

RESEARCH ARTICLE

A comparative descriptive analysis of perceived quality of caring attitudes and behaviours between haemodialysis patients and their nurses

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Abstract

Aim: Despite its importance in nursing, perceived quality of the nurse–patient relationship has seldom been researched. This study sought to examine and compare the quality of caring attitudes and behaviours as perceived by haemodialysis patients and their nurses.

Design: This comparative descriptive study involved 140 haemodialysis patients and 101 nurses caring for them in ten haemodialysis units in the French-speaking part of Switzerland.

Methods: Participants completed a sociodemographic questionnaire and the Caring Nurse–Patient Interaction Scale (CNPI-70).

Results: Both nurses and patients reported a high frequency of caring attitudes and behaviours. Patients gave higher ratings than nurses did on all the caring dimensions, except spirituality. Implications are discussed.

KEYWORDS

caring, haemodialysis patient, nurse–patient relationship, Watson's theory

1 | INTRODUCTION

Over the past few decades, nursing theorists (Boykin & Schoenhofer, 2013; Swanson, 1999, 2013; Turkel & Ray, 2000; Watson, 1985) have discussed the centrality of the nurse–patient relationship in nursing care and, by extension, the importance of the quality of this relationship not only for the nurses and patients, but also for the

patients' caregivers and families. Watson (2008, 2012) defined nursing care as helping people give meaning to their existence, suffering and disharmony through a caring relationship. The relationship that nurses cultivate with patients and their families corresponds to a human process that Watson (2001) called the “transpersonal caring relationship.” For this to be a genuine relationship, nurses must base their practice on a system of humanistic-altruistic values that allows

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patients and their families to grow in an environment conducive to the development of potential (Cara, 2004). Such an approach enables nurses to develop a holistic view of the people they care for and to attach importance to their experiences. Caring thus rests on a humanistic approach, where nurses need to develop specific attitudes and behaviours, including compassion, understanding, support, collaboration and reciprocity (Cara, 2004) to promote healing, health and well-being.

1.1 | Background

Various authors have documented the therapeutic effects of the caring relationship both on nurses (O'Reilly, 2007) in terms of improved self-esteem, well-being, sense of personal achievement and higher levels of work satisfaction (Euswas, 1993; McNamara, 1995) and on patients in terms of improved autonomy, independence, hope (Lucke, 1999), quality of life (Erci et al., 2003), resiliency (O'Reilly, Cara, Avoine, & Brousseau, 2011) and satisfaction with the nursing care received (Lee, Tu, Chong, & Alter, 2008). Research has also shown that a caring relationship contributes to the development of a sense of security among patients (McNamara, 1995) and to lowering hospital readmission rates in particular among patients with heart failure (Duffy & Hoskins, 2003). However, despite the documented benefits of a caring relationship for individuals living with a chronic condition, dehumanising nursing practices have been reported (e.g. Beagan & Ells, 2009; Bennett, 2011; McLeod & McPherson, 2007; O'Reilly et al., 2011). The presence of dehumanising care practices in clinical settings may have devastating effects for both patients and nurses (Haque & Waytz, 2012). According to the results of a literary meta-analysis by Swanson (1999, 2013), patients confronted with uncaring attitudes and behaviours feel humiliated, frightened, lacking in control and vulnerable states that can contribute to lengthen physical healing times. Moreover, uncaring practices (Swanson, 1999, 2013) are harmful to the nurses themselves as they can lead to burnout and depression and generate the impression of working impersonally without feeling involved. Consequently, maintaining a high-quality nurse–patient relationship becomes a guarantee of care quality and safety (Duffy, 2009), especially for patients living with a chronic disease requiring long-term treatment, such as patients living with renal failure requiring HD.

HD patients constitute a vulnerable population with substantial health needs. They are often older people with comorbid chronic conditions (Delmas & Cohen, 2014). They are required to undergo heavy medical treatment, which normally includes three weekly sessions of dialysis treatment lasting 4–6 hr (Delmas et al., 2018). They experience both physical and psychological symptoms (Almutary, Bonner, & Douglas, 2013; Danquah, Meininger, Zimmerman, Bergstrom, & Diamond, 2010; McClellan et al., 2010). The presence and intensity of these symptoms are a burden for these patients, resulting in the deterioration of their quality of life (Delmas et al., 2018; Raj, Ahuja, Frandsen, & Jose, 2017; Unruh, Weisbord, & Kimmel, 2005), which is considered to be a predictor of mortality (Tsai et al., 2010). Aside

from the considerable technical care they receive, these patients indicate that the quality of the relationship with their nurses can become therapeutic (Bevan, 1998). In this regard, nurse capacity to assist, listen and empathise was found to be as important as medical care for HD patients (Sankarasubbaiyan & Holley, 2000). In short, the quality of the nurse–patient relationship is a key element of care for this population.

