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Research Article

Benefits of Nausea Vomiting Scales in Practice- A Research Study

Angela P Halpin* and Loucine Huckcbay

Case Management, University of California, Irvine Medical Center, USA

***Corresponding Author:** Angela P Halpin, Case Management, University of California, Irvine Medical Center, USA.

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Abstract

Purpose: The psychometric properties of the Halpin Nausea and Vomiting (HNV) scale with descriptors were tested for reliability, validity, and sensitivity. Symptom control is important for patients' comfort and affect responses to illness or surgery. NV scales vary in psychometrics.

Design: A methodology quantitative study.

Methods: Adults (N = 163) Group I, with NV (medical-surgical); Group II, oncology patients with no NV on admission, predicted to experience NV due to chemotherapy; and Group III (control), patients with other diagnoses. Inter-rater reliability, concurrent validity, sensitivity measures of differences in NV at three separate intervals. Morrow's proven scale compares validity and reliability.

Findings: The HNV scales reported a high inter-rater reliability (Kappa = .825, $p < .001$) as compared to the control group. Concurrent validity was established between HNV and Morrow's worst nausea ratings. Results confirmed fine differences between and within groups, establishing sensitivity.

Conclusion: Application of HNV scales contributes new knowledge for tools selection.

Keywords: *Nausea and Vomiting (NV); Halpin Nausea and Vomiting (HNV)*

Introduction

Nausea and vomiting (NV) exhibited by hospitalized patients are common symptoms that nurses assess every day. Perianesthesia nurses note specifically that their patients frequently express fear of these symptoms with each surgery [1]. Yet, inconsistency exists amongst nurses and other health-care professionals in quantifying patients' evaluation of these symptoms.

Communicating the symptoms' severity within the context of the care may prove difficult unless scales are implemented that provide consistent measures. Patients often are not asked to describe the frequency or intensity of their symptoms. We know that controlling NV is recognized as an important aspect to stabilizing patients' hemodynamic status [2,3]. Researchers have been constructing and testing scales to measure NV since the 1970s and have found the ability to accurately evaluate the severity of NV to be problematic, particularly in acute care settings [4].

Kirkova evaluated 21 different NV scales in a systematic review for use in cancer care [4]. The finding indicated that a majority of these scales varied in terms of symptom and distress measures, and it was not clear how they were applied in perianesthesia or general nursing [4]. Additionally, since not all studies tested the scales' validity and reliability, their dependability was often in question. The usability of the existing NV scales has an additional concern because many are self-reporting questionnaires, which proved to be cumbersome in

acute care settings [4,5]. Recent interest both, nationally and internationally in measuring NV symptoms has been documented in literature as necessary in order to standardize practice and improve communication based on evidence. Unfortunately, however, psychometrics to enhance scale selection are scarce [6,7]. Perianesthesia care has published post-operative nausea and vomiting (PONV) algorithms to identify risk, yet prior to the surgical experience other clinical areas also must measure and manage these symptoms [1,8].

Statement of the problem

Study results show that the incidence of NV approaches are applicable in various patient populations, since most experience these symptoms [9-11]. Often, symptoms during acute care hospitalization occur in oncology, medical-surgical, emergency and gastrointestinal patients. Yet, it is known that although tools to measure NV exist, they are not used in all clinical areas. Psychometric studies provide confidence in selection of instruments/scales available in practice. It is surmised that the use of sound instruments must be applied to symptom assessments.

Management of care mandates that a nurse's practice requires accurate assessment of a patients' symptoms, and the ability to communicate findings to other health care providers [12-14]. Rating of the degree of the NV symptoms must be accurate, and patients' participation is needed in an initial assessment. Each assessment requires consistency to quantify severity so treatment can be more appropriate and precise, to allow for improved outcomes. Although guidelines are available to identify risk in perioperative care, all care units are faced with the challenge of assessment. When RNs collaboratively communicate clear findings using the same assessment scales when transitioning patients between units, better outcomes are possible.

