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Evaluation of Nurses' Self-Insight into their Pain Assessment and Treatment Decisions

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Abstract

Research generally indicates that providers demonstrate modest insight into their clinical decision processes. In a previous study utilizing virtual human (VH) technology, we found that patient demographic characteristics and facial expressions of pain were statistically significant predictors of many nurses' pain-related decisions. The current study examined the correspondence between the statistically-identified and self-reported influences of contextual information on pain-related decisions. Fifty-four nurses viewed vignettes containing a video of a VH patient and text describing a post-surgical context. VH sex, race, age, and facial expression varied across vignettes. Participants made pain assessment and treatment decisions on visual analogue scales. Participants subsequently indicated the information they relied on when making decisions. None of the participants reported using VH sex, race, or age in their decision process. Statistical modeling indicated that 28–54% of participants (depending on the decision) used VH demographic cues. 76% of participants demonstrated concordance between their reported and actual use of the VH facial expression cue. Vital signs, text-based clinical summary, and VH movement were also reported as influential factors. These data suggest that biases may be prominent in practitioner decision-making about pain, but that providers have minimal awareness of and/or a lack of willingness to acknowledge this bias.

Perspective: The current study highlights the complexity of provider decision-making about pain management. The VH technology could be used in future research and education applications aimed at improving the care of all persons in pain.

Keywords

pain management; disparities; virtual human technology; decision policies; self awareness

Introduction

Patient demographic characteristics may influence how healthcare providers assess and treat pain. Patients who are female^{7,10,42}, racial/ethnic minorities^{2,42,45}, and elderly^{3,32,47} are at increased risk (relative to males, members of the dominant racial and ethnic group, and younger

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persons, respectively) of having their pain under-assessed and under-treated. There are several possible explanations for these disparities, such as provider stereotypes and differences in patient communication. Continued research is needed on the extent to which patient demographic characteristics influence provider decision-making about pain.

In previous investigations, we described virtual human (VH) technology and lens model methodology as an innovative approach to the study of disparities in pain management^{29,30}. VH technology eliminates from the development of the research stimuli the very biases under investigation. Moreover, the lens model paradigm permits investigation of the decision-making process in addition to the outcome. Results of our previous investigations indicated that VH demographic cues played a significant role in the decision processes of nurses and laypersons^{29,30}. The investigation that included nurses found that – counter to several previous reports (see above) – VH who were female, African-American, and older were often rated as having greater pain and were more likely to be administered medication, relative to their demographic counterparts³⁰. VH facial expression of pain was also a significant predictor of pain-related decisions. VH patients expressing “high” pain were more often judged by nurses to be in greater pain and were more likely to be administered medication, compared to those expressing “low” pain³⁰. These findings are consistent with work highlighting the importance of nonverbal expressions of pain^{1,12,22}.

Although disparities in pain management may be prevalent, the extent to which providers are aware of their pain-related decision policies (i.e., how they weigh contextual information to make decisions) is not clear. The non-pain literature indicates that providers typically demonstrate moderate awareness of their decision processes^{17,24,25,35,38}. For example, Harries and colleagues²⁵ asked physicians to judge the likelihood that they would prescribe a medication (e.g., lipid-lowering drug) to hypothetical patients. These judgments were analyzed to determine the influence of 13 available cues. Participants also indicated the extent to which they thought the cues influenced their judgments. Results indicated that, on average, physicians actually used 4 cues but believed they had been influenced by many more²⁵.

Research has examined the factors that influence providers' pain-related decisions^{8,33,58}. Other studies have explored what providers report using when making such decisions^{18,37,39,57,61}. However, we are not aware of any research concerning provider self-insight about their pain management decisions, or the concordance between the statistical and self-report indices. This is an important avenue of research, since providers' awareness of their decision processes has implications for improving decision-making and, consequently, the care of persons in pain.

The current study sought to address this gap in the literature and build on our previous work using VH technology and lens model methodology. Specifically, we investigated the concordance between statistically-identified and self-reported influences on nurses' pain-related decisions. Given the disparities literature, we were particularly interested in concordance regarding the influence of patient demographic characteristics (sex, race, and age). Although results of our previous study³⁰ were often not consistent with the literature concerning under-management of at-risk groups, we believe that investigation of providers' insight into their use of VH demographic cues – regardless of the exact manner in which they used them – is an important pursuit. Moreover, this investigation may help explain these counterintuitive findings. Based on the broader literature concerning providers' self-insight, we hypothesized that nurses would demonstrate modest awareness of their pain-related decision processes. A summary of findings from this study was presented as a poster at the annual meeting of the American Pain Society³¹.

