

Pediatric Nurse Practitioner Knowledge of and Attitudes Toward Human Trafficking: A Psychometric Evaluation

Cijy Elizabeth Sunny, PhD,
Jessica L. Peck, DNP, APRN, CPNP-PC, CNE, CNL, FAANP, FAAN, &
Jennifer Sonney, PhD, ARNP, PPCNP-BC, FAANP, FAAN

Introduction: Human trafficking is an urgent health threat. This study sought to psychometrically validate the novel Pediatric Nurse Practitioner Knowledge and Attitudes Toward Human Trafficking scale.

Method: Using data from a 2018 study of pediatric-focused advanced practice registered nurses ($n = 777$), this secondary analysis examined dimensionality and reliability of the survey.

Results: The Cronbach α for scale constructs was < 0.7 for knowledge and 0.78 for attitudes. Exploratory and confirmatory analyses identified a bifactor model for knowledge with relative fit indexes within standard cutoffs, root mean square error of approximation = 0.03, comparative fit index = 0.95, Tucker-Lewis index = 0.94, and standardized root mean square residual = 0.06. The attitudes construct indicated a 2-factor model with root mean square error of approximation = 0.04, comparative fit index = 0.99,

Tucker-Lewis index = 0.98, and standardized root mean square residual = 0.06, within standard cutoffs.

Discussion: The scale is a promising tool in advancing nursing response to trafficking but needs further refinement to increase utility and uptake. *J Pediatr Health Care.* (2023) XX, e1–e10

KEY WORDS

Human trafficking, psychometric validation, item response theory

INTRODUCTION

Abuse and exploitation of children through human trafficking (HT), including sex and labor trafficking, is a global existential crisis that threatens child rights and safety while adversely impacting pediatric physical and mental health outcomes (Greenbaum et al., 2023; Peck, 2020). Although the atrocities of trafficking have risen in the collective public consciousness, misperceptions and misinformation dominate the national and international narrative (HEAL Trafficking, 2023; Peck et al., 2021; Prakash et al., 2022). Health care professionals are not immune; well-intentioned but inadequate education can foster implicit biases, leading to underrecognition of abused and exploited children (Peck et al., 2021; Prakash et al., 2022; Sangha & Birkholz, 2021; Stoklosa et al., 2017). Numerous barriers hinder the identification and referral of potential HT victims (Peck & Meadows-Oliver, 2019), including a lack of awareness, training and resources. Within the United States, HT awareness among health care professionals remains low, with few receiving evidence-based training (Barron et al., 2019; Bono-Neri & Toney-Butler, 2022; Doiron & Peck, 2022; Fraley et al., 2018; Peck & Meadows-Oliver, 2019). Although state-mandated continuing education requirements are emerging, Texas is currently the only state

Cijy Elizabeth Sunny, Assistant Professor, Department of Computing and Software Engineering, College of Education, Florida Gulf Coast University, Fort Myers, FL.

Jessica L. Peck, Clinical Professor, Louise Herrington School of Nursing, Baylor University, Dallas, TX.

Jennifer Sonney, President, National Association of Pediatric Nurse Practitioners, and Associate Professor, School of Nursing, University of Washington, Seattle, WA.

Conflicts of interest: None to report.

Correspondence: Jessica L. Peck, DNP, APRN, CPNP-PC, CNE, CNL, FAANP, FAAN, Louise Herrington School of Nursing, Baylor University, 333 N. Washington Ave., Dallas, TX 75246; e-mail: Jessica_Peck@Baylor.edu.

J Pediatr Health Care. (2023) 00, e1–e10

0891-5245/\$36.00

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<https://doi.org/10.1016/j.pedhc.2023.02.001>

requiring uniform, evidence-based standards in mandated HT training for health care providers (Peck et al., 2021).

Within nursing, HT has recently emerged as a priority public health threat. Although HT was first defined in the federal code by the Human Trafficking Victims Protection Act of 2000, the first HT position statement from a national professional nursing organization was not issued until 2017 (Doiron & Peck, 2022). Around the same time, the National Association of Pediatric Nurse Practitioners (NAPNAP) commissioned the creation of NAPNAP Partners for Vulnerable Youth (NPVY), a nonprofit 501(c)(3) organization. NPVY sought to establish a nursing leadership infrastructure to advance advocacy and education efforts on emerging child health threats. The first NPVY initiative was the Alliance for Children in Trafficking, launched in 2017 to respond to the emerging threat of HT.