Despite the importance of the nurse–patient relationship in care, few studies have examined how the relationship is perceived by nurses and patients and even fewer have compared these perceptions (Delmas, O'Reilly, Iglesias, Cara, & Burnier, 2016). Against this background, we undertook a study to examine the quality of the nurse–patient relationship as perceived by HD patients and their nurses and to identify differences in perception between the two groups.

2 | METHODS

2.1 | Design and sample

A cross-sectional comparative design was used for this observational study (Gray, Grove, & Sutherland, 2016). A convenience sample was recruited of HD patients and the nurses who cared for them in ten HD units in the French-speaking part of Switzerland. Patients had to meet the following inclusion criteria: at least 18 years of age; in active HD treatment for at least 6 months; a good level of written and spoken French; and able to provide informed consent. Patients were excluded if diagnosed with dementia. Nurses had to meet the following inclusion criteria: at least 6 months' work experience in the HD unit with at least beginner's level nursing expertise and, for interim nurses, on long-term assignment. In all, 202 patients and 115 nurses met the inclusion criteria and agreed to participate in the study. Of these, 140 patients (69.3%) and 101 nurses (87.8%) completed the questionnaires. The main causes of withdrawal were a change in health status (10.4%), death (7.4%) and transplant (4.5%) for patients and a change in mind or workplace (12.2%) for nurses.

2.2 | Ethical consideration

The study was approved by the Cantonal Ethics Committee for Human Research (certificate no. 2017-00946). Respondents received and completed an informed consent form. Each participant was assigned an alphanumeric code to ensure anonymity. No health-care staff or patient had access to the collected data and databases.

2.3 | Procedure

Permission to conduct the study with staff nurses and patients was obtained from hospital administrators and chief nurses beforehand. The nursing department provided the list of HD outpatients and all nurses assigned to the different dialysis centres. These centres were

contacted and the nurses who consented to take part in the study were given anonymized questionnaires to complete in their spare time. Patients were met individually to seek their consent to participate in the study. Those who granted it were met again 1 month later to complete the questionnaire with a research assistant. Both nurses and patients completed a sociodemographic questionnaire and the Caring Nurse–Patient Interactions Scale (Cossette, Cara, Ricard, & Pepin, 2005). Nurses filled a self-reported questionnaire, while patients were interviewed by a research assistant during their HD section. Based on the research team's experience with this vulnerable population (Delmas et al., 2018), it was decided that a research assistant would read the questionnaire out loud to each HD patient. Given the advanced age of many HD patients and their, often chronic, tiredness (Delmas & Cohen, 2014), filling a self-reported questionnaire can be a heavy burden for them. Moreover, most of HD patients are in the incapability to write comfortably as they are connected to a HD machine via a fistula in their arm. Consequently, the presence of a researcher reading the questionnaire out loud makes this task lighter for patients and provides a support, if difficulties in filling the questionnaire are met. Response rate and data quality both benefit from such an approach. Despite patients share a common space during HD sessions, rooms are big enough to assure that a discussion carried out in a normal tone could not be easily overheard. In hospitals where beds were closer, partitions usually used when the patient is undercover were set in place to assure a sufficient privacy.

2.4 | Instruments

A sociodemographic questionnaire was used to draw the profile of participating nurses and patients. For nurses, the questions covered age, gender, marital status, children, years of nursing experience, years of HD experience, job status (part-time or full-time) and past participation in nurse–patient relationship training. For patients, the questions covered age, gender, marital status, children, job status (unemployed or employed part-time or full-time), tobacco use, years in HD, entry on a transplant waiting list and comorbidities.

