Journal of Pediatric Nursing xxx (xxxx) xxx

Contents lists available at ScienceDirect

Journal of Pediatric Nursing

journal homepage: www.pediatricnursing.org

Nurses' behavioural intentions towards intravenous fluid administration for pediatric patients: Application of the theory of planned behaviour

Kulley Ackah Grace, BSc, RN [a,b], Senoo-Dogbey Vivian Efua, PhD, RN [c,d,*]

[a] Ghana College of Nurses and Midwives, Accra, Ghana
[b] Englishie Amanfrom Polyclinicl-Ghana Health Service, Accra, Ghana
[c] Department of Public Health, School of Nursing and Midwifery, University of Ghana, P. O. Box LG 25, Legon, Accra Ghana Legon, Accra, Ghana
[d] Ghana Institute of Management and Public Administration (GIMPA), School of Public Service and Governance, Ghana

ARTICLE INFO

Article history:
Received 10 September 2023
Revised 6 November 2023
Accepted 6 November 2023
Available online xxxx

Keywords:
Behavioural intentions
Behavioural control
Nurses
Subjective norms
IVF therapy

ABSTRACT

Background: For pediatric patients, the demand for quality and safe Intravenous Fluid (IVF) therapy is huge. This is because, compared to adults, children have a lower tolerance for IVF therapy errors and present devastating physiological responses to errors. Nurses play a vital role in IVF administration; therefore, adequate knowledge, positive attitudes, positive perceived behavioural control, and good behavioural intentions are required to achieve effective and successful therapy, patient safety and prevention of complications, and overall positive patient outcomes. This study sought to assess the behaviour of nurses towards IVF administration for pediatric patients.
Method: A cross-sectional facility-based study was designed and randomly recruited 112 nurses. The theory of planned behaviour was used as a conceptual framework to assess nurses' behavioural intentions towards IVF administration for pediatric patients. Mean scores and their respective standard deviations, reliability tests, exploratory factor analysis, and linear logistic regression were all performed using SPSS version 27, with the level of significance set at 0.05.
Results: Nurses' behavioural intentions for IVF administration for pediatric patients were influenced by their knowledge of standards and protocols for IVF use ($\beta = 0.320$; $p = 0.01$), attitudes ($\beta = 0.339$; $p = 0.006$) subjective norms (β 0.240; $p = 0.003$) and perceived behavioural control ($\beta = 0.26$; $p = 0.001$).
Conclusion: Nurses' behavioural intentions for IVF administration were significantly influenced by their knowledge of procedures and standards for IVF administration. Additionally, the nurses' subjective norms, perceived behavioural control, and attitude towards IVF administration have a significant effect on their behavioural intentions to administer IVFs to pediatric patients. For nurses to administer IVF effectively, safely, and successfully to pediatric patients, there is a need to enhance their knowledge of standards and guidelines for IVF administration. The nurses need to have good attitudes and positive support and influence from all others to be able to administer IVFs safely and successfully to their pediatric patients.

Introduction

Global estimates show that 25 million people receive Intravenous Fluid (IVF) therapy, and this has remained an essential component of patient care during hospitalization and in certain acute situations (Alexander & Corrigan, 2010). IVF therapies are usually recommended for fluid replacement, resuscitation, the administration of medications, or maintenance hydration (Finfer et al., 2018; Stephenson, 2020). An example of intravenous therapy is parenteral hydration, which is also referred to as Intravenous Fluid (IVF) therapy, where IVFs are delivered directly into a vein (Carson et al., 2012).

IVF therapy is managed collaboratively by physicians, pharmacists, and nurses (Gao et al., 2015; Guest, 2020; Leach et al., 2020). The roles of these professionals are interrelated, with doctors prescribing (Leach et al., 2020; Lobo et al., 2001), pharmacists providing support and advice during IVF prescriptions (Abbood et al., 2019; Staples et al., 2008), and nurses administering, regulating, and monitoring patients throughout the IVF therapy (Guest, 2020).

Nurses, therefore, are the cornerstone of IVF administration since they play a vital role in the entire process (Njunge et al., 2017). Therefore, nurses' competency and skills are needed to achieve effective and successful therapy, patient safety and prevention of complications, and overall positive patient outcomes (Guest, 2020). Assessing pediatric patients' IVF needs, as well as prescribing and delivering IVFs accurately, are essential daily routines in most pediatric settings (Mohamed et al.,

* Corresponding author at: P.O. Box LG 25, University of Ghana, Accra, Ghana.
E-mail address: efuvivi@yahoo.co.uk (S.-D.V. Efua).

https://doi.org/10.1016/j.pedn.2023.11.010
0882-5963/

2020). Specifically for nurses, these are complex responsibilities that entail careful clinical assessment, a good understanding of the physiology of fluid homeostasis both in health and disease, and appropriate supervision and training (Leung et al., 2021; Matt, 2023).

IVF therapies pose particular risks because of their complexity and the multiple phases required in their preparation, administration, and monitoring (Westbrook et al., 2011). IVF therapy can become potentially harmful as complications such as phlebitis, extravasation, infiltration, and infections have been reported (Dychter et al., 2012). Despite the knowledge and awareness of these complications, several studies involving patients hospitalized and given IVF therapy have revealed that IVF administration and monitoring practices are not up to the recommended standards (Njunge et al., 2017), and these practices traverse many public health institutions and facilities (Teshome et al., 2023). Specifically, recent studies assessing nurses' knowledge, attitudes, and practices towards IVF therapy revealed overwhelmingly low to average knowledge, and poor attitudes and practices (Lamsal & Shrestha, 2019; Njunge et al., 2017; Teshome et al., 2023).

