

# The effect of practice toward do-not-resuscitate among Taiwanese nursing staff using path modeling

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## Research article

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# Abstract

**Background:** Do-Not-Resuscitate (DNR) is signed to prevent patients from receiving invalid treatment at the end of life or near death. Nurses play an important role to discuss the DNR with patients or the patients' family members. However, research focusing on the relationship between the knowledge, attitude and practice of a DNR using path modeling in nursing staff is limited. Therefore, this study aimed to elucidate the effect of path modeling on the knowledge, attitude, and practice toward DNR among the Taiwanese nursing staff.

**Methods:** This was a cross-sectional, descriptive design using a simple random sampling. Data on demographics, knowledge, attitude, and practice as measured by the DNR inventory (KAP-DNR), Mindful Attention Awareness Scale, General Self-Efficacy Scale, and Dispositional Resilience Scale was collected. Participants were 194 nursing staff from a medical center in northern Taiwan in 2019. We performed descriptive statistics, regression analysis, and path modeling using SPSS 22.0 and set  $p < 0.05$  as the statistical significance threshold.

**Results:** The results showed that participation in DNR signature and education related to palliative care were positive significant predictors of knowledge towards DNR. The DNR predictors toward attitude included DNR knowledge, mindfulness, self-efficacy, dispositional resilience, and religious belief of nurses. Generally, the key predictors of DNR practice were DNR attitude, dispositional resilience, and male nurses. In path modeling, we identified that self-efficacy, dispositional resilience, master's degree, and religious belief directly influenced practices constituting DNR.

**Conclusion:** Based on the findings of this study, it is proposed that nurses should improve their self-efficacy and dispositional resilience. Encouraging staff to undertake further education and have religious beliefs can improve the practice of DNR and provide better end of life care.

## Introduction

The Hospice Palliative Care Act in Taiwan is specifically stipulated to respect terminally ill patients' will on the medical treatment, and protect their rights. Patients who suffer from serious injury or illness, are diagnosed as an incurable disease, with a fatal prognosis within the near death and they are allowed to write a letter of intent for the choice of hospice palliative care or life-sustaining treatment [1]. Do-Not-Resuscitate (DNR) is signed to prevent patients from receiving invalid treatment at the end of life or near death. Such treatments include endotracheal intubation, chest compression, injection of resuscitation drugs, external defibrillation, artificial cardiac pacing, mouth-to-mouth ventilation, and ventilator use.

Nursing staffs are the first line of care for patients, and play a predominant role in the medical decision-making process such as the signing of DNR and receiving hospice care for terminal patients and their families. A DNR decision can be a complex process involving nurses and physicians with a wide variety of experiences and perspectives. A previous study reported that providing DNR information to the patient was important, but a few nurses and physicians stated that they discussed DNR with patients before issuance [2]. The better the nursing staff's knowledge and attitude towards the terminal patients' care, the more confident they can be in discussing DNR and hospice care with terminal patients and their families [3]. Additionally, DNR discussion should be carried out as early as possible when the patient is relatively healthy and is still able to understand its undertakings, as well as provide a reference for the terminal patient and family members to make medical decisions to provide better care [2, 4–6].

Mindfulness emphasizes the attitude of not being critical and allowing its existence to all positive or negative thoughts or emotions [7]. Mindfulness is the integration into nursing care, which helps to effectively improve communication and build a good relationship with patients and health care professionals [8, 9]. Self-efficacy is a person's judgment of their

ability to effectively perform a task and has been shown to influence motivation, and psychological well-being [10, 11]. Mindfulness was the predictor of self-efficacy [12]. Nursing is a high-pressure job. Nursing staff with different personality traits will always be affected by or face all kinds of situations and challenges in the line of duty [13]. Therefore, dispositional resilience is considered as a personality style to differentiate individuals under stress based on commitment toward life, control of life, and willingness to overcome challenges [14].

Previous studies have rarely explored the knowledge, attitudes, and practice of nurses toward the signing of DNR. Although multiple regression models were crucial in applying information about the factors that predict knowledge, attitude, and practice (KAP), we were interested in other factors that directly or indirectly impacted on practice toward DNR utilizing path modeling among nursing staff. Therefore, the objective of this study was to explore the causal relationship between knowledge, attitude, and practice regarding DNR by using path modeling amongst Taiwanese nursing staff.

## Methods

### Study design and population

This study was a cross-sectional design employed in a medical center in northern Taiwan from June to August 2019. Simple random sampling stratified by medical ward, surgical ward, and intensive care unit (ICU) was used to recruit nurses. A sample size of 171 was required to undertake t-tests and one sample case analysis (using G\* power 3.1). A two-tailed p-value was set at 0.05, power at 0.90 and effect size at 0.25. We considered an 80% response and completion rate of the questionnaire; therefore, 207 subjects who were registered nurses, able to communicate in Mandarin, and agreed to participate in this study were recruited. A total of 13 subject refused to complete the questionnaire. Finally, a total of 194 subjects completed the questionnaire.