To direct program planning and resource allocation, NAPNAP conducted a needs assessment of NAPNAP members' knowledge and attitudes toward human trafficking in 2018 (Peck & Meadows-Oliver, 2019; Peck, 2022). This secondary data analysis aimed to psychometrically validate the pediatric nurse practitioner's knowledge and attitude toward the HT survey using the data collected by NAPNAP. Psychometrics is the science of evaluating or measuring psychological traits such as attitudes in the context of the survey respondent's scores or endorsement of the items, reliability, and validity (Furr & Bacharach, 2014). In this study, HT includes both sex and labor trafficking; hence, the attributes measured are knowledge and attitudes toward sex and labor trafficking. Specifically, this study sought to answer the following research questions:

1. Are the domains of knowledge and attitude toward HT for the NAPNAP sample unidimensional or multidimensional?
2. How well do the survey items measure the domain of knowledge and attitudes toward HT?
3. How reliable are the measures for the knowledge and attitude constructs?

METHODS

The original study from 2018 employed a cross-sectional survey design.

Participants

Pediatric-focused advanced practice registered nurses (APRNs) play a critical role in recognizing, identifying and responding to child health threats across the health care continuum. The survey was sent to 9,342 persons, with 777 respondents completing the survey. Inclusion criteria were (1) self-report as a pediatric-focused APRN and (2) current or past member of NAPNAP. A convenience sample was recruited through emails to NAPNAP membership listservs. The survey was available for 3 months, from November 2017 to January 2018.

Instrument Development

Executive leaders serving on the board of NPVY appointed an advisory council of expert academics, clinicians and HT leaders to develop a survey to measure the knowledge and attitudes of nurse practitioners toward HT. Recognizing that HT was an emerging health care priority, the advisory council first conducted an integrated literature review to access studies within health care that focused on measuring the HT knowledge, attitudes, and beliefs of nurse practitioners. After discovering a paucity of literature, they proceeded to concept analysis, specifically through the lens of the social ecologic model. This framework helps pediatric practitioners understand the multifactorial influences within an individual's ecosystem that are plausible contributors to HT (Peck, 2020). The concept analysis was followed by the creation of the survey items. The advisory council met weekly to generate survey items until a consensus was reached for each item for the knowledge and attitudes toward the HT survey. A pilot survey was informally circulated to elected and appointed leaders within NAPNAP, and minor revisions were made to revise the instrument further. After Institutional Review Board approval, the electronic survey was deployed to members of NAPNAP via the SurveyMonkey platform.

Knowledge and Attitudes Toward HT Survey

The survey consists of 27 questions, including demographics, experience working with HT victims, knowledge questions, attitude-based questions that gauge their confidence and beliefs, and an open-ended question for additional comments. For details of the original study, readers are referred to the original publications in the *Journal of Pediatric Health Care* by Peck and Meadows-Oliver (2019, 2021).

The 26-item survey (excluding the open-ended question) had six demographic items, and three asked about their experience in care, identification of a trafficking victim, and involvement with antitrafficking organizations (Peck & Meadows-Oliver, 2019). The remaining 17 items examined the pediatric nurse practitioner's knowledge and attitude regarding HT. These 17 items were the focus of this validation study as they were theorized to measure the knowledge and attitudes of pediatric-focused APRNs toward HT.

Knowledge is typically defined as facts or information about a topic that leads to the practical and theoretical recognition and understanding of that topic (Calzone et al., 2013), in this case, HT. Seven items covered risk factors, patient characteristics that should raise concerns for possible HT, health care problems for teens involved in sex trafficking (ST), and general questions concerning HT. The scales for the knowledge construct were dichotomous (yes/no; true/false). For example, preexisting mental health diagnosis/concern, running away/living on the streets, and so on, were each presented as an item (question) that depicted the various risk factors for ST identified by experts. For the analysis, each choice was coded as a separate question that either received a score of one for the correct answer or zero for the incorrect answer. This yielded 31 items for knowledge construct, as shown in Table 1, along with the percentage of correct responses for the current sample.