Poor knowledge of IV therapy is a risk factor for patient mortality, as it can affect the quality of care provided to patients and consequently result in negative patient outcomes (Akech et al., 2018). The consequences of poor knowledge and attitudes towards IVF therapy can be dire for pediatric patients who are particularly vulnerable (Mohamed et al., 2020). Based on the greater vulnerability of pediatric patients to IVF therapy errors, there is a need to periodically assess nurses' behaviour towards IVF therapy for pediatric patients and determine how their behaviour is influenced by their knowledge, attitude, subjective norms, and behavioural controls. A study done in Ghana reported negative attitudes and behaviour of nurses towards IV medication administration (Ntow et al., 2021). We are not aware of how these negative attitudes influence the behaviour of nurses towards IVF therapy for pediatric patients, who are much more vulnerable to IVF administration errors. In this light, we used the Theory of Planned Behaviour (TPB) to guide a study that aimed to examine the relationship between nurses' knowledge, attitude, subjective norm, and behavioural control on their behavioural intentions and behaviour for IVF administration for pediatric patients in Southern Ghana.

Hypothesis

In line with the theoretical framework or model (Theory of Planned Behaviour), we hypothesized that: nurses' knowledge of IVF administration, their attitudes, behavioural control, and subjective norms have a significant influence on their behavioural intentions towards IVF administration for pediatric patients.

Methods and materials

Theoretical underpinning

We utilized the Theory of Planned Behaviour (TPB) as the conceptual framework to underpin this study. According to the proponent of the theory, three core components or constructs, namely, attitude, subjective norms, and perceived behavioural control, together shape an individual's behavioural intentions (Ajzen, 1991). The theorists believe that the more positive the attitude towards a certain behaviour, the greater the perceived social support and control over the behaviour and the more likely an individual will adopt a certain behaviour. Behavioural intentions refer to the disposition of thoughts and the motivation to act.

We adapted and modified this theory by adding one more component or construct, called IVF therapy knowledge, since there is evidence to show that knowledge of a phenomenon affects the behavioural intentions of individuals; hence, the knowledge component has been used as the fourth construct of the TPB by social science and health researchers (Atencion et al., 2019).

Under the guidance of the adapted TPB, we sought to determine the influence of nurses' attitudes, subjective norms, and perceived behavioural control on their behavioural intention towards the administration of IVF for pediatric patients.

Study design and location

The study was a cross-sectional hospital-based study that was undertaken from March to June 2023. The participants, who were nurses, were randomly recruited from a conveniently selected health facility, and their behavioural intentions were assessed using a pretested questionnaire.

Ethical procedures were followed per local standards, and the research protocol of this study was approved by the Ghana Health Service Ethics Review Committee (GHS-ERC:050/03/23). The study was done in a public health facility belonging to the polyclinic level in the southern part of Ghana. The facility has a 28-bed capacity with an average admission of 942 children in 2022. The facility was upgraded to polyclinic status in 2018 and now runs a 24-h service to provide a wider range of health services to the community, which has a population of close to 115,710. The major units within the facility include the administration block, ear, nose and throat department, eye, dental, emergency and triage units. The facility also has male, female, and pediatric wards. Other units include the health information, laboratory department, public health, pharmacy, and outpatient departments.

Study population and sampling

The study was restricted to nurses of all levels, being auxiliary or professional. The inclusion criteria for selection were providing direct patient care to pediatric patients (including IVF administration) in the facility, being at post at the time scheduled for data collection and giving consent to be included in the study. Nurses who were on leave, on internship, or performing other duties that did not include IVF administration were excluded from the study.

The total number of nurses in the facility was 137. Using this figure as the population of Nurses (N), with a margin of error (e) of 5% and a nonresponse rate of 10%, the minimum sample size estimated for the study using the Yamane formula was 112. Therefore, the sample size for the study was determined as: $n = \frac{137}{1+137*(0.05^2)} n = 102.05 \sim 102 + 10.2 = 112$.

According to Hair et al. (1995), a sample size of 100 or greater is adequate for performing Exploratory Factor Analysis (EFA). The probability sampling procedure, specifically a lottery method, was utilized in selecting eligible participants for the study.

Data collection instruments and tool

The research instrument for this study was a questionnaire, which had two main sections. Section A had questions that assessed the demographic profiles of respondents, such as age, gender, etc. Section B1 had questions on Knowledge of IVF administration, recommended steps, procedures, etc. This subscale had 18 items in all. Section B 2 had 3 items and was used to assess nurses' subjective norms. Section B3 assessed perceived behavioural control with 3 items. Section B4 had questions on behavioural intention with 3 items. Section B5 assessed attitudes and it had 3 items.