## Instruments

### Demographics and work-related characteristics

Demographics collected included age, gender, education level, religious belief, marital status, and the number of children. Work-related characteristic collected included ward, length of service in nursing, experience of caring terminal friends or relatives, participation DNR signature, frequency of caring terminal patients (rated on a 1–5 score with 1 being “never” and 5 being “always”), participation in education related to palliative care, participation in education related to DNR.

### Knowledge, Attitude, and Practice Regarding DNR Inventory (KAP-DNR)

The KAP-DNR was developed based on the literature review and Hospice Palliative Care Act [1]. The KAP-DNR is composed of 3 scales measuring the knowledge (K-DNR), attitude (A-DNR), and practice (P-DNR) regarding DNR of nurses.

The K-DNR was used to measure the level of understanding regarding the concept, purpose, and significance of DNR. It contains 15 items; each item was rated on true, false, and I don't know responses. The percentage of correct answer rate was calculated by the number of correct questions divided by the total number of questions.

The A-DNR is composed of 10 items measuring attitudes toward DNR of terminally ill patients. Items 9 and 10 were negatively worded. All items are rated on a 5-point Likert-scale, rated on a 1–5 score with 1 being strongly disagree, and

5 being strongly agree. The total score ranges from 10 to 50, with a higher score indicating a more favorable attitude toward DNR.

The P-DNR is composed of 10 items measuring the nurse's ability to actively communicate with a patient or family caregiver regarding DNR. Item 3 was negatively worded. The items were rated on a 1–5 score with 1 being never, and 5 being always. The total score ranges from 10 to 50, with a higher score indicating more favorable practices regarding DNR.

Content validity was established by a panel of 5 experts, which consisted of an associate professor, a physician, a supervisor, a head nurse, and a hospice shared care nurse all working within the field of terminal care or palliative care. Each item of KAP-DNR was rated on relevance, accuracy, and applicability on a 1–5 score by experts. The content validity index (CVI) for each item was counted depending on the number of experts who rated the item on a 4 or 5 score and divided that number by the total number of experts. The average CVI across the items in this study was 0.92. Cronbach's alpha of the K-DNR, A-DNR, and P-DNR was 0.505, 0.775, and 0.871 for the 194 nurses, respectively.

## **Mindful Attention Awareness Scale (MAAS)**

MAAS was developed by Brown & Ryan (2003)[15] and translated into the Chinese version by Chang, Lin, & Huang (2011)[16]. MAAS measures two unique factors, attention and awareness. This scale contains 15 items, rated on a 1–6 score with 1 being almost not and 6 being always. Items were all negatively worded. The total score ranges from 15 to 90, with a higher score indicating a higher mindfulness level. Internal consistency, Cronbach's  $\alpha$ , was 0.81. Cronbach's  $\alpha$  of the MAAS was 0.902 for the 194 nurses in this study.

## **General Self-Efficacy Scale (GSES)**

The GSES was initially developed in German by Jerusalem and Schwarzer in 1981, first as a 20-item version and later as a reduced 10-item version [17]. This scale measures a broad and stable sense of personal competence to deal efficiently with a variety of stressful situations and has been translated into different languages. The Chinese version of the GSES was developed by Jerusalem and Schwarzer and was tested in a sample of 74 Chinese adults with mild mental health symptoms. This scale was unidimensional and had good internal reliability, Cronbach's  $\alpha = 0.92$  [18]. This scale contains 10 items and each item is rated on a 1–4 score with 1 being completely incorrect and 4 being completely correct. The total score ranges from 10 to 40, with a higher score indicating a higher self-efficacy to deal with stressful situations. Internal consistency, Cronbach's  $\alpha$ , of the GSES was 0.926 for the 194 nurses in this study.

## **Dispositional Resilience Scale (DRS)**

DRS was developed by Tu and Weng (2013) based on the 15-item Dispositional Resilience Scale [19]. This scale was used to measure psychological hardiness, considered as a personality style to differentiate individuals under stress based on commitment toward life, control of life, and willingness to overcome challenges. This scale contained 15-items which were divided into 3 subscales, that is, commitment, control, and challenge, whereby, each subscale contained 5-items. Each item was rated on a 0–3 score with 0 being "not agree" and 3 being "totally agree". The total score ranges from 0 to 45, with a higher score indicating higher hardiness. This scale displayed acceptable reliability and validity [19]. In this study, internal consistency, Cronbach's  $\alpha$ , of the overall DRS was 0.871, and the subscales of commitment, control, and challenge were 0.730, 0.811, and 0.701, respectively, for the 194 nurses.