Materials and Methods

Participants

The study participants were nurses recruited from both local and national sources. In order to be eligible, participants must have been 18 years or older and currently licensed and practicing as a Registered Nurse (RN). Individuals who were currently enrolled in an academic program, as well as those with advanced degrees in nursing, were included if they met the eligibility criteria. Local participants were recruited via presentations at class lectures in the University of Florida College of Nursing, advertisements in local medical facilities, and presentations at association meetings. Participants outside the local area were recruited from nursing email listservs and fliers distributed at national meetings. Although there is overlap in participants and data between the present study and a prior one³⁰, the current analyses address distinct questions not addressed in the prior study.

Procedure

A more detailed description of the research methodology used in this study is presented in a previous manuscript³⁰. Briefly, a lens model design^{6,11,23} was employed. The lens model is an analogue method for modeling how individuals use environmental information to form judgments. This model assumes that judgments are determined by the individuals' attention to and weighting of the information available in the immediate environment. This information is referred to as 'cues.' In lens model investigations, a series of profiles (situational contexts) are presented to research participants, and each profile contains a combination of cues that may be used by the participants to form a judgment. These judgments are typically recorded on a numerical rating scale (NRS) or visual analogue scale (VAS).

Statistical modeling of decision processes first occurs at the individual level ('idiographic' analyses). Data are subsequently aggregated for group-based analyses ('nomothetic' analyses). In order to satisfy the statistical requirements of idiographic analyses, a sufficient ratio of profiles to cues must be employed. The smallest recommended profile-to-cue ratio is 5:1¹¹. This study involved presentation of 32 profiles with 4 cues (age, race, sex, and pain expression) of interest that were systematically manipulated across profiles. Thus, an 8:1 profile-to-cue ratio was adopted, which exceeded the 5:1 recommendation and maximized the power of this study. Furthermore, this ratio permitted each possible cue combination to be presented twice, which further enhanced reliability and statistical power. Based on a power analysis (Power Analysis and Sample Size package, NCSS Statistical Software), the results of a previous study⁸ that most closely resembles the current one, and other relevant literature, a minimum of 50 participants were planned for recruitment. Lens model designs that employ a sufficient profile-to-cue ratio have enhanced power due to greater reliability of each participant's data as a result of multiple observations. Thus, investigations like the current study can achieve adequate power with a smaller sample size than traditional research designs¹¹.

The virtual human (VH) profiles consisted of a vignette and 20-second looped video of a VH patient. Profiles were randomly presented to prevent order effects. The vignette (see Appendix) described a patient recovering from an open appendectomy surgery. Clinical information regarding patient status, pain complaint (duration and location), and prescription medication orders were also presented. Values for temperature, blood pressure, pulse rate, respiration rate, and mental status were provided; these varied among profiles but were always within normal limits.

The VH videos were created with *People Putty* software and contained virtual characters displaying dynamic facial expressions of pain (low and high). Sample still frame images captured from the VH videos are contained in a previously published manuscript²⁹. The sex,

race, and age of the VH were systematically manipulated to create a diverse array of characters. VH facial expressions of pain were manipulated based on the Facial Action Coding System (FACS). The FACS is an objective system for classifying anatomically-based action units (AUs) that are the fundamental constituents of facial expressions. The facial expression of pain has been found to be relatively constant across different clinical pain conditions^{13,20,40,41,52}. Moreover, the magnitude of facial expression increases in relation to exacerbations of clinical pain intensity and is related to several indices of clinical pain severity^{13,21,41,51,52}. The facial expression of pain in adults is characterized by the following core features: brow lowering (AU4), tightening of the orbital muscles surrounding the eye (AU6&7), nose wrinkling/upper lip raising (AU9&10), and eye closure (AU43)^{14,49}. The facial expression of pain can be differentiated from other negative subjective states^{22,40,41}.

Each VH contained four cues: sex (male or female), race (Caucasian or African American), age (young or old), and pain (low pain expression or high pain expression). Thirty-two unique scenarios were created, which permitted each possible cue combination to be presented twice. Participants made judgments about the pain experience (intensity and unpleasantness) and recommended treatment (non-opioid and opioid medication) for each VH profile. These judgments were rated on computerized visual analogue scales (VASs). Pain assessment ratings were recorded on separate VASs with endpoints at *no pain sensation* and *most intense pain sensation imaginable* for pain intensity, and *not at all unpleasant* and *most unpleasant imaginable* for pain unpleasantness. Pain treatment ratings were based on participants' perceived likelihood of administering a non-opioid and opioid analgesic within the prescribed dosage. Separate VASs were used for each rating, with endpoints at *not at all likely* and *complete certainty*.