All subscales were adopted from related studies. The items were measured using a five-point Likert scale, which ranged from strongly disagree (1) to strongly agree (5). The highest attainable score for knowledge is 60, with 15 for the subjective norm., and 40 for attitude, and perceived behavioural control having a maximum score of 15. The higher the mean score of the construct of the TPB (sub-scale), the better the performance of the participants on that sub-scale. The subscales

have been validated and tested for reliability (Aslam et al., 2017; Han & Yoon, 2015; Ibrahim & Fadlalmola, 2020). The research instrument was again subjected to both face and content validity as a pretesting and expert review was done to ensure the appropriateness and clarity of the questions. A few gaps were identified, and corrections and adjustments were made based on the recommendations of the experts and the results of the pretesting exercise. The questionnaire was finally approved and deemed accurate for the purpose.

Data collection procedure

The medical superintendent and administrator of the facility were contacted and informed about the study. An arrangement was made to meet the nurse leaders of the facility. They were given a thorough explanation of the aim and procedures of the study. This paved the way for the research team to have access to the nurses who were to be recruited into the study.

The aims of the study, the dates scheduled for questionnaire administration, as well as the overall procedure of the study, were communicated to the potential participants. Information on the study was posted on notice boards, ward information sheets, and social media (WhatsApp) platforms. On the scheduled days of data collection, the nurses were approached at the end of the morning shifts. This was done to avoid any interruption of patient care activities during the shift. The nature and purpose of the study were again explained to them. The consenting process was also clarified, and the questionnaires were handed over to the nurses after they had signed the written consent forms. All the participants self-administered the instrument in the nurses' resting rooms, Nurses stations, and coffee rooms. It took 30–40 min for the questionnaire to be answered.

Ethical Issues

Ethical approval for the conduct of this study was obtained from the Ghana Health Service Ethics Review Committee *(GHS-ERC:050/03/23)*. Introductory letters were received from the principal investigator's institution and presented to the medical superintendent and health service administrators of the study site. Throughout the study, we ensured voluntary participation and withdrawal from the study without any persuasion. We ensured privacy and anonymity and clearly explained the risks and benefits to all participants, after which they signed the consent forms to demonstrate their willingness to voluntarily participate in the study.

Data analysis

All questionnaires were reviewed for completeness and given a unique identity. Data from 115 questionnaires was entered as separate data sets into SPSS version 27 and cleaned. Following the removal of missing information, 112 observations remained for analysis. Descriptive statistics (mean, SD, range, skewness, and kurtosis) were computed for all variables. Mean cut-off points of 1.0–2.4, for poor performance 2.5–3.4 for moderate or intermediate and 3.5–5.0 for high performance were utilized (Wanjohi & Syokau, 2003).

Skewness and kurtosis were within −2.0 to 2.0, suggesting normality (Hair et al., 1995). We performed validity tests by assessing the internal consistency of the five scales by measuring Cronbach's alpha coefficient. We obtained values for direct reliability measures ranging from 0.76 to 0.83, indicating an acceptable level of reliability (Ursachi et al., 2015). Exploratory Factor Analysis (varimax rotation method) was used to reduce many variables into a smaller set of variables (factors). Secondly, it was used to establish underlying dimensions between measured variables and latent constructs and to provide construct validity evidence of self-reporting scales (Tabachnick & Fidell, 2007: Williams et al., 2010).

The Kaiser-Myer-Olkin index (KMO) value was >0.50. Similarly, Bartlett's test of sphericity $X^2(528) : 1542.57 : p - 0.000$ was significant indicating an adequate sample for factor analysis. The following set of rules guided the determination of the optimal number of factors to retain: (Cattell's scree test (inspection of a plot of the eigenvalues for breaks or discontinuities), and Monte Carlo Parallel Analysis (comparison of the present eigenvalues with those obtained in 100 sets of random data of the same size (Hair et al., 1995; Tabachnick & Fidell, 2007; Williams et al., 2010).

Correlation analysis was also performed, and correlation coefficients were classified as weak, moderate, acceptable, and strong per the guidelines given by Mukaka (2012). We finally performed multiple linear regression analyses to assess the relationship between the various factors, with the level of significance set at 0.05.

Results

Demographic profile of the participants

The results of the study suggest that out of the total 112 participants, 22.3% (25/112) were males and the remaining 77.7% (87/112) were females. Most of the participants, 46.4% (52/112), were between 31 and 40 years old. As evidenced in the results, 26.8% (30/112) of the participants were certificate holders, 36.6% ($n = 41$) were diploma holders, 33% (37/112) were first-degree holders, and 3.6% (4/112) were master's degree holders. Most of the participants 61.6% (69/112), were married. Professional nurses were in the majority, 66.1% (74/112). Regarding work experience or duration of service, most of the participants(58% or 65/112) have worked for between 1 and 5 years in their area of expertise, with minimum and maximum years of experience of 1 and 30 years, respectively, as shown in Table 1.

The mean and standard deviation of items in each construct of the TBP

The range of estimated mean and standard deviation per construct of the TPB is presented in Table 2.

Table 1
Sociodemographic characteristics of participants ($N = 112$).

Variable	Frequency	%
Gender		
Male	25	22.3
Female	87	77.7
Age range		
20–30	46	41.1
31–40	52	46.4
41–50	5	4.5
51–60	9	8.0
Level of Education		
Certificate	30	26.8
Diploma	41	36.6
First degree	37	33.0
Masters	4	3.6
Marital Status		
Single	33	29.5
Married	69	61.6
Separated	1	0.9
Widowed	9	8.0
Professional category		
Auxiliary Nurse	38	33.9
Professional Nurse	74	66.1
Years of Experience		
1–5 years	65	58.0
6–10	25	22.3
11–15	3	13.4
16–20	15	3.6
20>	4	2.7

The result as obtained suggested that all the items had skewness and kurtosis ranging from (skewness = −1.49 to 0.33; kurtosis = −1.38 to 1.95). The result suggests that normality is achieved based on skewness and kurtosis values.