TABLE 1. Knowledge construct

Item no.	Description	Correct responses (%)
14	The following are possible risk factors for entry into human sex trafficking: (check all that apply)	
14.1	Preexisting mental health diagnosis/concern	91
14.2	History of child maltreatment, especially sexual abuse	99
14.3	LGBTQ adolescent	84
14.4	Chronic medical concerns such as asthma	81
14.5	Not a legal U.S. citizen/resident	8
14.6	Running away/living on the streets	99
14.7	Living in foster care/group home setting	94
14.8	Family dysfunction/conflicts at home	3
14.9	Developmental delays	20
15	The following are possible signs of or risk factors for entry into human labor trafficking: (check all that apply)	
15.1	Poverty	94
15.2	Recent immigration from a foreign country	93
15.3	Hunger, malnourishment	92
15.4	Clothing inappropriate for the weather	88
15.5	Injuries not adequately explained by history	93
15.6	Being employed without a school work permit	74
15.7	Living with an employer or having an employer listed as a school's caregiver	93
15.8	Failing school performance attributed to long working hours	91
16	Which of the following patients should raise your concern for possible human sex trafficking involvement? (check all that apply)	
16.1	A 14-year-old presented to the adolescent clinic unaccompanied for testing for sexually-transmitted infections and stated, "please don't tell my mom I am here." The patient is known to the clinic and freely answers questions about home and school	82
16.2	A 16-year-old female presented to the emergency department with bruising and a radial fracture. She is accompanied by an older male who identifies as her brother, who answers questions directed at the patient	99
16.3	A 15-year-old presenting to urgent care unaccompanied for testing for sexually-transmitted infections is reluctant to answer or has difficulty answering questions such as address, school, or with whom she lives	97
16.4	A 15-year-old female presented to the community clinic for pelvic inflammatory disease with a female in her early twenties identified as her sister. You note both females have tattoos stating "Dee's girl" on their wrists	97
17	Which of the following patients should raise your concern for possible human labor trafficking involvement? (check all that apply)	
17.1	An 8-year-old male presents to urgent care in a rural community with complaints of dizziness and headache. Your assessment reveals severe dehydration and malnourishment. His caretaker reports he has been unable to attend school this year because of his symptoms.	83
17.2	A 15-year-old male presents to the emergency department with a partial finger amputation. He is accompanied by his father, who reports the injury in his high school shop class. An administrator from the school has arrived and is requesting information on the student	82
17.3	A 17-year-old female presents to the primary care clinic requesting to sell magazines. The office receptionist declines, but the teen insists on speaking to you. When you ask for identification, the teen is unable to produce any documents. She begs you to please purchase a magazine subscription so she can support her younger sister	93
18	The following are common presenting health care problems for teens involved in human sex trafficking: (check all that apply)	
18.1	Physical injuries	98
18.2	Suicidal ideation/attempts	92
18.3	Sexually-transmitted infections	100
18.4	Pregnancy/miscarriage	96
18.5	Drug/alcohol overdose/withdrawal	96
19	Many adolescent victims of human trafficking do not perceive themselves as being victimized and may need time to realize their victimization before they desire to seek rescue from their current situation	97
20	Within U.S. borders, U.S. teens are more likely than foreign nationals to be victims of human trafficking	53

Note. LGBTQ, Lesbian, gay, bisexual and transgender.

TABLE 2. Attitude scale

Item no.	Description	Mean \pm SD
10	I am confident in my ability to identify a child or teen who is a potential victim of human trafficking	2.74 \pm 0.96
11	I am confident in my ability to report to the authorities a possible case of human trafficking according to my state or community's protocols/laws	3.31 \pm 1.18
12	I am confident in my ability to refer to or activate community resources if I identify a child/teen at high risk for human trafficking victimization	3.02 \pm 1.16
13	I feel knowledgeable about the immediate and long-term health care needs of victims of human trafficking	2.92 \pm 1.08
21	I believe it is possible I might encounter a potential victim of human trafficking in my current practice setting	4.24 \pm 0.80
22	I believe knowing how to identify potential victims of human trafficking is an important clinical skill relevant to pediatric practice	4.73 \pm 0.49
23	I feel comfortable explaining the differences between human labor trafficking, human sex trafficking and human smuggling	2.83 \pm 1.10
24	I believe child sex trafficking is a significant problem in the United States	4.39 \pm 0.66
25	I believe child labor trafficking is a significant problem in the United States	4.09 \pm 0.78
26	I believe pediatric clinicians should play an important role in the prevention of all forms of human trafficking of children	4.73 \pm 0.50

In education and nursing, attitudes are defined as feelings, beliefs, likes and dislikes toward a particular field or, in other words, the perceived importance or perceptions (Calzone et al., 2013; Guzey et al., 2014). For this study, the definition of attitude was adapted to qualitatively conceptualize attitudes as feelings, beliefs, or self-perceived confidence about perceived ability toward HT. The attitude scale had a total of 10 items and used a five-point Likert scale (1, strongly disagree; 5, strongly agree) as shown in Table 2, along with the mean and standard deviations for each item as the scale here is polytomous (more than two response scales).

Analysis

This secondary analysis of quantitative data was done using Microsoft Excel, Mplus (version 7.31; Muthén & Muthén, 2012), and SPSS (version 28). As this was an exploratory analytic study, the sample of 777 respondents was randomly split into a test sample (367) for exploratory analysis and a cross-validation sample (410) for confirmatory analysis using item response theory (IRT) models (requires larger sample sizes; Hambleton, 1989). The internal consistency was computed using Cronbach alpha values for the overall knowledge and attitude constructs and each of the subscales within these constructs.