This study was delivered via the Internet. The majority of participants completed the study on a personal computer; the remainder participated on a laboratory computer. Following informed consent, participants completed a demographic questionnaire and then proceeded to the VH portion of the study. Participants were first instructed how to approach the task and use the VASs. The following procedure was then used for administration of the VH profiles: (1) participants read the clinical information and viewed the video simultaneously; (2) participants completed questions that asked them to provide the pain assessment and treatment ratings. Following completion of the VH portion, participants were asked to indicate the information they used when making their pain assessment and treatment decisions. These responses were provided in an open-text format. Finally, participants were debriefed regarding the study hypotheses and provided compensation in the form of continuing education credits or \$15. The study procedures were approved by the University of Florida Institutional Review Board, and informed consent was obtained from all participants.

Statistical Analyses

The demographic and background characteristics of the sample were examined using descriptive statistics. Idiographic (individual-based) multiple regression analyses were used to detail each participant's decision making policies. 'Decision policy' refers to the consistent approach an individual takes in weighting contextual cues to make a given decision. VH cues of sex, race, age, and pain expression were the independent variables in each model; these variables were entered simultaneously in the regression model. Pain assessment and treatment ratings were the dependent variables in each model. The standardized regression coefficients (β) in each regression model represent the weight of each cue in the formation of the assessment and treatment judgments. This weight represents the unique contribution and relative importance of each cue in the individual participant's clinical decision. The coefficient of multiple determination (R^2) represents the amount of variance in assessment and treatment policies accounted for by the independent variables, or the overall function of the cues in each

individual's policy. Overall policies (R^2) and individual cues (β) were considered significant at $p < .05$.

The written participant responses indicating the information used when making decisions were examined by study investigators for emergent themes. Participants were coded based on their endorsement of these themes (participants could endorse more than one theme). These data were then subjected to frequency and concordance analyses. Specifically, we calculated the percentage of the sample who endorsed each theme. These values were then compared to the results of the statistical analyses that determined the percentage of participants who actually used each contextual cue (i.e., VH sex, race, age, and pain expression) when making decisions. These concordance analyses allowed us to examine the extent to which participants demonstrated awareness of their decision policies for pain assessment and treatment.

Results

Sample Characteristics

The final sample consisted of 54 nurses. The majority were female (83%) and self-reported Caucasian (93%). Average age of the sample was approximately 42 years ($SD = 11.90$). These characteristics are roughly consistent with national nursing norms [58]. Twenty-three participants (43%) resided in Florida; the remainder was drawn from a wide range of U.S. geographical locations. Participants were educated at the Associate ($n = 22$; 41%), Bachelor ($n = 17$; 31%), and graduate ($n = 15$; 28%) degree levels. Almost three-quarters of participants were not currently enrolled in an academic program at the time of study participation. Eleven of the 15 enrolled participants were pursuing graduate degrees. The average nursing experience of the sample was approximately 14 years ($SD = 10.52$). The three most frequently endorsed current practice areas were critical care ($n = 22$), primary care ($n = 16$), and oncology ($n = 14$). All participants except one reported having experience working in a hospital setting.

Statistically-Modeled Cue Significance

Individual regression equations were computed for each participant to model his or her decision policies for pain assessment (intensity and unpleasantness) and treatment (opioid and non-opioid medication). Each regression model consisted of 4 independent variables (VH sex, race, age, and pain expression) that were entered simultaneously in a single block. Detailed results of these idiographic analyses have been presented in a previous manuscript³⁰. The following sections contain only that which is specific to the purposes of the current study.

The demographic cues of interest consisted of VH sex, race, and age. Examination of the aggregated idiographic results indicated that 33 of the 54 total participants had a statistically-reliable (i.e., R^2 is significant at $p < .05$) decision policy for pain intensity assessment, whereas 34 had a significant policy for pain unpleasantness assessment. The average R^2 values for significant pain intensity and unpleasantness policies was .54 and .56, respectively. In the pain treatment domain, statistically-reliable decision policies for opioid and non-opioid medication were found in 23 and 13 nurses, respectively. The average R^2 value was .53 for significant opioid policies and .39 for significant non-opioid policies. The decision policies of these nurses (i.e., those with significant R^2 values for the regression models) were further examined to determine the extent to which VH demographic cues were significant contributors (i.e., regression coefficient is significant at $p < .05$) in these models. Nurses who did not employ a decision policy that was amenable to statistical modeling were not subject to additional analyses, since, by definition, they did not use the contextual cues in a statistically-reliable manner.