Reliability and internal consistency of items in each construct of the TPB

The internal consistency of the responses was measured using Cronbach's alpha (α). The result presented in Table 2 suggests that all items have alpha (α) values ranging from 0.76 to 0.83. indicating an acceptable level of internal consistency between the items on each scale.

Constructs correlations

The result is presented in Table 3**,** which shows the correlations among the study constructs. As shown in the table, there was a high correlation among most of the constructs, such as knowledge, perceived behavioural control ($r = 0.42^{**}$), behavioural intentions ($r = 0.54^{**}$), attitude ($r = 0.68^{**}$), and subjective norm ($r = 0.32$) while there was a positive but weak association among constructs such as knowledge and behavioural intention ($r = 0.19$), subjective norm and perceived behavioural control (r = 0.19), subjective norm and behavioural Intentions ($r = 0.17$).

Relationship between the five constructs of the TPB

The result, as shown in Table 4, suggests that nurses' knowledge of intravenous fluid administration has a positive and significant influence on their behavioural intentions (β = 0.320- p-0.001) supporting our hypothesis that knowledge has a positive impact on nurses' behavioural intentions. The result suggests that attitude has a positive and significant influence on nurses' behavioural intentions (β-0.339, p-0.006).

This study also revealed that nurses' subjective norm has a positive and significant influence on their behavioural intention (β = 0.240, p-0.003). This implies that nurses' subjective norm practices have a strong and positive impact on their behavioural intentions.

The findings have shown that nurses' perceived behavioural control over the administration of intravenous fluid has a significant influence on their behavioural intentions (β =0. 260, p-0.001). This finding supports evidence indicating that perceived behavioural control positively influences nurses' behavioural intentions in the administration of intravenous fluid.

The results, as shown in Fig. 1**,** suggest that behavioural intention has a positive and significant influence on overall behaviour among the participants (β = 0.741, p-0.000). This implies that nurses who have positive behavioural intentions would have positive behaviour in the administration of intravenous fluid. Therefore, the four hypotheses proposed in this study were valid.

Discussion

Nurses' knowledge of intravenous fluid administration

This present study sought to assess the behaviour of nurses towards IVF administration for pediatric patients. The study has highlighted how nurse's knowledge, subjective norms, attitude, and behavioural controls can influence their behavioural intentions and overall behaviour towards safe IVF administration for pediatric patients. The findings are important in pediatric nursing practise since IVF administration has become one of the most important nursing procedures in pediatric settings. For pediatric patients, the demand for quality and safe IVF therapy is huge since failing to deliver IVF therapy correctly can have a significant impact on morbidity and mortality (National Institute for Health and Care Excellence, 2020). This is because, compared to adults, children have a lower tolerance for IVF therapy errors and present devastating physiological responses to errors compared to adults (Davison et al., 2014; Floss, 2011).

In this study, the mean IVF therapy knowledge score was M = 3.66 ± 0.54. an indication of the good performance of nurses on the knowledge scale. Njunge et al. (2017), in their study in Kenya, reported moderate knowledge of IVF administration among nurses. The findings of this study are contrary to the poor knowledge of IFV administration observed among nurses in previous studies (Lamsal & Shrestha, 2019: Tailor et al., 2020). Nurses having in-depth knowledge of age, and condition-specific parameters in IV fluid administration is critical to attaining patient safety and eliminating errors associated with IVF administration (Gorski et al., 2021).

The results of the present study suggest that there was a statistically significant impact or relationship between nurses' knowledge and their behavioural intentions (β-0.320, p-0.001). This finding implies that participants who are highly knowledgeable about IVF administration would have a positive behavioural intention, and this can translate into a positive intention towards the administration of IVF among pediatric patients. A similar study by Rubin et al. (1989) also reported a positive and significant relationship between knowledge and behaviour.

Nurses' attitude towards intravenous fluid administration

Attitude is described as a learned tendency to evaluate things in a certain way. This can include evaluations of people, issues, objects, or events. The evaluation of issues and circumstances may be positive or negative (Cherry, 2023). Attitudes and behaviour are related, such that people's attitudes are expressed through their behaviour patterns. In this study, we observed a good or positive attitude towards IVF administration for pediatric patients among the study participants, with a mean attitude score of 3.79 ± 0.60. Mohamed et al. (2020) equally reported a positive attitude towards IVF administration among pediatric nurses. Additionally, the result from this current study suggests that the nurses' attitude has a good and strong impact on their behavioural intentions in the administration of IVF (β-0.339, p-0.006). In China, Li et al. (2009) also found a positive and significant relationship between

Table 3
Correlation among constructs.

Constructs	1	2	3	4	5
1. Knowledge	1.00				
2. Perceived behavioural control	0.42**	1.00			
3. Behavioural Intention	0.54**	0.19	1.00		
4. Attitude	0.68**	0.26	0.71**	1.00	
5. Subjective Norm	0.32*	0.19	0.17	0.30*	1.00
Mean(M)	3.66	3.30	4.04	3.79	3.83
Standard deviation (SD)	0.54	0.85	0.71	0.60	0.59

Table 2
Mean Score and Reliability and internal consistency of items in each subscale of TPB.