The Caring Nurse–Patient Interactions Scale (CNPI-70; Cossette et al., 2005; Cossette, Pepin, & Fontaine, 2019) was used to determine frequency of caring attitudes and behaviours as perceived by nurses and patients. The instrument comprises ten subscales, one each to explore the ten carative factors of Watson's theory of human caring (2008, 2012) through a variable number of items: Humanism (six items), Hope (seven items), Sensitivity (six items), Helping Relationship (seven items), Expression of Emotions (six items), Problem Solving (six items), Teaching (11 items), Environment (seven items), Needs (10 items) and Spirituality (six items). The items are rated on a 5-point Likert scale ranging from "almost never" (1) to "always" (5). Patients and nurses completed the appropriate version of the questionnaire (patient or nurse). Cronbach's alphas for the subscales and the items ranged from .73–.91 in the validation study (Cossette et al., 2005), suggesting overall good internal consistency.

The scale has been used with nurses in Switzerland (Delmas et al., 2016) and the USA (Desmond et al., 2014) and with nursing students in Turkey (Kalender, Tosun, Çınar, Bağçıvan, & Yaşar, 2016; Yılmaz & Çınar, 2017).

2.5 | Data analysis

The quantitative data were analysed using R software, RStudio 1.1.463. Absolute and relative frequencies, central tendency (means) and dispersion (standard deviations) measures were used to describe the samples. Means and standard deviations were used to calculate each carative subscale value. Student's *t* test was used to compare perceived quality of the nurse–patient relationship between nurses and patients. Level of significance was set at 5%. Missing data were not replaced.

3 | RESULTS

3.1 | Sociodemographic data

Most nurses in our sample were women (85.9%). A little more than half were married (53.5%), 16.2% are single, 16.2% are in a free partnership, one tenth (10.1%) are separated, and the remaining are either widowed (2.0%) or in a civil union (2.0%). Nearly three-quarters of the nurses in our sample (74.7%) had at least one dependent child. Mean age was 45.3 years (*SD* = 9.8). Just over two-thirds (68.4%) were full-time nurses. Mean years of nursing experience were 21.1 (*SD* = 10.9), and mean years of HD nursing experience were 12.0 (*SD* = 8.4). Regarding the HD patients, almost three-fifths (59.3%) were men. Mean age was 68.2 years (*SD* = 12.7). Slightly more than half were married (52.9%), the 18.6% are separated, 15.0% are widowed and 13.6% single. Among the patients in our sample, almost three-quarters (71.4%) had children. Most were currently not employed (85%) and non-smokers (85.7%). They had been on HD for over 5 years on average (62.5 months *SD* = 78.3). Just over two-fifths (41.2%) were on a transplant waiting list. Comorbidities included hypertension (49.6%), diabetes (27.1%), heart arrhythmia (25.8%), heart failure (25.2%), cancer (14.5%), arteritis (11.8%), chronic obstructive pulmonary disease (10.1%) and hepatitis (1.4%). A minority of patients were amputated (12.9%) or suffer from hemiparesis (2.2%). These profiles are like those of HD patients and nurses in previous studies conducted in the French-speaking part of Switzerland (Delmas et al., 2018, 2016).

3.2 | Nurse–patient interactions

Table 1 presents the patient and nurse mean ratings for the ten dimensions of the nurse–patient relationship measured by the CNPI-70. Nurses rated all dimensions above 3, except *Spirituality*. Some dimensions were even rated above 4, including *Humanism*, *Helping*

Dimension	Nurses			Patients			t Test p-Value
	N	Mean	SD	N	Mean	SD	
A-Humanism	100	4.31	0.45	139	4.49	0.55	.01
B-Hope	99	3.78	0.71	132	4.19	1.15	.00
C-Sensitivity	98	3.05	0.76	129	3.75	1.19	.00
D-Helping Relationship	100	4.05	0.56	137	4.43	0.73	.00
E-Expression of Emotions	100	3.71	0.62	121	3.97	1.18	.04
F-Problem Solving	99	3.13	0.78	123	3.45	1.34	.03
G-Teaching	99	3.55	0.70	129	4.33	0.89	.00
H-Environment	100	4.11	0.51	129	4.63	0.52	.00
I-Needs	99	4.09	0.49	134	4.66	0.46	.00
J-Spirituality	95	2.88	0.94	122	2.27	1.51	.00

TABLE 1 Comparison of perceived quality of relationship between nurses and patients, as assessed with the Caring Nurse-Patient Interactions Scale (CNPI-70)

Relationship, Environment and Needs. A similar pattern was observed for patient mean ratings. All dimensions were rated above 3, except *Spirituality*. A large number of dimensions were even rated above 4, notably *Humanism, Hope, Helping Relationship, Teaching, Environment and Needs*.