The evolution of the HNV scales was a result of nurses' dissatisfaction with poor measurement of NV symptoms [16]. In clinical units, RNs and physician personnel found difficulty both in measuring the severity of the NV experience and in communicating with each other and with patients on the degree of such NV occurrences. Therefore, the HNV scales were designed with specific descriptors so nurses are able to assess and accurately record the severity of NV, while enabling the patient's involvement in expressing their symptom experience. This psychometric study of the HNV purposes was adopted at community hospitals in the perianesthesia area, obstetrics, oncology, medical-surgical, and all nursing units. Policy and procedure was adopted with fields for documentation integrated in the electronic medical record (EMR) for use of the scale during nursing assessments. The perianesthesia nurses adopted the scale after pilot testing in the perioperative arena during adoption of a specific PONV algorithm.

Statement of Purpose

In order to translate the HNV scales into practice, obligatory research must be undertaken to address the psychometrics. During this step the Morrow scale was selected, since it correlated to the degrees used in the HNV. The researcher correlates both to verify psychometric properties. Both scales are designed with degrees of intensity (very mild, mild, moderate, severe, very severe and intolerable) yet Morrow's lacks descriptors.[11] This study uses the Morrow scale, and also uses descriptors from the HNV scales to attest to validity and reliability. Patients participate in rating their symptoms using both scales' parameters. The difference in HNV scales versus the Morrow is that the HNV descriptors assist patients in clarifying their symptoms' intensity and severity.

This study claimed that the HNV scales are reliable and valid for measurement of NV. The purpose of the study was to establish the psychometric properties of the HNV scales with descriptors (NVWD) by measuring their inter-rater reliability, validity, practicality, and sensitivity. Research questions were: 1. What is the reliability of the NV scale? 2. What is the validity of the NV scale as measured by construct validity? 3. What is the practicality of the NV scale? and 4. What is the predictability of the NV scale?

Review of the Literature

MEDLINE (Ovid and PubMed) and Virginia Henderson International searches provided evidence of NV scales' construction since the late 1970's. Criterion-referenced measures are used in standard of care interventions with NV symptoms noted in evidence-based studies [17]. Cancer treatment centers frequently use scales, however many clinical areas also require measurement of NV: obstetrics, emergency care, and medical surgical areas [13,18]. Psychometric tests are scarce, although evidence in literature acknowledges their importance in choice of scales [17,19].

Additionally, surgical tools have been developed to measure risk factors that deter NV symptoms post procedural patients [8]. An example is an original study conducted by Apfel, Laara, Koivuranta, Greim and Roewer (1999), which assessed predictors for postoperative nausea and vomiting (PONV) [20]. This prospective evaluative study reviewed samples from 520 and 2,202 adult patients, and analyzed the distribution of predictor characteristics of PONV. It affirmed predictor variables of gender, previous history of motion sickness and/or PONV, non-smokers, and types of surgery. Establishing risk scores assist in selection of anesthesia medications prior, during intra-operative and post-operative periods. Yet, it is a risk stratification and does not reference use of tools that measure intensity or degree of N/V.

Myles and Wengritzke (2012) also assessed PONV degrees of risk in a sample of 163 and found poor management affected recovery [19]. Risk stratification assisted in identifying the degrees of individual responses to PONV risk; however, gaps remain in clinical studies regarding the use of scales to complete initial assessments that measure intensity or degree of NV symptoms prior to application of the PONV tools. Boogaerts (2000) examined surgical patient predictors for PONV and medication effectiveness with choices of rescue medications [21]. There were, however, no descriptors to clearly explain patients' ability to tolerate oral intake post procedures during assessments.

Morrow (1984) summarized studies and discussed both observer-rated and self-reported scales [11]. He critiqued these tools to be global in their explanation of the NV symptoms and their description of the characteristics of each. He found that patients who reported anticipatory nausea were more likely to express the symptoms ($p < .001$). Morrow then developed the Morrow Assessment of Nausea and Emesis (MANE) tool [11,22]. His scale was designed as a self-reported tool as he believed "patient self-reports of these side effects may be more accurate and clinically applicable in assessment" (p.2272) [11]. The MANE scale separates questions into anticipatory nausea, anticipatory vomiting, post treatment nausea, and post treatment vomiting. The MANE scale has components addressed in the worksheet. Psychometrics properties of the MANE tool were established in 500 consecutive oncology outpatient situations [22]. Morrow's measures of validity content showed both nausea and vomiting inter-rater had a variance (0.50) and that there was 25% of shared variance with reliability test retest across four variables of anticipatory NV, and post treatment NV $r = 0.78$ [22].