Sub-scale	No of Items	Mean score	Mean* range	Standard deviation**	Item loading	Overall (α)****
Knowledge	16	3.66 ± 0.54	3.1–4.27	0.76–1.43	0.645–0 79	0.76
Subjective Norm	3	3.83 ± 0.59	3.54–4.19	0.95–1.33	0.742–0.796	0.83
Perceived Behavioural Control	3	3.30 ± 0.85	3.04–4.36	0.70–1.36.	0.628–0.769	0.80
Behavioural Intention	8	4.04 ± 0.71	3.78–4.19	0.69–1.19	0.632–0.756	0.80
Attitude	3	3.79 ± 0.60	3.40 to 4.19	0.85–1.45	0.643–0.808	0.75

**** *Cronbach's Alpha* *Range of means (from lowest mean to highest for each model construct) ** Range of standard deviations (from lowest SD to highest for each model construct).

Table 4
Relationship between the five constructs of the TPB.

Pathway	Estimate (β)	S.E.	*p-value*
Knowledge → Behavioural Intention	0.320	0.144	0.001
Attitude → Behavioural Intention	0.339	0.124	0.006
Subjective Norm → Behavioural Intention	0.240	0.066	0.003
Perceived Behaviour Control → Behavioural Intention	0.260	0.083	0.001
Behavioural Intentions → Bahaviour	0.741	0.059	0.000

attitudes and behaviour intentions among their study participants. Contrary to the findings of this study, Ntow et al. (2021) in Ghana, reported in their study that the majority (55%) of respondents had negative attitudes towards IV therapy. Negative attitudes can reduce self-efficacy, reduce the motivation to safely administer IVF, and hence increase the risk of errors in IVF administration, especially for pediatric patients who are very vulnerable and suffer major consequences of errors. In health care settings, especially for pediatric units, frequent training, support, and mentorship are needed to improve nurses' positive attitudes towards IVF therapy.

Nurses' subjective norm on Intravenous fluid administration

American Psychologists define subjective norms as a perception that people have regarding whether other people who are important to them believe that they should or should not perform a particular behaviour (America Psychology Association, 2023). In other words, subjective norms refer to the belief about whether most people approve or disapprove of the behaviour. It relates to a person's beliefs about whether peers and people of importance think that one should engage in a particular behaviour. In this study, the mean nurses' subjective norm for IVF administration was ($M = 3.83 \pm 0.59$). The study also revealed a significant relationship between nurses' subjective norms and their behavioural intentions ($\beta = 0.240$, $CR = 3.002$, $p = 0.003$). A similar study done among nurses elsewhere reported a significant relationship between nurses' subjective norms and their behavioural intentions for nursing documentation and working with elderly clients (Cui et al., 2023: Renfroe et al., 1990). The result of this study implies that the more positive acceptance that nurses receive for certain behaviours, the more likely that behaviour will be implemented or practised. Nurses need social support and the recognition of their efforts by their peers, superiors, parents of their pediatric patients, and other important individuals and this can motivate them to have positive behavioural intentions towards the safe and effective administration of IVF for pediatric patients.

Nurses' perceived behavioural control on intravenous fluid administration

The perceived ease or difficulty of carrying out the planned task is referred to as perceived behavioural control. It takes into consideration normative and subjective standards or factors that influence a person's intentions and behaviour (Wallston, 2001). The result from this study indicates that perceived behavioural control significantly influenced nurses' behavioural intention ($\beta = 0.260$, p-0.001). In China, Cui et al. (2023) also reported a positive relationship between perceived behavioural control and behavioural intentions for a nursing procedure. According to Jeyapala et al. (2015), nurses' perceived behavioural control is affected by logistics availability, availability of protocols, and a positive and stimulating clinical setting. According to Cui et al. (2023), some of the factors that affect nurses' behavioural control are internal and include the ability of nurses to overcome obstacles and their psychological adaptability. There is a need to improve the external environment to meet nurses' needs by providing them with the needed logistics, protocols, and guidelines, the right atmosphere for mentorship and training, and other resources to improve their self-efficacy in performing IVF administration.

Nurses' behavioural intention on intravenous fluid administration

In this study, behavioural intention had a positive and significant influence on behaviour ($\beta = 0.741$, $p < 0.000$). This finding implies