Results indicated that of the 33 nurses with a significant pain intensity assessment policy, 16 had at least one significant VH demographic cue coefficient (standardized beta) for this decision domain. Specifically, 7 nurses had a significant coefficient for age, 6 nurses had a significant coefficient for sex, and 5 nurses had a significant coefficient for race (the total exceeds 16 because some nurses had significant coefficients for more than one cue). Thus, 48% of nurses with a reliable pain intensity policy (30% of the total sample) significantly weighted VH sex, race, and/or age. Stated differently, these nurses used VH sex, race, and/or age in a statistically consistent manner when making decisions about the level of pain intensity experienced by the VH patient. Seventeen participants (50% of those with a significant overall R^2 and 31% of all participants) had policies for pain unpleasantness assessment that significantly weighted one or more VH demographic cues (sex: $n = 10$, age: $n = 9$, race: $n = 3$). Similar results were found for decisions about opioid and non-opioid treatment; 57% ($n = 13$, 24% of total) and 54% ($n = 7$, 13% of total) of nurses had at least one significant VH demographic cue coefficient for these treatment domains, respectively. In the opioid treatment domain, 7 nurses had a significant coefficient for age, 4 nurses had a significant coefficient for sex, and 4 nurses had a significant coefficient for race. For non-opioid treatment decisions, 4 nurses significantly weighted age, 2 nurses significantly weighted sex, and 1 nurse significantly weighted race. In general, participants with significant VH demographic cues tended to provide higher pain intensity and unpleasantness ratings to VH who were female, African-American, and older. VH with these characteristics were also more likely to receive higher opioid treatment ratings. Ratings for non-opioid treatment were less consistent. A more detailed account and discussion of the findings regarding the directional effect of the demographic cues is presented in Hirsh et al³⁰.

The fourth independent variable in the regression models – VH facial expression of pain – was tested in a similar manner; results of idiographic regression analyses were examined to determine the frequency with which this cue emerged as a significant predictor. In the pain assessment domain, 32 nurses (97% of those with a significant overall R^2 and 59% of all participants) had a significant VH pain expression coefficient for pain intensity, and 34 nurses (100% of those with a significant policy and 63% of total sample) had a significant coefficient for pain unpleasantness. Forty-three percent of nurses ($n = 23$, 100% of nurses with significant overall policy) used the VH pain expression cue when making decisions about opioid medication treatment. Finally, 12 participants (92% of participants with significant overall policy and 22% of total sample) consistently incorporated this cue into their decision policies for treatment with non-opioid medication. Similar to results for the demographic cues, greater consistency in the direction of this effect was found for pain assessment (intensity and unpleasantness) and treatment with opioid medication; VH with a high pain expression tended to receive higher ratings than those with a low pain expression. Again, however, less directional consistency emerged for decisions about non-opioid medication.

Self-Reported Cue Significance

At the conclusion of the study, participants were asked to describe the information they used when making pain-related decisions. Their responses were provided in an open-ended format and then compared with the results of idiographic regression analyses presented above. In this way, we were able to evaluate the extent to which study participants demonstrated consistency in the cues they reported using versus the cues they actually used in their decision-making process for pain.

Examination of participants' open-ended responses indicated that none of the 54 nurses self-reported using VH sex, race, or age when making decisions about pain assessment and treatment. This finding is in stark contrast to the results of idiographic regression analyses, which indicated that between 13% and 31% of all participants and 48% and 57% of participants

with a significant overall decision policy (depending on the decision domain) used VH sex, race, and/or age in a statistically reliable manner.

VH facial expressions of pain emerged as the most frequently cited piece of information used to make decisions; this cue was reportedly used by 65% of participants. An example response from this category is as follows: "I looked at facial expressions – if the eyes were open... what their mouth looked like." Moreover, 76% of nurses – including those who did and did not report using this cue – demonstrated concordance between their reported and actual (statistically significant) use of VH facial expressions of pain when making pain-related decisions. Thus, the majority of participants demonstrated consistency between the statistically-identified and self-reported use of VH facial expressions in this context.