Rhodes and Daniels furthered summarized existing scales that measured NV. There evidence emphasized the importance of psychometrics instruments [5]. The resource was a bases for extending selection based on the science of reliability and validity. According to Frank-Stromborg and Olsen, identified NV tools were not pervasive in acute care settings, but were often used in outpatient settings [23]. Self-reported ratings of the existing tools consist of lengthy questions, and have varying degrees of reliability, validity and intensity of ratings. And much of the research on NV reflects studies conducted on chemotherapy patients using questionnaires over time [22,24]. These studies evaluated medication effectiveness along with the episodes of NV.

Management of symptoms using medications and protocols such as PONV algorithms have become common practice [9]. Identification of the risk for nausea and vomiting are utilized based on factors derived from surgical and oncology patients [1,9]. Although these algorithms are useful in management during perioperative care, nurses in multiple areas of acute care need to measure the symptoms' presence prior to implementing PONV risk if applicable [8].

According to literature, psychometric evaluation includes measurement of attributes, and requires a formal study to demonstrate psychometric properties [17,28]. The purpose of this study was to scientifically establish the soundness of the CNV scales, thus ensuring the scales accurately measure the degree and severity within psychometric properties.

Methods

Design

The study employed a methodological quantitative quasi-experimental design using three groups to establish the validity and reliability of the HNV scales. The study was approved by an outside institutional review board (IRB) and also approved by the internal hospital and nursing research councils. The convenient sample consisted of three groups of adult patients, recruited from the patient population on admission. The sample selection criteria included adult patients 18 years and older, mentally alert, able to speak, read and write English fluently, and willing to participate in the study. Settings were two acute-care hospitals, with subjects selected to establish the psychometric properties of the HNV scales with descriptors. A total of 75 male and 88 female patients (N = 163) participated in the study.

The three groups were near equal in size, with each having about 50 subjects. Each group received the same assessment tool. Group I (n = 54) were those admitted to the hospital with the primary diagnosis (a primary symptom of NV), medical surgical. Group II (n = 52) were cancer patients admitted to the hospital with no reported feelings of NV, but who met the predictive criteria for nausea or who were scheduled to undergo chemotherapy. Group III (n = 57) was the control group of patients who were admitted to the hospital with any other medical-surgical diagnosis, with no reported feelings of NV and who were not expected to experience any nausea or vomiting. The scales were equally administered to these three groups after consent was granted. The control group established the reference point of the rate "0" baseline. If any of the control group patients experienced NV at any time, they were excluded from the study because they could no longer be rated as "0".

Data collection

Instruments: Three instruments were included as part of the study: the HNV scales with descriptors, the Morrow (MANE) Tool, and the demographic data sheet [11].

Clinical nausea and vomiting (HNV) scale: The HNV scales consist of two parts: part I is the nausea item scale, which measures the extent to which a patient is experiencing nausea. The patients rated the severity of their symptoms by using the HNV descriptors. Part II of the scale measures the vomiting item by frequency, intensity and amount using descriptors to rank degree. Each item rates the patient's respective feelings of NV using the HNV 6-point rating scale, with zero indicating no nausea or vomiting, graduating to five, which indicates severe feelings of nausea and very frequent and intense experiences of vomiting. Each rating has its own descriptors.

The HNV scales were adapted from Rhodes Index, National Cancer Institute and Williams studies [24-26]. The uniqueness of the HNV scales is that each rating has its own descriptor. The descriptor being the operationalization of the number rating, this contributes to the scales' sensitivity and practicality. The specificity of each rating enables the patient and the nurse to make a more accurate and relevant assessment. In the Halpin study conducted in 2007, nurses preferred using the HNV tool with the associated descriptors over the tools that lacked descriptors [16].

The procedure began by following steps to complete scoring of the HNV scales. After a patient gave verbal consent to participate, two nurses entered the patient's room (one RN as the speaker and the second RN as an observer). A worksheet was used and read aloud which included HNV with descriptors and the Morrow scales. Each patient then specified his/her feeling of individual NV symptoms, and both RNs (RN1 and RN2) circled the patient responses onto the worksheet during the encounter. The responses are indicative of the descriptors which were read aloud.

Inter-rater accuracy of recording responses was established by having the two trained RNs rate each of the patients at the following three time periods: upon admission, at the time when the patient complained of feeling nauseous or reported vomiting, and 30 minutes after the patient received anti-nausea or anti-emetic medication. Detailed results are presented in the results section. Validity of the tool was established by four methods, which are described below.