Exploratory models

As this was the first time a survey of this nature was developed, especially to assess the knowledge and attitudes of the NAPNAP members, it was decided that exploratory factor analysis would be the best starting point to assess the dimensionality (no. of latent dimensions/traits/attributes/constructs measured) of the survey. A construct is any trait measured using the items, also called indicators. For example, in the NAPNAP survey, knowledge and attitudes are two of the constructs and items or indicators were developed to measure these variables. Psychometrically, the standard is to have three or more items representing a

construct, as this provides useful statistical information about the shared variance (Fabrigar et al., 1999; Izquierdo et al., 2014; Taber, 2018). Model fit was determined on the basis of the absolute and relative fit statistics/indexes. The absolute fit is commonly estimated via the log-likelihood test or the χ^2 value, wherein a nonsignificant value indicates the model can reproduce the population covariance matrix and fits the data. Standardized root mean square residual and root mean square error of approximation (RMSEA) is also used to test for a good fit of the models with a standardized root mean square residual value of ≤ 0.09 , an indication of a reasonably good fit and an RMSEA value < 0.05 indicating very good fit. In addition, the relative/comparative fit compares two models to assess the best-fitting model and is assessed using the comparative fit index (CFI) and the Tucker-Lewis index (TLI) with values > 0.95 indicating a good fit of the model to the data (Hu & Bentler, 1999; Kelloway, 2015). The quality of the statistical model was also assessed using the Akaike information criteria (AIC) and the Bayesian information criteria (BIC). The best-fitting model has lower values for these information criteria compared with another model (Akaike, 1974; Judd, 2003)

IRT models

IRT is a complex psychometric framework that evaluates a test item on the basis of the traits of the person responding to the item and the quality of the item (Furr & Bacharach, 2014). In simpler terms, it gives a more granular diagnostic regarding item and person fit. For this study, the mathematical details of the model used will not be presented as it is beyond the scope of this paper. IRT models were employed for the confirmatory part of the analysis as these are confirmatory models for dichotomous and polytomous items. Two models that were used for the cross-validation sample were the two-parameter logistic model (Embretson & Reise, 2000) for the dichotomous response scale (knowledge) and the graded response model (GRM; Samejima, 1969) for polytomous response scale (attitude). A two-parameter logistic model determines a person's

ability to respond to an item on the basis of the difficulty of the item and item discrimination (items differentiating between individuals with a high level of a particular trait being measured compared with others with lower levels of the trait; Furr & Bacharach, 2014). The GRM model is an extension of the two-parameter logistic model in that the slopes are not constrained to a constant. They are different for different items. It differs from the other ordered polytomous theoretical models in that the GRM is a cumulative response model, whereas the others are adjacency models (De Ayala, 2009). Model fit was determined using the fit statistics described above. In addition, for IRT models, item and person misfit were assessed using the p value of signed χ^2 test statistic (S_{X2} ; $p < .05$) and person out-fit statistic z ($Z \geq \pm 2$; De Ayala, 2009). Local dependence was assessed using the Q3 statistic, and a correlation > 2 indicates

two items are significantly correlated after the contribution of the latent factors is removed (De Ayala, 2009).

The following section will present the results of the demographic makeup of the analytic sample, followed by the validation.

RESULTS

The survey was administered to 8,647 pediatric clinicians, and 798 completed the survey, yielding a response rate of 9.2%. When respondents with missing responses were removed, the missing percentage was 2.6, which is $< 5\%$ indicating that the missingness would not likely bias the estimations (Graham, 2009). This yielded a final sample of 777. The demographic characteristics of this analytic sample are shown in Table 3.

TABLE 3. Demographic characteristics

Characteristics	n (%)
Sample size	
Age, years	
20–30	95 (12)
31–40	188 (24)
41–50	146 (19)
51–60	192 (25)
61–70	141 (18)
≥ 71	15 (2)
Sex ^a	
Female	767 (99)
Male	8 (1)
APRN role (multiple roles)	
PNP-primary care	577 (74)
PNP-acute care	91 (12)
FNP	39 (5)
Pediatric CNS	11 (1)
Faculty/educator	102 (13)
Other ^b	152 (20)
APRN experience, years (776 responses)	
0–5	275 (35)
6–10	148 (19)
11–20	115 (15)
> 20	238 (31)
Primary practice site	
Out-patient primary care clinic	326 (42)
Out-patient specialty care clinic	121 (16)
Public health or state department of health clinic or office	15 (2)
In-patient/hospital setting (as care provider)	106 (14)
In-patient/hospital setting (as administrator or consultant)	7 (1)
Academic/education setting	62 (7)
School-based clinic/school	38 (5)
Other ^c	102 (13)
Education (776 responses)	
Doctorate (DNP, DNS, DN, EdD, PhD)	176 (23)
Master's	538 (69)
Postbaccalaureate certificate	7 (1)
Baccalaureate	34 (4)
Other ^d	21 (3)

Note. APRN, advanced practice registered nurse; CNS, clinical nurse specialist; FNP, family nurse practitioner; PNP, pediatric nurse practitioner.

^aTwo did not respond.