The second-most reportedly used factor was VH vital sign values, which was indicated as influential by 56% of participants. An example from this category is: "I focused on vital signs – especially blood pressure and respiration rate." Text-based description of the clinical scenario (26% of participants; e.g., "I relied on information in the scenario re: patient history, experience of pain, # of hours since surgery..."), VH movement (17% of participants; e.g., "...did they look like they were moving frequently..."), and personal clinical experience (6% of participants; e.g., "I used my clinical experience and knowledge of treating pain.") were also reported by the participants as influential factors in their decision-making about VH pain. Concordance analyses (difference between participants' reported and actual use) could not be conducted for these variables, however, as they were not systematically manipulated across vignettes and, thus, could not be included in the idiographic regression equations.

Discussion

Females^{7,10,42}, racial/ethnic minorities^{2,42,45}, and elderly^{3,32,47} individuals are at increased risk for sub-optimal pain care. These disparities may be related to differences in providers' pain decisions as a function of sex, minority status, and age. However, provider awareness of their decision-making processes for pain has not been adequately investigated. Using VH technology and lens model methodology, this study found zero correspondence between participants' reported and actual use of patient demographic characteristics when making decisions. In contrast, participants indicated relatively good correspondence between the reported and actual influence of VH facial expressions on their decisions.

Two explanations seem most plausible in accounting for this discrepancy. First, nurses may have been unaware of their decision policies, particularly regarding use of demographic cues. If true, this would be consistent with research suggesting lack of self-insight as characteristic of the decision-making process^{17,24,25,35,38}. Because biases often operate outside of conscious awareness¹⁹, it is reasonable to speculate that nurses who used demographic cues for pain decisions were largely unaware of this fact. A second possible explanation for the discrepancy is that nurses were aware of their decision policies, but social desirability pressures may have influenced their descriptions of those policies⁴⁹. Both of these factors may have contributed to the present findings; however, additional research is needed to test these tentative explanations.

Our findings regarding the influence of VH demographic cues was often counter to previous research; many participants gave higher assessment and treatment ratings to female, African-American, and older VH compared to their demographic counterparts. Although these issues were not a primary focus of the current study (a detailed discussion of them can be found elsewhere³⁰), it is possible that awareness of the factors contributing to pain-related decisions may in fact influence such decisions. For example, clinicians who are unaware of their pain

treatment policies may be more likely to under-treat certain patients. A larger sample size would be needed to test these possibilities in future research.

Greater concordance was demonstrated for VH facial expressions. Facial expressions had the largest statistical impact on decisions, and it was most frequently reported as influential. One would hope that clinicians would rely on facial expressions, given that they are more clinically-relevant than demographic cues. That facial expressions were actually and reportedly used by a large proportion of nurses is consistent with previous research highlighting this as an important source of information for pain-related decisions^{33,36,37,39,57,61}. Nevertheless, a sizeable minority neither used the expression cue in a statistically-reliable manner nor reported they used it in their decision process. Unfortunately, the lack of sample diversity did not permit exploration of whether provider characteristics predict cue use in this context. We were also unable to determine the specific facial features that influenced participants' decisions. Future research could examine whether some facial cues are more influential than others, and whether participants are aware of these influences.

Nurses also reportedly relied on other information when making pain-related decisions. Over half reported using vital sign values, and approximately one-quarter reported using information from the vignette. VH movement and personal 'clinical experience' were also listed to a lesser degree. The actual influence of these factors on decisions could not be determined, since none was systematically manipulated across profiles. Vital signs varied minimally – within normal limits – to increase task realism. Consequently, these values were expected to provide little useful information for the clinical decisions. Although patient physiologic data is frequently used in the clinical setting, it is unreliable and not recommended to inform pain management decisions²⁸. The text description did provide useful information about the clinical situation. Thus, it seems reasonable that nurses reportedly used this information when making decisions, despite the vignette being identical across profiles. Although VH movement did not systematically vary and, thus, would seem to provide little pertinent information by which to make decisions, attention to such non-verbal cues is a legitimate practice behavior in the context of pain management²⁸ (see also Igier and colleagues³³).