First, content validity was substantiated with literature; HNV scales were based on the rationale of the studies conducted by Morrow, Rhodes Index of Nausea, Vomiting and Retching, and by the National Cancer Institute guidelines for toxicity grading of both NV [24-26]. The second method of establishing validity was through the use of a panel of five judges who are experts in the subject matter. Each member of the panel rated each of the items of the scales on whether it measured the degree or the severity of nausea or vomiting. The agreement among the judges was 95 percent. The results of the third (predictive validity) and the fourth (concurrent) methods establish validity by correlating the HNV with Morrow's MANE nausea and vomiting tool. The results are presented in detail in the results section.

Morrow's assessment of nausea and emesis (MANE) tool: MANE is a patient self-report questionnaire that assesses the occurrence, duration, severity and intensity of post-chemotherapy and anticipatory nausea and vomiting. MANE consists of five major questions with several sub-questions for a total of 16 of the 17 questionnaire items. The questions that tap "onset" and "intensity" of nausea are constructed on a 6-point Likert rating scale. Eight of the 16 question items paralleled the HNV tool. These items included the main question related to the experience of the symptoms of nausea or vomiting, and descriptions of the symptoms. However, the HNV used detailed descriptors versus descriptors of the MANE scale of mild, moderate, and severe. Time frame related to the symptoms of vomiting was less frequent in the study assessments.

Demographic data sheet: Demographic characteristics were collected to determine potential relationships to the incidence of NV: age, gender, diagnosis, history of PONV and motion sickness, type and length of surgery, whether the patient is a smoker or a non-smoker, and if cancer patients had a previous history of post-cancer treatment NV. Demographic data are reported by several studies to be predictors for NV [20,27].

Procedure

The data collection phase began after the Protection for Human Subjects review was obtained from IRB. Daily census logs were used to identify subjects who fit the study inclusion criteria. Each identified patient was recruited by the research nurse who explained the study and who provided an information sheet on the study. Once patients verbally consented to participate in the study they were assessed for NV symptoms. To determine the severity of NV symptoms, the RN1 read scales with descriptors from the worksheet and directed the patient to determine a rating by verbally selecting the ratings. A second RN2 simultaneously recorded what the subjects responded without consultation. Both RNs independently recorded the patient's response to the questions on worksheet which included both the CNV tool and on the Morrow's MANE tool.

Three readings on the two NV scales were obtained by the study RNs from each patient: (1) upon admission, (2) with the first incidence of feelings of nausea and/or vomiting in the first two groups of patients, and (3) 30 minutes after a non-medical intervention or an anti-nausea and vomiting medicine was given. The control group followed similar procedures providing readings on NV; (1) upon admission, and also while the first two groups of patients were being tested for the second (2) and the third (3) readings. The control group did not receive anti-nausea or anti-emetic medicines. If they required any anti NV medications, they were excluded from the study. Since there were 163 patients, and each was observed three times, the total number of observations and reading of the status of NV was 489 observations.

Data analysis

Inter-rater recorder accuracy for both the HNV scales and the Morrow MANE tool were computed using the Kappa measure. Pearson Product moment correlations were used to determine the concurrent validity between the HNV and the Morrow's MANE tools. Multiple regressions and chi square tests were used to determine the predictability of NV from the variables of gender, history or PONV, smoker versus non-smoker, or motion sickness. Analysis of variance (ANOVA) for repeated measures was used to determine the sensitivity of the scales. This step detected differences between the groups and determined whether there was an interaction effect.[17] Belonging to a group depended upon both membership in that group and the time of the measurement.

Results

The groups were assessed for comparability and chi square tests and were non-significant for ethnicity, gender, coronary artery disease, hypertension, diabetes, congestive heart failure, other medical surgical diagnosis and risk for PONV. On admission, the groups differed in terms of nausea. Group I had significantly more nausea patients ($p < 0.001$) and a higher degree of the diagnosis of pancreatitis ($p = 0.01$). Group II had significantly more cancer diagnosis ($p < 0.001$), and chemo patients ($p < 0.001$). In terms of age, one-way analysis of variance indicated that the groups were significantly different ($p = .003$). Scheffe's test indicates that Group I patients (the medical/surgical group) were significantly younger ($p < .05$) than the control and the cancer group. Groups II and III were homogenous with no significant difference in age.