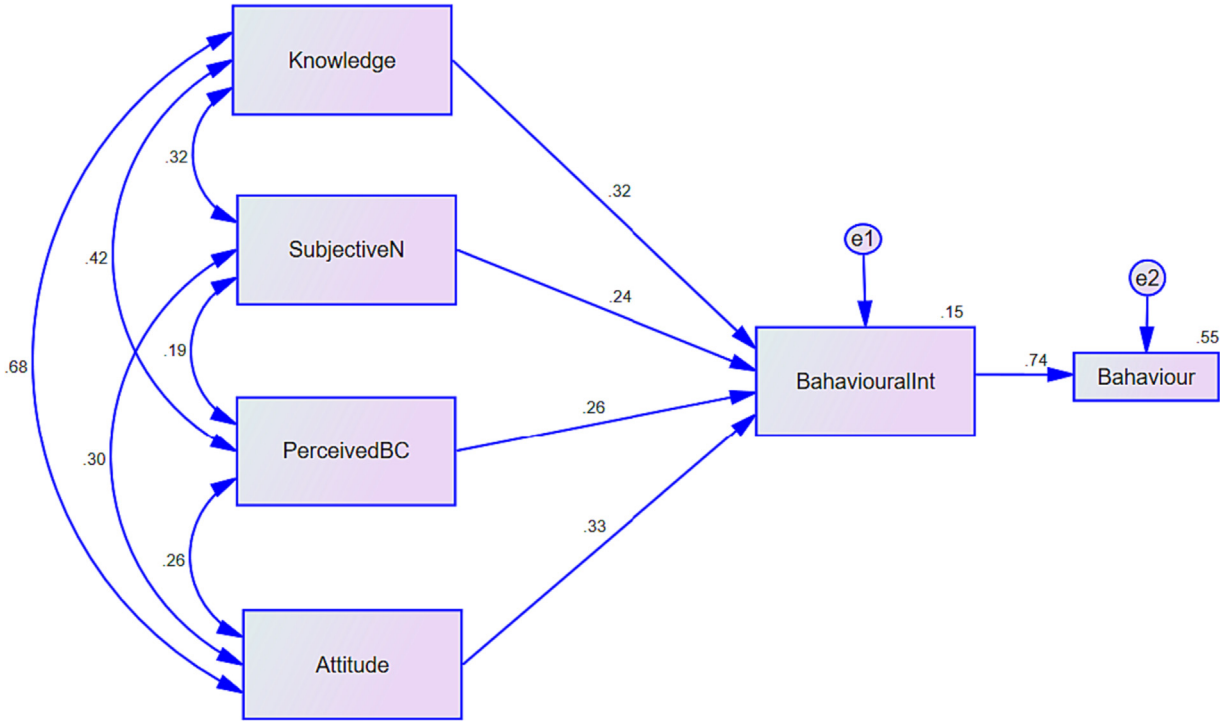

Fig. 1. Estimated standardized regression coefficients.

that nurses who have positive behavioural intentions would have positive behaviour in the administration of IVFs. They would follow evidence-based protocol and ensure that patients are infused with the prescribed IVF, adhering to all the rights of medication administration. Those with a negative behavioural intention would perform contrary to the laid-down standard protocols, which can be detrimental to the patient's health. Conner and Norman (2022) in their study, found that behavioural intentions precede and influence behaviours as suggested in the current study, and the greater the behavioural intention, the more likely the behaviour will be carried out (Barlett, 2019). Personal values and beliefs, good communication and coordination within the healthcare team, degree of expertise, and education are all important factors that impact behavioural intentions (Cheng et al., 2021).

Study limitations

Our study identified some significant findings. However, we investigated behavioural intention towards IVF administration for pediatric patients and not actual behaviour. Also, the data collection strategy of using self-reports could have biased the study. The study was done in one facility, and the findings should be extrapolated to nurses in other settings with great caution.

Implications for pediatric nursing practice

Nurses need to be supported to have positive attitudes towards IVF administration. Continuous education and training can increase the level of knowledge of nurses about the current standards and recommendations for IVF administration for pediatric patients. To promote nurses' behavioural control and self-efficacy for safe and effective IVF administration, resources and logistics need to be constantly provided, and the work environment should be organized or modified to support through supervision, mentoring. and coaching to increase nurses' subjective norms for overall practice.

Conclusions

Our study has shown that participants had a positive behavioural intention for the administration of IVF for pediatric patients. We have demonstrated that nurses with positive behavioural intentions for IVF administration have good knowledge of procedures and standards for IVF administration, a higher level of subjective norms, good perceived behavioural control and also a positive attitude towards IVF administration for pediatric patients. These findings provide some insight for developing effective and tailored strategies to promote nurses' behavioural intention towards pediatric patients in need of IVF therapy.

Research involving human participants, their data or biological material

The study received ethical approval from the Ethics Review Committee of the Ghana Health Service with approval number - *(GHS-ERC:050/03/23)*.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Funding

This research did not receive any specific grants from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Kulley Ackah Grace: Conceptualization, Methodology, Formal analysis, Data curation, Investigation, Writing – original draft. **Senoo-Dogbey Vivian Efua:** Methodology, Supervision, Writing – original draft, Writing – review & editing.

Data availability

The data used in this study is available upon reasonable request from the corresponding author.

Declaration of Competing Interest

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Acknowledgments

The authors wish to acknowledge the nurses who voluntarily participated in this study.

References

Abbood, S. K., Assad, H. C., & Al-Jumaili, A. A. (2019). Pharmacist intervention to enhance postoperative fluid prescribing practice in an Iraqi hospital through implementation of NICE guideline. *Pharmacy Practice*, *17*(3), 1–8. https://doi.org/10.18549/PharmPract.2019.3.1552.

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Decision Processes*, *50*(2), 2–5.

Akech, S., Ayieko, P., Gathara, D., Agweyu, A., Irimu, G., Stepniewska, K., ... Wafula, J. (2018). Risk factors for mortality and effect of correct fluid prescription in children with diarrhoea and dehydration without severe acute malnutrition admitted to Kenyan hospitals: An observational, association study. *The Lancet Child and Adolescent Health*, *2*(7), 516–524. https://doi.org/10.1016/S2352-4642(18)30130-5.

Alexander, M., & Corrigan, A. (2010). *Infusion nursing: An evidence- based approach* (3rd ed.). Elsevier.