Patients rated all of the dimensions significantly higher than nurses did, except *Spirituality*, which nurses rated significantly higher. This suggested that patients perceived a higher frequency of caring attitudes and behaviours from their attending nurses than the nurses did themselves.

4 | DISCUSSION

This study aimed to examine the quality of the nurse-patient relationship as perceived by HD patients and their nurses and to compare the perceptions of the two groups. Globally, both nurses and patients reported a high frequency of caring attitudes and behaviours in the ten HD units that participated in the study. Levels were generally in line with those reported in other studies (Delmas et al., 2016; Desmond et al., 2014; Kalender et al., 2016; Yilmaz & Çinar, 2017), although a robust comparison is possible only in part owing to the small number of studies that have used the CNPI-70. The instrument has been used extensively in more recent years to describe nurses' caring attitudes and behaviours, but most studies in the past used the CNPI-23, the abridged version of this instrument, or did not focus on the carative factors (see Cosette et al., 2019, for a review). Only four studies (Delmas et al., 2016; Desmond et al., 2014; Kalender et al., 2016; Yilmaz & Çinar, 2017) have previously used the CNPI-70 scale to describe nurses' caring attitudes and behaviours and thus provide results directly comparable to ours. However, two of these were pilot studies based on very small samples: Delmas et al. (2016) involved nine nurses and Desmond et al. (2014) involved 10. Consequently, their values are highly unstable and cannot be considered a sound reference. In the other two studies (Kalender et al., 2016; Yilmaz & Çinar, 2017), the CNPI-70 was used with nursing

students, a population similar but not identical to trained nurses. Compared with these four previous studies, our results are in line with those obtained in a real working context (Delmas et al., 2016; Desmond et al., 2014), but much lower than those obtained with nursing students (Kalender et al., 2016; Yilmaz & Çinar, 2017). The difference may be explained by the more idealistic view that students have of the profession, the greater ease they have using recently studied concepts and the larger presence of these concepts in current nursing training. Regarding this last point, the relationship between education and caring attitudes and behaviours is a matter of contention in the recent literature. Some studies (e.g. Compton, Gildemeyer, Reich, & Mason, 2019) have suggested a positive correlation between education and caring attitudes and behaviours, whereas others failed to establish a clear link between the carative factors and nurse education level (Pajnikihar, Štiglic, & Vrbnjak, 2017). A further explanation might be that caring practices simply tend to fade over time regardless of nurse education level. This view is supported by several studies (Bennett, 2011; Martin et al., 2014; Moran, Scott, & Darbyshire, 2009). This phenomenon could be linked to the inhibitory action of many professional contexts (Adams & Maykut, 2015; Roch, Dubois, & Clarke, 2014). These are managed from a strictly economic perspective that focuses almost exclusively on quantifiable measures and performances and gives little or no consideration to relational aspects. Such a perspective inevitably fosters "uncaring" practices (Adams & Maykut, 2015; Berquist, St-Pierre, & Holmes, 2018) and an inhumane, harmful and even bullying environment. Young nurses and nursing students might not be affected yet by the negative impact of this context owing to their limited work experience, which may be the reason they rate higher on caring attitudes and behaviours.

Our data also suggest that patients rate their interactions with nurses higher on all of the caring dimensions than nurses themselves do, with the exception of *Spirituality*. Again, this is in line with findings reported by Desmond et al. (2014) and Delmas et al. (2016) in their pilot studies, though the difference between the frequency of the *Spirituality* dimension and that of all the other dimensions was

not as marked as in our study. No such pattern emerged from the Kalender et al. (2016) and Yılmaz and Çınar (2017) studies, which were based on a sample of nursing students. This reinforces the notion that students tend to base their evaluations on a more abstract and uniform perception of the nurse–patient relationship.