The accuracy of nurses' pain assessments has received considerable empirical attention. Across a range of conditions and settings, nurses often underestimate pain compared to patient self-report^{9,15,27,43,48,53,55,56,60}. Many reasons likely exist for these discrepancies, including provider biases and lack of insight into decision-making processes, which were primary considerations in this study. Because VH self-reported pain was not included in this study, we cannot determine whether participants under/overestimated patient pain. However, one recent study did demonstrate that information regarding patient self-reports can be used by clinicians to increase the accuracy of their pain assessments.³⁴ The current methodology may provide an elegant way to investigate whether similar improvements in accuracy occur within and across patient demographic groups.

The VH technology used in this study allowed us to create visual stimuli that minimized the influence of the very biases under investigation. This approach is likely more clinically-representative and less face-valid (i.e., study hypotheses are less obvious to participants) than exclusively text-based vignette designs. It is also more methodologically-sound – through increased experimental control – than retrospective investigations of actual clinical decisions. The lens model methodology also permitted detailed analyses of providers' decision-making processes, which is not possible when examining only the outcome of that process. Consequently, we were able to compare the information participants said they used, to information they actually used as indicated by statistical modeling. This is an important distinction from previous research on the accuracy of providers' pain assessment (i.e., provider ratings vs. patient report) and/or the factors that actually influence providers' decisions.

This approach has implications for future research and education. For example, participants could complete a task similar to the current study. After decision processes were analyzed, participants could be provided personalized feedback about their cue use. An educational intervention could also be provided, as needed. For example, a participant who inappropriately considers patient age when making decisions could be provided corrective feedback about the treatment of pain across the lifespan. Such 'cognitive feedback' has been widely used in decision research¹⁶.

Several study limitations should be acknowledged. First, although the methodology likely maximized the representativeness of this analogue study, the results may not generalize to a real clinical situation. Nevertheless, over 90% of pilot participants thought the clinical context accurately reflected a real post-operative scenario. Relatedly, although not every possible pain-related facial action unit [e.g., AUs 20 (lip stretch), 26 (jaw drop)] was manipulated, over 70% of pilot participants thought the VH facial expressions were realistic depictions.

Second, lens model investigations must limit the number of cues that are systematically manipulated. This is necessary due to human cognitive limitations⁴⁴ and because the number of profiles that participants must view increases exponentially as cues are added¹¹. Consequently, potentially important cues may have been omitted. Indeed, participants' self-report data suggest that other variables (e.g., vital signs, movement) may be as or more influential than the demographic and expression cues examined herein.

Third, the open response format in which participants self-reported their decision processes is but one approach to eliciting this information. Since this was the first study, to our knowledge, that examined providers' self-insight about their pain decision policies, we felt that an open response approach was preferable to a fixed response one. However, the methodology used to elicit self-report is important and may influence the degree of accuracy²⁶. Further, individuals may possess insight into their use of cues but be unable to articulate it⁵⁴ and/or may provide a socially-desirable view about how information ought to be weighted instead⁴⁶. Future research could examine the extent to which these issues influence participant self-report about pain decision-making.

Fourth, the decision policies of some participants were not sufficiently reliable for concordance analyses. There are many possible reasons for this. The current findings may merely reflect the unreliability of general and clinical decision-making^{4,5}. The hypothetical nature of the scenario, restriction and/or irrelevance of cues, participant fatigue, and participant uncertainty about the nature of the task, could also have contributed. Relatedly, pain assessment decisions demonstrated greater reliability than pain treatment decisions. The contextual cues may have been more relevant to decisions about assessment than treatment. Pain assessment decisions may also be inherently more reliable than treatment decisions, but research is needed to test this speculation. Regardless, the current findings must be considered tentative and are in need of replication in larger and more diverse samples.

Finally, the nurses in this study may be unique in some way that influenced their approach to the task. Moreover, although participants' demographic characteristics were consistent with national norms, the current sample had limited diversity and did not permit investigation of possible group differences in actual and reported decision policies.

In summary, this study suggests that biases related to patient sex, race, and age may be prominent in practitioner decision-making about pain assessment and treatment. The providers in this study appeared to have minimal awareness of this bias as indicated by the lack of correspondence between statistical and self-report data. These results and study methodology have implications for continued research and education efforts aimed at improving the care of all persons in pain.

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Appendix. Clinical vignette

Patient presents with abdominal pain 22 hours post open appendectomy surgery. Patient reports that the pain began immediately following surgery. The pain is localized to the right lower abdomen in the area around the surgical incision. Patient also reports occasional generalized pain throughout the entire abdominal area. The pain limits patient's ability to move around freely. Patient reports no prior surgical treatments and has current prescriptions for anti-inflammatory and analgesic medications.

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