^bPNP practicing in specialty care, student, lactation consultant, psychiatric APRN.

^cStudent mental health center, and urgent care.

^dPostmaster's certificate.

Validation Results

This section organized results by construct, knowledge, and attitudes. The exploratory results are followed by the confirmatory results for each construct. As there was no theory underpinning the development of this instrument, the exploratory analysis for all 41 items did not yield conclusive results. Parallel analysis and exploratory structural equation modeling (ESEM)—a type of exploratory model—yielded factors with only one item loading onto a factor or construct. As mentioned previously, psychometrically, this is not enough to measure the breadth of the measured construct. A construct is any trait measured using the items, also called indicators. For example, for the NAPNAP survey, knowledge and attitudes are two of the constructs and items were developed to measure these. Given these inconclusive results, it was decided to split the survey on the basis of theoretical conceptualizations of knowledge and attitudes based on the description of the items.

Knowledge Construct

Exploratory

Using the test sample with only knowledge items, several exploratory models were examined using Mplus, which did not yield conclusive results. Our findings revealed factors with very weak loadings or single-item loading with very strong correlations with multiple factors. Although the ESEM model led to a comparatively better result, it was not devoid of the above problems. Quantitatively, the model was better. However, it required eliminating some conceptually important items; for example, those about patients that should raise concerns for possible labor trafficking (LT; 17.1–17.3; Table 1) and items about knowledge of HT in the context of victims, particularly adolescents and teens within the United States (items 19 and 20; Table 1) to name a few. As the exploratory analysis suggested, the ESEM could be a plausible model with fit statistics (χ^2 difference [51] = 1,142.28; $p < .0001$), providing an absolute fit to the data ($\chi^2[320] = 357.90$; $p = .07$; CFI = 0.97; TLI = 0.95; RMSEA = 0.02; weighted root mean square residual = 0.7).

As the goal of this validation was to retain conceptually relevant items, constrained confirmatory factor analysis (Figure 1) using item response theory was performed with items 14.1–15.8 and 19 and 20 loading onto factor 1 (f1; risk factors for entering into sex and labor trafficking), 16.1–17.3 loading onto factor 2 (f2; concerns for possible sex/labor trafficking), and 18.2–18.5 loading onto factor 3 (f3; health care problems for teens involved with HT). The exploratory analysis indicated items 19 and 20 loading on factors that the items measuring risk were loading on though some items had weak loadings (< 0.3) on those factors and no loadings on others.

Confirmatory

The confirmatory analysis was performed using the cross-validation sample. The IRT analysis was performed using the multidimensional item response theory (MIRT) package in the R software (Chalmers, 2012). This analysis suggested the bifactor model was the better model in the relative sense. A bifactor model is an advanced MIRT model wherein all the items are loaded onto a general factor and subfactors (f1, f2, f3; Reise et al., 2007). Figure 2 shows the visual of the Bifactor model for the knowledge construct.

Compared with the third-factor qualitatively conceptualized model (AIC = 6,353.40; BIC = 6,606.11), the bifactor was a parsimonious model as it had a lower AIC (6,299.09) but not a lower BIC value (6,672.15). The relative fit indexes (RMSEA = 0.03; CFI = 0.95; TLI = 0.94; SRMSR = 0.06) were also within the standard cutoffs. Several confirmatory models were explored, but the bifactor was the better model. As IRT gives further diagnostic details, item and person fit statistics were computed. Item fit statistic measures how closely the observed NAPNAP member item responses matched what the IRT models would predict. Fifteen of the knowledge items were found to have some degree of misfit as determined by the p value of signed χ^2 test statistic (S_X2 ; $p < .05$). Examination of the person outfit statistic z revealed 11 misfitting respondents from the sample ($Z \geq \pm 2$). In other words, 11 NAPNAP members had atypical responses. This means their item-score patterns are not typical of other NAPNAP members. Items with $|\text{Yen's } Q3| >$

FIGURE 1. Constrained confirmatory factor (f) analysis.