These results can be interpreted in various and at times contrasting ways. Watson's aim to support the professionalism of nurses with a theory that values the relational dimension and the care work inherent to nursing (Watson, 2008, 2012) may still not be fully achieved. To some extent, nurses might still perceive professional attitudes and behaviours related to caring as part of a person's natural predisposition or general kindness and politeness. If so, this might lead them to underestimate their own caring attitudes and behaviours. Paradoxically, patients might perceive these attitudes and behaviours much more clearly. As shown in other studies (Bevan, 2007; Palmer et al., 2014; Wilson & Harwood, 2017), patients are extremely sensitive to nurses' relational abilities and they intuitively experience the beneficial effects of caring on their health status (van der Cingel, 2014; Merrill, Hayes, Loryclukey, & Curtis, 2012). This is particularly true of HD patients owing to the nature of their treatment, which requires them to spend three half-days per week seated or reclined in close contact with healthcare personnel and depending in large part on HD nurses for support. Qualitative studies in HD settings have shown that, once the nurse–patient relation is established, when patients experience that a nurse is present, visible and ready to act, they immediately feel safe, even if nurses do not involve them in any specific activity (Bevan, 2007). Patients clearly perceive when the HD environment is characterized by trust and caring (Bevan, 2007; Romyn, Rush, & Hole, 2015; Wilson & Harwood, 2017), while nurses, concentrated on their work, may be less perceptive. A concurrent and opposite explanation suggests that nurses are more aware of the concept of caring and its dimensions on account of their professional training. Because of this knowledge, they set a higher standard when evaluating their caring attitudes and behaviours than do patients, who rely more on intuition, which tends to polarize their evaluations. Exposed to caring of average-to-high quality, as was the case for our sample, patients tend to evaluate on the upside. Unfortunately, given that no previous study used the CNPI-70 to compare how nurses and their patients perceive nurses' caring attitudes and behaviours, we lack other qualitative data to corroborate our speculations. Consequently, we proffer these considerations as cues for future research.

Spirituality was the sole exception among the caring dimensions. It followed a completely different pattern. Both nurses and patients gave this dimension a much lower rating than they gave the other dimensions. A possible explanation for this may have to do with the Swiss context of our study. No other researchers (Desmond et al., 2014; Kalender et al., 2016; Yılmaz & Çınar, 2017) observed such a large difference, except Delmas et al. (2016), whose pilot study was carried out in Switzerland as well. Two elements might play a key role in this regard. First, spirituality is a very private matter for most Swiss people. Patients may be reluctant to share their spiritual life, especially in the typical open-space design of HD units, which often

provides little privacy for meaningful conversations (Cervantes, Zoucha, Jones, & Fischer, 2016). This makes it harder for nurses to venture into near-taboo territory. Moreover, spirituality is a complex issue that it is not limited to the religious practice but refers to a wider effort to find a balance in life (Walton, 2002). Therefore, nurses' support for spirituality can pass through other activities, without implying an explicit discussion. As Tanyi and Werner (2008) suggest, "nurses can promote and support faith, trust and belief in God or a higher power by listening, by being present" (Tanyi & Werner, 2008, p.47). Consequently, nurses trained in a caring approach could be more aware of the spiritual support they give during the everyday activities of the HD centre. At the contrary, patients may interpret the benefits of the caring relation in a more intuitive way. Thus, the caring environment is described as featured by trust and safety (Bevan, 2007) or friendly (Wilson & Harwood, 2017), but not linked to spirituality, a dimension that is still culturally linked to ritual practices. This would explain why patients show lower scores than nurses on this dimension. Second, spirituality is the only carative domain where nurses have direct competitors. Most hospitals usually provide spiritual support through priests, ministers or volunteers affiliated with a religious organization. As shown in other researches (Beechem, 1995; Cervantes et al., 2016), the presence of spiritual guides can interfere in the relation with the healthcare professionals in the absence of a strong patient-centred approach. Consequently, given the presence of these professionals, patients may consider spirituality to lie outside the sphere of concern of nurses.