One of the major purposes of the study was to establish the inter-rater agreement by recording responses from patients using both the HNV tool and the Morrow's MANE tool [11,22]. For each rating made, the two raters' responses were cross tabulated and Kappa, a measure of inter-rater agreement, was computed. The percentage of agreement ratings was also tallied, as Kappa cannot be computed if only one rater uses a particular rating, or if one of the variables is constant, as was sometimes the case. On the Morrow MANE scale, some ratings (duration and worst severity) are made only if the subject reports the presence of nausea or vomiting, so these ratings were set to "blank" and were not included in the tallies of inter-rater agreement. The inter-rater agreement was very high. All Kappas were significant at the $p < .000$ level and for the two instances where Kappa was not computed, there was 100 percent agreement. Kappa ranged from 0.851 to 1.00, and the percentages of perfect agreement ranged from 91 to 100 percent. These findings indicate that the HNV scales have high inter-rater reliability.

Concurrent validity: HNV scales were analyzed with respect to their correlation with Morrow's scale: "Are you experiencing nausea /vomiting right now?" "What was the duration of the nausea or vomiting?" and "How severe was the nausea/vomiting at its worst?" The highly significant correlations were between the HNV scales and the respective Morrow scales that indicated whether or not the subject was presently experiencing nausea or vomiting. These six correlations ranged from $r = -0.852$ to $r = -0.619$ and were significant at $p < .000$ level. This correlation was negative because of the higher value on the HNV scales. Greater NV is related to "yes, I am experiencing NV," which was coded as 1 and "no" was coded as 2 in the Morrow scale.

Regarding Morrow's scale question related to worst nausea ratings, the correlation between the Halpin nausea scale and Morrow nausea scale was significant at time 1 ($r = 0.318$, $p = 0.038$, $n = 43$). Some of the other correlations were high, but not significant because of the low number of cases on the Morrow duration and worst-severity scales. These findings provide evidence of concurrent validity of the Halpin tool when it is compared to the Morrow tool.

Concurrent validity was also calculated between Morrow's drug efficacy rating and changes in HNV ratings. It is reasonable to expect patients who report that anti-emetic drugs are beneficial would also have a decrease in their Halpin nausea and vomiting ratings. HNV ratings made 30 minutes after the administration of the medication were subtracted from those made just before the medication was

administered, yielding an increasingly positive number for improving conditions. The gains in HN ratings had a significant correlation ($r = -0.281$, $p = 0.019$, $n = 69$) with Morrow ratings of drug effectiveness.

These gains scores, excluding the control group, were then correlated with Morrow ratings of drug usefulness, where 1 meant "very useful" and 4, "doesn't seem to help." The Halpin vomiting change scores varied in the expected direction, but the correlation was not significant ($r = -.201$, $p = 0.097$, $n = 69$). This may have been due to lack of incidences of patients experiencing vomiting.

Sensitivity: Sensitivity of the tool was measured by the ability of the tool to quantify variations in the feelings of NV. This was done by the administration of medication over the three time periods by each of the groups: 1 (at admission), 2 (during feelings of nausea and/or vomiting, 3 (at 30 minutes after the administration of medication).

HNV ratings were averaged by group and plotted over time. A two-way analysis of variance with repeated measures on nausea scores indicated that there was a significant group effect ($F(2,160) = 29.131$, $p < 0.001$). This analysis observes that the groups differed in their feelings of nausea, a significant time effect ($F(1,160) = 14.465$, $p < 0.001$) meaning that there were differences between times 1, 2, and 3. There was also a significant time by group interaction effect ($F(2,160) = 7.306$, $p = 0.001$), meaning that feelings of nausea are jointly determined by both belonging to a specific group and the time period when nausea was measured.

The group means followed the expected pattern: low and unchanging scores for the control group vs. high initial nausea for Groups I and II that decreased after admission and dropped more sharply after medication. For the cancer group the scores increased after admission and chemo, followed by decreasing scores after anti-nausea drugs were administered. These findings suggest that the HN rating is sensitive to the phenomenon the scale was designed to measure.