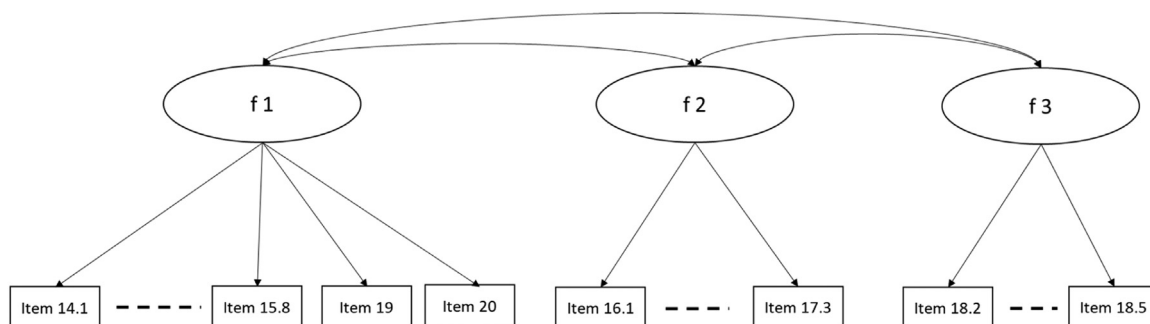
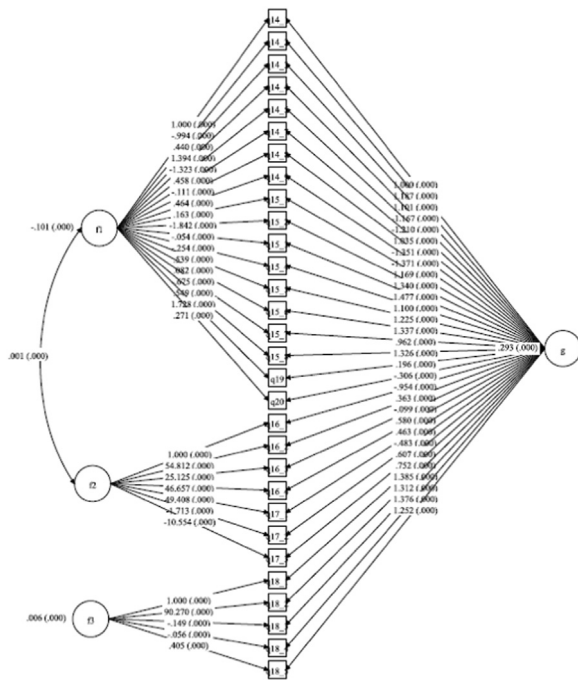


FIGURE 2. Bifactor model for the knowledge scale.

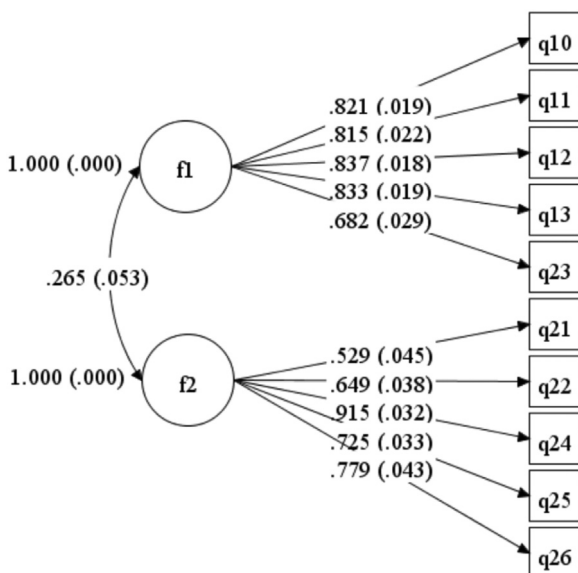


f, factor; g, general factor.

0.20 have local dependence, and for the knowledge construct, two items (not a legal U.S. citizen/resident [14.5] and recent immigration from a foreign country [15.2]) had local dependence as Q3 statistic was > 0.2 (0.4).

This means that these two items are significantly correlated after the contribution of the latent factors is removed.

FIGURE 3. A two-factor model for the attitude scale.



f, factor; q, question.

This also indicates there may be another secondary factor being measured. Several of the knowledge items had poor discrimination (< 1), which indicates they did not discriminate against NAPNAP members regarding their knowledge about HT. However, all but one of the constructs (health care problems for teens involved in HT) had good discrimination parameters.

In addition, the knowledge items have two different concepts covered within HT. The items were conceptualized as indicators of knowledge about ST and LT. As both are important types of trafficking and each had different risks and concerns, the additional models tested these using the cross-validated sample. The ST items consisted of items 14.1–14.9 (risk factors for entry into ST), 16.1–16.4 (concerns for possible ST), and 18.1–18.5 (health care problems for teens involved in ST). Several models were run, and the model without items 19 and 20 with three specific factors and a general factor; in other words, a bifactor model was a plausible fit for the data. Item 14.6 (running away/living on the streets) was eliminated from the analysis as all the respondents answered this survey question correctly and, as such, only had one category response which was one. The three-factor bifactor model had relative fit indexes (RMSEA = 0.03, CFI = 0.97, TLI = 0.96, and SRMSR = 0.05), which were also within the standard cutoffs.

Similarly, for the LT items, there were two conceptualized factors: risk factors for entering LT (items 15.1–15.8) and concerns for possible LT (items 17.1–17.3). In addition, items 19 and 20 were added to concerns as they did not align with ST or LT. Model testing indicated that the model improved and was a better fit when items 20 and 17.2 were eliminated. Both these items were found to be misfitting and had very weak factor loadings (< 0.3). A two-dimensional bifactor model was found to be a plausible model in the relative sense and had a lower AIC. As before, the fit statistics revealed three of the knowledge items measuring LT were found to have some misfit. Person outfit statistic z revealed five misfitting respondents from the sample. There were five item pairs with local dependence.