America Psychology Association (2023). *Subjective norms.* APA Dictionary of Psychology. https://dictionary.apa.org/subjective-norm.

Aslam, S., Afzal, M., Kousar, R., Waqas, A., & Gilani, S. A. (2017). The assessment of nurses ' knowledge and practices about fluid and electrolytes monitoring and administration among cardiac surgery patients: A case of Punjab institute of cardiology. *International Journal of Applied Sciences and Biotechnology*, *5*(2), 208–215. https://doi.org/10.3126/ijasbt.v5i2.17626.

Atencion, B. C. S., Oducado, R. M. F., & Suaboksan, M. T. T. (2019). Factors associated with intention to report child abuse among district hospital nurses in Iloilo, Philippines. *International Journal of Caring Sciences*, *12*(1), 210.

Barlett, C. P. (2019). Social psychology theory extensions. *Predicting cyberbullying* (pp. 27–37). Elsevier Inc. https://doi.org/10.1016/B978-0-12-816653-6.00005-4.

Carson, D., Dychter, S. S., Gold, D., & Haller, M. (2012). Phlebitis and thrombophlebitis. *The Journal of Infusion Nursing*, *35*(2), 84–91. https://doi.org/10.1016/S0140-6736(00)75627-3.

Cheng, J., Cui, J., Yu, W., Kang, H., Tian, Y., & Id, X. J. (2021). Factors influencing nurses ' behavioral intention toward caring for COVID-19 patients on mechanical ventilation: A cross-sectional study. *PLoS One*, *16*(11), 1–13. https://doi.org/10.1371/journal.pone.0259658.

Cherry, K. (2023). Components of attitudes, definition, formation and changes. *Very Well Mind*. https://www.verywellmind.com/attitudes-how-they-form-change-shape-behavior-2795897?print.

Conner, M., & Norman, P. (2022). Understanding the intention-behavior gap: The role of intention strength. *Frontiers in Psychology*, *04*(August), 1–16. https://doi.org/10.3389/fpsyg.2022.923464.

Cui, H., Sun, R., Wang, Y., Lin, L., Duo, R., Li, Y., Ma, F., & Li, H. (2023). Investigation and influencing factors of the behavioral intention of nurses voluntarily participating in the care of older adults with disabilities. *International Journal of Nursing Sciences*, *10*(1), 64–71. https://doi.org/10.1016/j.ijnss.2022.12.008.

Davison, D., Basu, R. K., Goldstein, S. L., & Chawla, L. S. (2014). Fluid management in adults and children: Core curriculum 2014. *American Journal of Kidney Diseases*, *63*(4), 700–712. https://doi.org/10.1053/j.ajkd.2013.10.044.

Dychter, S., Gold, D., Carson, D., & Haller, M. (2012). Intravenous therapy: A review of complications and economic considerations of peripheral access. *Journal of Infusion Nursing*, *35*(2), 1–7. https://doi.org/10.1097/NAN.0b013e31824237ce.

Finfer, S., Myburgh, J., & Bellomo, R. (2018). Intravenous fluid therapy in critically ill adults. *Nature Reviews Nephrology*, *14*(9), 541–557. https://doi.org/10.1038/s41581-018-0044-0.

Floss, K. (2011). *Intravenous fl uids: Principles of treatment.* October: The Pharmaceutical Journal, 1–12.

Gao, X., Huang, K. P., Wu, H. Y., Sun, P. P., Yan, J. J., Chen, J., & Chen, X. (2015). Inappropriate prescribing of intravenous fluid in adult inpatients-a literature review of current practice and research. *Journal of Clinical Pharmacy and Therapeutics*, *40*(5), 489–495. https://doi.org/10.1111/jcpt.12295.

Gorski, L. A., Hadaway, L., Hagle, M. E., Broadhurst, D., Clare, S., Kleidon, T., ... Alexander, M. (2021). *Infusion therapy standards of practice* (8th ed.)*Vol. 44.*. Infusion Nurses Society.

Guest, M. (2020). Understanding the principles and aims of intravenous fluid therapy. *Nursing Standard*, *35*(2), 1–5.

Hair, J., Anderson, R. E., Tatham, R., & Black, W. (1995). *Multivariate data analysis* (4th ed.). Prince-Hall Inc.

Han, H., & Yoon, H. J. (2015). Hotel customers ' environmentally responsible behavioral intention: Impact of key constructs on decision in green consumerism. *International Journal of Hospitality Management*, *45*, 22–33. https://doi.org/10.1016/j.ijhm.2014.11.004.

Ibrahim, M. M., & Fadlalmola, H. A. (2020). Effects of Nurses'work environment and practice on patient s' safety. *Sudan Journal of Medical Sciences*, *15*(4), 345–354. https://doi.org/10.18502/sjms.v15i4.8157.

Jeyapala, S., Gerth, A., Patel, A., & Syed, N. (2015). *Improving fluid balance monitoring on the wards, 5–7. https://doi.org/10.1136/bmjquality.u209890.w4102.*

Lamsal, S., & Shrestha, R. (2019). Nurses knowledge and practices regarding intravenous therapy in a teaching hospital, Bharatpur. *Journal of Chitwan Medical College*, *9*(27), 13–19.