In regard to the HV scale, the group factor was significant ($F(2,160) = 5.933$, $p = 0.000$), as was the time factor ($F(1,160) = 6.509$, $p = 0.012$), but the group by time interaction was not significant, ($F(2,160) = 1.414$, $p = 0.246$). As was the case with the nausea scale, belonging to a specific group was a determinant on the feelings of vomiting. There were also differences in feelings of vomiting over the three periods of time. However, there was no interaction effect between group membership and the time that the feelings of vomiting were measured. Group I tended to have higher scores, but both the NV (medical-surgical) and cancer groups' (Group I and II) vomiting ratings decreased at approximately the same rate. These findings suggest that the vomiting rating is sensitive to the phenomenon the scale measures in its design.

Predictability of the tool from the demographic data: One of the questions explored the relationship between gender and risk for postoperative nausea and vomiting (PONV). The Morrow and Halpin scales did not have these variables and were considered in aspects of analysis, as the NV scales were used on both medical and surgical patients. The variables risk for PONV, NV on admission, smoker status, motion sickness, and history of PONV were used to predict gender in a stepwise multiple regression procedure. Multiple regression is a test that selects the variables that are most related to gender. A multiple regression was conducted to determine if the predictor variables of PONV, history of smoking, motion sickness, and nausea on admission are related to the gender of the patients. Results showed that history of PONV and motion sickness were related to the gender of the patients $F = 8.307$, $df = 2$, $p < .001$). However, only 10 percent of the variance is in common, that is attributed to gender. Thus, we can conclude that if a patient has a history of motion sickness and PONV, the probability that that patient is more likely to be female.

Cross tabulations of the predictor variables and gender were also determined. The cross tabulation of gender by PONV history yielded a ($X^2 = 9.11$, $df = 1$, $p = 0.003$), with females tending to having a history. Motion sickness related to gender was also significant ($X^2 = 8.248$, $df = 1$, $p = 0.004$) with females reporting histories more often. Not entered in the regression equation was NV related to gender on admission, which is also significant ($X^2 = 7.938$, $df = 1$, $p = 0.005$), with females tending to report nausea on admission more frequently. These

findings suggest that if a person has a history of PONV and motion sickness upon admission, the likelihood is higher that person's gender is female.

The second question determined if there was predictability between Halpin and Morrow ratings from PONV factors. To answer this question, the ratings made by the two raters were averaged to obtain a single rating on each scale item (Halpin nausea, Halpin vomiting (HNV), Morrow worst nausea, Morrow worst vomiting) for each of the three time periods, with a total of six HNV ratings and six Morrow ratings. These averaged ratings were used as the dependent variable in stepwise multiple regression analyses to determine the extent to which the ratings could be predicted from PONV-related variables (risk for PONV, NV on admission, smoker status, motion sickness, history of PONV, and gender).

Presumably there should be a relationship between the ratings and variables dealing with the construct of NV. Results showed that three H ratings had one predictor variable (NV on admission), and three had two predictor variables (NV on admission, and history of PONV or gender) entered at the .05 level of inclusion in the regression equation. For the Morrow ratings, only two ratings could be predicted using equations, with singular variables entered at the .05 level (NV on admission or motion sickness). Morrow ratings of the "worst nausea" or "worst vomiting" were completed only if the patient reported nausea or vomiting at the time that the survey was taken, and the number of cases with Morrow ratings varied from 6 to 43, whereas the Halpin ratings all had 163 cases. The latter may be because the Halpin ratings appear to be related to, or better anchored with, the predictor variables, suggesting that they have construct validity.

One additional test examined whether the HNV scale was related to risk for PONV and history of PONV over the time periods, using the Pearson Product Moment Correlation. Results showed that there is a marginally significant relationship between HV ratings and risk for PONV ($r = -0.182$, $p = 0.05$) and history of PONV ($r = 0.224$, $p = 0.01$) only at time 1 (admission). This finding provides additional support for the construct validity of the HNV tool.

Analysis of variance (ANOVA) was used for comparison of groups across the three time periods. The Cronbach was unable to be applied because the scales were single-item scales. Statistical Package for the Social Sciences (SPSS) 18 was applied to complete analysis.

Discussion

The findings of this study expand nursing knowledge regarding the psychometrics of NV scales and increases the scales' value to the goals of evidence-based practice [17]. Nursing knowledge and a curriculum that includes practical tools used to assess symptoms, accentuate the value of nurses' interactions and management of outcomes. For example the HNV scales and PONV algorithms; lend to evidence-based practice. The HNV scales demonstrate correlations of $r = 0.5$. The results show that a simple 6-point rating scale with descriptors of symptom qualifiers of the NV experience can be valid and can prove a reliable tool to assess patients' conditions. This includes pre- and postoperative conditions, patients who undergo cancer treatments, and medical conditions where patients experience nausea and/or vomiting. Accurate assessment of these distressing conditions can lead to a more accurate and timely treatment that alleviates patients' discomfort and improves their quality of life.