Reliability of the knowledge construct and its subconstructs

The reliability was established using standard measures of Cronbach alpha and the values for the overall scale and the subscales—risks, concerns for possible HT, and health concerns were 0.50, 0.36, 0.27, and 0.64, respectively. They were below the acceptable limit of 0.7 (De Vellis, 2012). For ST measures, the reliability for the overall scale and specific factors (risk, concerns, and health problems) were 0.27, 0.23, 0.20, and 0.64, respectively. Except for the scale measuring health problems, all other alpha values were below the acceptable limit. For the LT measures, the reliability for the overall scale and specific factors (risk and concerns) were 0.64, 0.69, and 0.13, respectively. The concerns scale has very low reliability.

Attitude Scale

Unlike the knowledge measures, the attitude response scales were polytomous.

Exploratory

Using the test sample with only attitude items, several exploratory models were examined using Mplus, and it suggested a two-factor model (Figure 3) as the plausible model with fit statistics (χ^2 difference (26) = 208.42; $p < .0001$; CFI/TLI > 0.9; weighted root mean square residual = 0.06; RMSEA = 0.14). In addition, all items had significant factor loadings on the respective factors except for Q23, which loaded well on f1, which was qualitatively conceptualized as confidence. It had a significant loading on this factor. Once the exploratory analysis suggested a plausible model, as previously mentioned, the goal of this validation was also to retain conceptually relevant items, and so constrained confirmatory factor analysis using IRT was performed with items 10–13 and 23 onto f1 (confidence) and items 21, 22, and 24–26 loading onto f2 (beliefs). As the data here is polytomous, an additional IRT model built exclusively for polytomous data, namely, the GRM, was also implemented.

Confirmatory

The confirmatory analysis was performed using the cross-validation sample. The IRT analysis was performed using the MIRT package in R software. This analysis suggested the constrained two-factor GRM model was the plausible model in an absolute and relative sense. Figure 2 shows the two-factor GRM model for the attitude scale.

Compared with the unconstrained two-factor qualitatively conceptualized model (AIC = 8,073.88; BIC = 8,293.42), the constrained GRM, 2-factor model was a parsimonious model as it had lower AIC (8,064.68) and BIC values (8,252.28). The relative fit indexes (RMSEA = 0.04; CFI = 0.99; TLI = 0.98; and SRMSR = 0.06) were also within the standard cutoffs. All the items had good discrimination (> 1), which indicates they can discriminate between NAPNAP members of varying attitudes toward HT. Three of the attitude items (I am confident in my ability to identify a child or teen who is a potential victim of HT [item 10]; I believe knowing how to identify potential victims of HT is an important clinical skill relevant to pediatric practice [item 22]; I believe pediatric clinicians should play an important role in the prevention of all forms of HT of children [item 26]) were found to have some degree of misfit, as determined by the p value of signed χ^2 test statistic (S_X2; $p < .05$; De Ayala, 2009). Examination of the person outfit statistic z revealed 16 misfitting respondents from the sample ($Z \geq \pm 2$). In other words, 16 NAPNAP members had atypical responses. This means their item-score patterns are not typical of other NAPNAP members. Items with $|\text{Yen's } Q3| > 0.20$ had local dependence. For the attitude scale, six-item pairs (e.g., I am confident in my ability to identify a child or teen who is a potential victim of human trafficking [item 10] and I am confident in my ability to refer to or activate community

resources if I identified a child/teen at high risk for HT victimization [item 12]; $Q3 = 0.42$) had local dependence as $Q3$ statistic was > 0.2. This indicates that these two items are significantly correlated after the contribution of the latent factors is removed. This also indicates they may be measuring another secondary factor.

Reliability of the attitude scales and its subscales

The reliability was established using standard measures of Cronbach alpha and the values for the overall scale and subscales—confidence and beliefs were 0.78, 0.86, and 0.71, respectively. They were all acceptable values for alpha.

DISCUSSION

This study aimed to validate the NAPNAP member survey, which was developed to assess the nurse practitioner's knowledge and attitude toward child HT, including sex and labor. The validation covered dimensionality and associated analysis and reliability of the HT survey. The analysis concludes that the NAPNAP survey is a multidimensional instrument.