Leach, R., Crichton, S., Morton, N., Leach, M., & Ostermann, M. (2020). Fluid management knowledge in hospital physicians: 'Greenshoots' of improvement but still a cause for concern. *Clinical Medicine Journal of the Royal College of Physicians of London*, *20*(3), E26–E31. https://doi.org/10.7861/clinmed.2019-0433.

Leung, L. C. K., So, L. Y., Ng, Y. K., Chan, W. K. Y., Chiu, W. K., Chow, C. M., ... Chan, K. C. (2021). Initial intravenous fluid prescription in general paediatric in-patients aged >28 days and <18 years: Consensus statements. *Hong Kong Medical Journal*, *27*(4), 276–286. https://doi.org/10.12809/hkmj209010.

Li, J., Mizerski, D., Lee, A., & Liu, F. (2009). The relationship between attitude and behavior: An empirical study in China. *Asia Pasific Journal of Marketing and Logistics*, *21*(2), 232–242. https://doi.org/10.1108/13555850910950059.

Lobo, D. N., Dube, M. G., Neal, K. R., Simpson, J., Rowlands, B. J., & Allison, S. P. (2001). Problems with solutions: Drowning in the brine of an inadequate knowledge base. *Clinical Nutrition*, *20*(2), 125–130. https://doi.org/10.1054/clnu.2000.0154.

Matt, V. (2023). I.V fluids: Guide & cheat sheet. https://nurseslabs.com/iv-fluids/#h-what-are-iv-fluids.

Mohamed, N. I., Ahmed, S. M., & Tawfic, A. H. (2020). Assessment of pediatric nurses' performance regarding intravenous therapy. *Minia Scientific Nursing Journal*, *8*(1), 1–14.

Mukaka, M. M. (2012). Statistics corner: A guide to appropriate use of correlation coefficient in medical research. *Malawi Medical Journal*, *24*(September), 69–71.

National Institute for Health and Care Excellence (2020). Intravenous fluid therapy in children and young people in hospital. *NICE guideline (Issue December 2015)*. https://www.ncbi.nlm.nih.gov/books/NBK563449/.

Njunge, W., Mbithi, B., & Okova, R. (2017). Completion of intravenous fluids administration regimen by nurses working in adult medical and surgical wards at a County referral hospital, Kenya. *Journal of Health, Medicine and Nursing*, *35*, 32–35.

Ntow, H. D., Opoku, A., Menlah, A., & Poku, A. A. (2021). Assessing intravenous medication administration among nurses in the emergency department of the Komfo Anokye Teaching Hospital. *Asian Journal of Research in Nursing and Health*, *4*(4), 75–96. https://www.sdiarticle4.com/review-history/74124.

Renfroe, D. H., O'Sullivan, P. S., & McGee, G. W. (1990). The relationship of attitude, subjective norm, and behavioral intent to the documentation behavior of nurses. *Scholarly Inquiry for Nursing Practice*, *4*(1), 47–60 discussion 61.

Rubin, D. H., Bauman, L. J., & Lauby, J. L. (1989). The relationship between knowledge and reported behavior in childhood asthma. *Journal of Developmental and Behavioral Pediatrics*, *10*(6), 307–312. https://doi.org/10.1097/00004703-198912000-00004.

Staples, A., Dade, J., & Acomb, C. (2008). Intravenous fluid therapy — What pharmacists need to monitor. *The Pharmaceutical Journal*, *15*, 277–282. https://www.pharmaceutical-journal.com/download?ac=1064512.

Stephenson, B. (2020). *Three important benefits of IV hydration therapy.* Rehab Select.

Tabachnick, B., & Fidell, L. (2007). *Multivariete statistics.* Pearson Education Inc.

Tailor, K. S., Mudgal, S., Chundawat, D. S., & Nehra, K. K. (2020). Nurse knowledge regarding 1ntravenous therapy in a tertiary care hospital: A cross-sectional study. *International Journal of Advanced Research*, *8*(11), 69–73. https://doi.org/10.21474/ijar01/11978.

Teshome, M., Geda, B., Assebe, T., & Mideksa, L. (2023). Intravenous fluid administration practice among nurses and midwives working in public hospitals of Central Ethiopia: A cross-sectional study. *Heliyon*, *9*(8) Article e18720https://doi.org/10.1016/j.heliyon.2023.e18720.

Ursachi, G., Horodnic, I. A., & Zait, A. (2015). How reliable are measurement scales ? External factors with indirect influence on reliability estimators. *Procedia Economics and Finance*, *20*(15), 679–686. https://doi.org/10.1016/S2212-5671(15)00123-9.

Wallston, K. (2001). Control beliefs: Health perspectives. *International Encyclopedia of TheSocial Behaviour Sciences*, *1*, 2724–2726.

Wanjohi, A. M., & Syokau, P. (2003). *How to conduct likert scale analysis.* Kenpro. https://www.kenpro.org/how-to-conduct-likert-scale-analysis/.

Westbrook, J. I., Rob, M. I., Woods, A., & Parry, D. (2011). Errors in the administration of intravenous medications in hospital and the role of correct procedures and nurse experience. *BMJ Quality and Safety*, *20*(12), 1027–1034. https://doi.org/10.1136/bmjqs-2011-000089.

Williams, B., Onsman, A., & Brown, T. (2010). Exploratory factor analysis: A five-step guide for novices Mr. *Journal of Emergency Primary Health Care*, *8*(3), 1–13.