In sum, our data suggest that both nurses and HD patients rate their interactions high on all the carative factors. This stands in stark contrast with the findings of previous research that painted a picture of rampant dehumanizing practices in health care (for a review, see Haslam & Stratemeyer, 2016; for a recent contribution, see Brousseau, Cara, & Blais, 2019). Given the lack of fully comparable studies, it is unclear whether this particularity is connected to the Swiss context, where humanistic relationships are well grounded in nursing training, or to other factors, such as the organisation of Swiss HD units, which are managed by qualified nurses mindful of the quality of life of patients. Even if caring attitudes and behaviours are largely present in the eyes of both nurses and patients, the two groups seem to differ slightly, though significantly, in their perceptions. The causes of this divergence require further investigation. Furthermore, the nurses in our sample rated Spirituality lower than all the other caring dimensions. This view was confirmed and even reinforced by the patients' evaluations. The role of spirituality in a healthcare context is a complex matter that involves the nurse–patient relationship, cultural norms and personal beliefs. In this light, the development of this dimension may require special training that remains under-provided in today's nurse education.

4.1 | Limitations

Our study suffers from several limitations. First, the most obvious limitation concerns the non-representativeness of our sample of

HD patients. Ours was a convenience sample that comprised only patients with a good command of French and healthy enough and willing to participate in the study. This non-random selection created a sample that is not representative of the entire population of HD patients living in the French-speaking part of Switzerland. Patients excluded from the study may well have a different relationship with HD nurses from the one observed in our study. This difference might have had an impact on the mean perceived level of caring and led us to reach different conclusions. For example, the health conditions of many HD patients make it impossible for them to complete a questionnaire even with assistance, like we provided in our study. A second limitation regarding our sample has to do with the fact that both nurses and patients came from ten different hospitals. We analysed them as a uniform population consisting of independent observations. However, the observations might have differed across the hospitals. If a larger sample had been available, a multilevel analysis might have yielded more meaningful results. Third, our analyses provided a picture of a specific situation in time and space. Given the limited research involving the instrument used and the absence of longitudinal measures, there is no knowing whether our data reflect a stable situation or whether they are part of a more complex pattern. Nevertheless, the CNPI-70 scale is growing in popularity (Cossette et al., 2019) and future studies will soon corroborate or confute our conclusions. Finally, we must stress a fourth limitation. The CNPI-70 has been validated and used mostly with nurses and nursing students. Only a previous pilot study (Delmas et al., 2016) included patients. Consequently, further testing is needed to identify possible issues linked to the use of this instrument with patients. Particularly, as the instrument is deeply grounded in theoretical concepts, with which patients may not necessarily be well acquainted, some small differences among similar concepts may be lost. Thus, some attitudes may be overestimated or underestimated.

4.2 | Future perspectives

Our results provide further evidence that nurse self-evaluations and patient perceptions of the quality of the nurse–patient relationship do differ and that patients tend to rate their interactions higher on all of the caring dimensions, except spirituality. However, further research is clearly needed to clarify certain points. In particular, we do not know whether our results are specific to the Swiss context or whether they constitute an exception arising from the limitations of our study or whether they genuinely reflect a larger scheme of things. Our study clearly needs to be replicated in other contexts and with longitudinal measures. Moreover, as mentioned, our results can be interpreted in various plausible ways. We do not know the causes of the gap between nurse and patient evaluations or the factors that widen or narrow it. Qualitative or mixed-method analyses appear necessary to determine the mechanisms behind our observations. Finally, despite the importance that patients attach to caring, there exist few interventions aimed at reinforcing caring skills.

Existing interventions (e.g. O'Reilly & Cara, 2011; O'Reilly, Cara, & Delmas, 2016) need further validation and new interventions need to be developed.

5 | CONCLUSION

In conclusion, this study demonstrated that Swiss HD patients and their nurses perceive the caring provided by nurses to be of high quality. Patients rated all of the carative factors higher than nurses did, with the exception of Spirituality. The spiritual dimension proved a challenge for both patients and nurses, even though the search for meaning is fundamental to human existence. A mix of cultural constructs, regarding both religion and the role of nurses and other constraints, such as the lack of privacy provided by most HD units, might be behind these difficulties. Finally, although the results were rather satisfactory with this population, it is necessary to keep in mind that caring can deteriorate over time. This is why it is imperative to develop practical training to maintain the level of caring high at all times.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHORS' CONTRIBUTIONS

PD, LOR, CC, SB, JW, DRS, IL, JP, MK: Conception and design. MA, EB, VB, TBT: Data acquisition and collection. JP, MA, PD: Data analysis and interpretation. LB, PD, MA: Drafting the article. LOR, CC, SB, JW, DRS, IL, JP, MK: Revising the article critically for important intellectual content. All authors agreed on the final version.

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