The HNV scales were tested for inter-rater agreement and were found to have a high inter-rater reliability Kappa score. Based upon the RNs' abilities to independently discern the patient's expressed ratings using descriptors on HNV scales, the ratings used behavior anchors (mild, moderate, great or severe) with the descriptors. These suggest the HNV scales are unambiguous, accessible to the patient, and produce consistently interpretable ratings. These results suggest high inter-rater agreement indicates that a nurse will be able to accurately record the ratings made by the patient.

Relevance to Clinical Practice

Nurses and other healthcare professionals can use the HNV scales with confidence in all areas of practice. RNs and staff will require a review of the scale and will need to receive training. It is recommended that orientation of RNs includes a policy and scale education. Patients need to be oriented as well on the scale and need to be asked to rate their nausea and episodes of vomiting. The scale is simple to use; having the descriptors associated with each rating makes the scales more useful regarding a patient's accuracy on the degree of severity. Prior to the use of PONV risk algorithms, the HNV can be used to assess NV symptoms prior to and after the operative procedure, thus assisting in management of medications or non-pharmacological approaches provided by anesthesia or perioperative RNs.

A two-way analysis of variance with repeated measures on nausea scores indicates that there was a significant group effect ($F(2,160) = 29.131$, $p < 0.001$). HNV agreement was obtained, along with concurrent validity, by comparing and correlating the HNV scales with the well-established, valid, and reliable Morrow's MANE NV tool [11]. The significant correlations between the HNV scales and Morrow's tool provide strong evidence to the concurrent validity of the HNV scales (Table 1).

Vomiting	Measure	Descriptors
0	None	No vomiting
1	Anticipated	Vomiting is anticipated, and prophylaxis medications may be given.
2	Mild	1-2 episodes in 12 hours, small amount of emesis
3	Moderate	3-5 episodes in 12 hours. Vomiting persist
4	Great	6 episodes in 12 hours
5	Severe	> 7 episodes in 12 hours, intractable, incessant, retching with emesis
Nausea	**Measure**	**Descriptors**
0	None	No Nausea
1	Anticipated	Nausea is anticipated, and prophylaxis medications may be given.
2	Mild	Nausea reported. Able to tolerate food/medications by mouth
3	Moderate	Nausea persisting. Lacks appetite. Able to eat small meals occasionally.
4	Great	Nausea ongoing. No appetite. Unable to tolerate food/medications by mouth.
5	Severe	Nausea with Dry Heaves reported

Abbreviations

HN: Halpin Nausea; HNV: Halpin Nausea Vomiting; PONV: Post-operative nausea vomiting; RN: Registered Nurses.

With respect to the predictors of history of PONV, history of smoking, gender, diagnosis, and motion-sickness, each were found to be predictors of increased ratings of incidence of NV, especially if the patients were female. One reason for these findings may be that, in the case of the female gender, these symptoms are hormonal in nature [18]. The higher incidence of NV with previous history of NV or motion sickness may be due to a conditioning effect. The more of these predictor variables an individual has, the higher the probability of the PONV experience [8]. This study's findings contributes to existing studies of perianesthesia PONV [1,8].

In summary, it is recommended that CNV be used prior to providing non-pharmaceutical interventions or anti-nausea and anti-emetic medications when NV symptoms are reported. RNs can then identify high-risk NV patients prior to surgery by measuring intensity and severity. The baseline data can be used to guide the perianesthesia management of NV reactions as reported. Evidence of integrating PONV with NV scales assist in outcome management.

Conclusion

The findings support the reliability and validity of the HNV scales. The scale's value-added descriptors and simple ratings of 0 - 5 are effective in practice. Communication amongst the providers and the patients enhances the symptom management [16]. Additionally, by expanding the perianesthesia nurses' assessment parameters, with PONV risk algorithms, the HNV can be operationalized to recognize symptoms and prevent further deterioration of the patient's condition. Satisfaction increases in both patient perceptions and care outcomes when symptoms are managed together.

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Volume 3 Issue 11 November 2019