to highlight this group especially. The items were clarified sorted out through email correspondence with the author of the original version, as well as the author of the Icelandic version, who worked in close collaboration with the original author. Also, there was a Skype conversation to discuss and clarify unclear aspects of the original. However, this process shows some of the difficulties and the need to culturally adapt items within the translating process to make them relevant in the context.

As well as in the translation of the MISSCARE Survey into Icelandic (Bragadottir et al., 2015), there were difficulties in finding an adequate term that captured the meaning of "missed nursing care" in a Swedish context as there is no equivalent term for "nursing care." Also, there were discussions about the word "missed," and whether the respondent should interpret the word as "missed," "left out" or "omitted." This required consultation with the expert panel as well as with RNs and NAs to capture the core meaning. As Hilton and Skrutkowski propose, field testing and refining the items and instrument with persons from the target culture are necessary to serve as a check for translation quality (Hilton & Skrutkowski, 2002).

### 5.2 Internal construct validity

The CFA failed to show an adequate fit between the suggested MISSCARE model and the observed data in this study; that is, there was a failure to cross-validate part B of the MISSCARE Survey. The indicated lack of support for the initial multi-domain model in the CFA appears to be due to problematic content on item level; that is, several items did not adequately reflect the hypothesised latent domains, that is "communication," "labour resources" and "material resources." As six items were finally removed, the overall pattern of loadings indicated a similar distribution of items to the original model. When scrutinising these items, one of the difficulties might have been due to the translation process; for example in Swedish, the word "caregiver" can be interpreted in several ways and thus needed to be clarified. Although individual items still provide important information, due to these findings, the mentioned issues need to be further settled in future studies in a Swedish context.

### 5.3 Internal consistency

The internal consistency for part B, measured by the Cronbach's alpha, was found to be good in the test and retest. Moreover, the Cronbach's alpha for the domains in the test and retest indicated an acceptable to good internal consistency where the Cronbach's alpha for the domain "labour resources" was slightly beneath the recommended alpha value of 0.70 (Nunnally & Bernstein, 1994).

### 5.4 Methodological considerations

A total of 915 RNs and NAs were asked to participate in the web survey. However, the response rate was low, since only 126 participated in the test and retest, representing 14% of the eligible nurses. Although there was written and oral information from both the responsible researchers and the heads of the units, we did not achieve an appropriate response rate. This may have been because the survey was received by the healthcare professionals through their inbox email, which they do not routinely check. Also, working three shifts and not being at the unit during the daytime in the week may have had some implications as well. However, the response rate was considered to be sufficient for the method and results of the current study.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's α</th>
<th>Item</th>
<th>ICC test-retest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Labour resources</td>
<td>0.677</td>
<td>Inadequate number of staff</td>
<td>0.568</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unexpected rise in patient volume and/or acuity on the unit</td>
<td>0.487</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Urgent patient situations (e.g. a patient's condition worsening)</td>
<td>0.325</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inadequate number of assistive personnel (e.g. nursing assistants,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>techs etc.)</td>
<td>0.286</td>
</tr>
<tr>
<td>2. Material resources</td>
<td>0.827</td>
<td>Supplies/equipment not function properly</td>
<td>0.517</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Supplies/equipment not available when needed</td>
<td>0.442</td>
</tr>
<tr>
<td>3. Communication</td>
<td>0.879</td>
<td>Nursing assistant did not communicate that care was not done</td>
<td>0.389</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tension or communication breakdowns with the medical staff</td>
<td>0.384</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tension or communication breakdowns with other support departments</td>
<td>0.355</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of back-up support from team members</td>
<td>0.348</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tension or communication breakdowns within the nursing team</td>
<td>0.306</td>
</tr>
</tbody>
</table>
To translate an instrument into another language and culturally adapt it to a new context is time-consuming and requires a great effort from both the researchers and the healthcare professionals who are asked to assist. Still, the researchers worked close to the guidelines and did not hesitate to probe into questions where the content and context needed further clarification, with assistance from both the strategic nursing council and other nurses.

A considerable number of items showed poor psychometric properties. This might be explained by difficulties with some words which needed to be adjusted to the Swedish context. Also, the items might be unclear and open to interpretation to the reader, especially when there are clarifications within the item, for example “other departments did not provide the care needed (e.g. physical therapy did not ambulate)” as the item may be interpreted in different ways.

Nevertheless, the MISSCARE Survey—Swedish version showed adequate psychometric properties, including good acceptability and internal construct validity when omitting items and applying a modified factor structure, as well as good internal consistency.

6 | CONCLUSION

In the current study, we found the MISSCARE Survey—Swedish version to be reliable and valid with good psychometric properties. Hence, the instrument is suitable for assessing MNC at in-hospital settings in the Swedish context and the study adds to the body of scientific knowledge concerning the measurements of MNC, including the nurse–patient ratio and competence mix.

7 | RELEVANCE TO CLINICAL PRACTICE

More reliable language versions of the instrument enable national and international comparisons that could be valuable for nursing managers and/or directors of nursing who are responsible for quality of care and patient safety in the strategic care planning process.

ACKNOWLEDGEMENTS

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

AUTHOR CONTRIBUTIONS

Translation and culture adaption of the instrument and initial statistics: CN, KG, LF and AvV; exploratory factor analysis and confirmatory factor analysis and text in the results: FS; manuscript responsibility: CN and AvV; and manuscript preparation: CN, KG, LF and AvV.

ORCID

Carolin Nymark  https://orcid.org/0000-0003-0891-6358
Ann-Christin von Vogelsang  https://orcid.org/0000-0002-3006-2443

REFERENCES


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Additional supporting information may be found online in the Supporting Information section.