The knowledge construct of the survey has a bifactor structure with general factor and three specific factors that were named (1) risk factors for entering into sex and labor trafficking, (2) concerns for possible sex/labor trafficking, and (3) health care problems for teens involved with HT. Although the bifactor was a plausible model, there were items with weak loadings on the factors. For example, item 19 (many adolescent victims of HT do not perceive themselves as being victimized and may need time to realize their victimization before they desire to seek rescue from their current situation) had a weak loading. An improvement that could be made is to split this item into two items as it embeds two statements within it. Best practice item writing guidelines include keeping items simple and short and avoiding compound statements (De Vellis, 2012). The reliability of this scale, including subscales, is not within the acceptable range (≥ 0.7 ; Mayers, 2013). The item fit statistics may be used to identify misfitting items for possible deletion. Another statistic is to look for local dependency (different items in a survey should not be closely related because if they are, then they would be redundant items), but for this sample, only a few items had severe local dependence. Conceptually, each knowledge item measures the NAPNAP member's understanding of HT. These items are important, so each choice as a well-constructed item could be included in the next version of this survey. Table 4 provides an example of the updated version of the better-constructed risk factor subscale for the knowledge items for the next iteration of this survey.

The attitude scale of this survey had two constructs (dimensions) which were conceptually named confidence and beliefs. IRT analyses indicate that most items were a good fit, but those misfitted did not approach the cutoff. The exception to this is item 22 (I believe knowing how to identify potential victims of HT is an important clinical skill

TABLE 4. Revised items for risk factors for entering human trafficking

Item	Revised description
15	The following questions ask about possible risk factors that may make a child enter human labor trafficking. Please select the bubble you most agree (1, strongly disagree; 5, strongly agree)
15.1	Poverty is a possible risk factor for entry into human labor trafficking
15.2	A child who has recently immigrated from a foreign country is a risk factor for entry into human labor trafficking
15.3	Hunger and malnourishment in children are also possible risk factors for entry into human labor trafficking
15.4	A child's clothing inappropriate for the weather is a possible risk factor for entry into human labor trafficking
15.5	Injuries on a child not adequately explained by history are a possible risk factor for entry into human labor trafficking
15.6	A child being employed without a school work permit is a possible risk factor for entry into human labor trafficking
15.7	A child living with an employer or having an employer listed as a child's caregiver is a possible risk factor for entry into human labor trafficking
15.8	A child's failing school performance attributed to long working hours is a possible risk factor for entry into human labor trafficking

relevant to pediatric practice). The overall construct and subconstructs also had acceptable reliability values.

Although knowledge and attitudes had subconstructs, overall, the NAPNAP survey is multidimensional, with the survey items measuring the domains of knowledge and attitudes toward HT but as two separate constructs. Although the knowledge construct had moderate to weak reliability, the attitude construct had acceptable internal consistency (reliability), indicating these items are a consistent measure of the construct, namely attitudes toward HT. This is reflective of the very limited knowledge base of nursing as a whole and the complete absence of any reliable tools existing at the time for accurate measures. Based on this psychometric evaluation, future users of the NAPNAP survey could use the knowledge and/or attitude items separately. A cumulative score could be calculated as an index for each subscale. Because of this survey development, the U.S. Department of Health and Human Services issued the landmark report entitled *Core Competencies for Human Trafficking Response in Health Care and Behavioral Health Systems*. (National Human Trafficking Training and Technical Assistance Center, 2021). This interprofessional effort included the disciplines of medicine, social work, mental and behavioral health, and nursing, for which NAPNAP served as the sole nursing representative. This report will be an essential resource in future revisions of the survey tool.

Conclusions

As the focus of this paper was to evaluate the NAPNAP survey psychometrically, the analysis concludes that the current version of the NAPNAP survey can be used to measure attitudes toward sex and labor trafficking reliably but not to test the knowledge of the respondents about sex and labor trafficking given the poor reliability of the knowledge construct. In addition, the psychometric evaluation confirms the validity of the current survey regarding its dimensionality as being multidimensional and not unidimensional as conceptualized qualitatively. As an alternative, given the knowledge items of this survey are testing for advanced registered nurse practitioners' knowledge about HT, an index or composite score can be calculated as the responses to these items on this survey are dichotomous. The composite or index

score can interpret knowledge as low, medium or high about HT. As the knowledge-based items did not yield a strong evaluation result, future versions of the survey as part of its continued validation should be rewritten and measured on a confidence scale instead of an agreeability scale (e.g., not confident to very confident). Secondly, future work should also focus on how the responses to knowledge and attitude scales vary on the basis of different demographic characteristics such as age, experience, and education through a differential item functioning analysis to look at construct, metric, and scalar invariance across these groups.

In summary, the NAPNAP Pediatric Nurse Practitioner Knowledge and Attitudes Toward Human Trafficking scale is a promising tool in advancing nursing engagement and response to abuse and exploitation of children presenting across the clinical care continuum. Future efforts to refine the scale will increase its utility and uptake. Research and scholarship to assess nursing response should include thoughtful and deliberate scientific design with academic rigor to contribute to professional nursing literature to guide clinical response effectively.

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