## **Study process**

The researcher described the aims and methods for participants in a meeting room. Questionnaires were unidentified and the information was deemed confidential. Participants spent around 15–20 minutes to fill out the questionnaires. However, they were permitted to discontinue the questionnaire and withdraw from the study at their discretion. After

completing the questionnaire, participants received a gift card. A total of 194 subjects completed the questionnaire. This study was approved by the Institutional Review Board (IRB 2-108-05-066).

## Statistical analysis

The collected data was coded using excel and analyzed by SPSS 22.0. Categorical variables were described by frequency and percentage. Continuous variables were described by mean and standardized deviation (SD). Student's t-test, Wilcoxon rank-sum test, Chi-square test, Fisher's exact test, and multiple linear regression were also used in this study. Path analysis was used to describe the direct or indirect dependencies among a set of variables including demographics and work-related characteristics. Three types of results were included demographics and work-related characteristics; affecting practice through knowledge and attitude ( $a \rightarrow d \rightarrow e$ ), affecting practice through attitude ( $b \rightarrow e$ ), and directly affecting practice (c). Path modeling is shown in Fig. 1. A p-value of  $< 0.05$  was considered statistically significant.

## Results

### Demographics and work-related characteristics

The mean age of the participants was 29.71 years. Most of the subjects were females (92.8%), with bachelor's degrees (85.1%), no religious beliefs (53.1%), and single (83.0%). The mean length of service in nursing was 6.59 years. The largest proportion of the participants worked in ICU was 38.7%, no experience of caring for terminal friends or relatives (68.6%), no participation concerning DNR signature (72.7%), participated in education related to palliative care (88.1%) and DNR (77.3%). The mean frequency of caring for terminal patients was 3.47 (57.0%) (Table 1).

### Knowledge, attitude, practice, mindfulness, self-efficacy, and dispositional resilience toward DNR signature of the terminal patient among nurses

The mean percentage of correct answer rate of knowledge toward the DNR signature of the terminal patient among nurses was 73.99 (SD= 9.9). The mean scores of attitude and practice toward the DNR signature of the terminal patient among nurses were 42.53 (SD=4.46), and 38.30 (SD=6.25), respectively. The mean scores of mindfulness, self-efficacy, and dispositional resilience were 66.84 (SD=9.87), 25.25 (SD=5.14), and 27.49 (SD=5.10), respectively. Among dispositional resilience scores, nurses scored the highest in control and lowest in the challenges (Table 2).

### Predictors of Knowledge, attitude, practice toward DNR signature of the terminal patient among nurses

As shown in Table 3, the significant predictors of the K-DNR among nurses were participation in DNR signature, and participation in education related to palliative care after adjustment for mindfulness, self-efficacy, dispositional resilience, demographics and work-related characteristics among nurses. Nurses who have participated in the DNR signature had a higher mean score for the K-DNR than those who had never participated in DNR signature by 3.88 points (95% CI=0.26~7.50,  $p=0.037$ ). Nurses who have participated in education related to palliative care had a higher mean score for the K-DNR than those who had never participated in relevant education by 9.18 points (95% CI=3.73~14.64,  $p=0.001$ ).

DNR knowledge, mindfulness, self-efficacy, dispositional resilience, religious belief were important predictors for the A-DNR after adjustment for DNR knowledge, mindfulness, self-efficacy, dispositional resilience, demographics and work-related characteristics among nurses. Nurses with higher DNR knowledge ( $\beta=0.10$ , 95% CI=0.03~0.16,  $p=0.004$ ), mindfulness ( $\beta=0.08$ , 95% CI=0.01~0.14,  $p=0.019$ ), self-efficacy ( $\beta=0.20$ , 95% CI=0.05~0.35,  $p=0.010$ ), or lower dispositional resilience ( $\beta= -0.16$ , 95% CI= -0.32~ -0.01,  $p=0.039$ ) had better attitude towards DNR. Nurses who have

religious beliefs had a higher mean score for the A-DNR than those who had no religious belief by 2.23 points (95% CI=0.99~3.48,  $p=0.001$ ).

DNR attitude, dispositional resilience, and male gender were important predictors for the P-DNR after adjustment for DNR knowledge, DNR attitude, mindfulness, self-efficacy, dispositional resilience, demographics and work-related characteristics among nurses. Nurses with higher DNR attitude ( $\beta=0.62$ , 95% CI=0.42~0.81,  $p<0.001$ ), or dispositional resilience ( $\beta=0.24$ , 95% CI=0.04~0.44,  $p=0.023$ ) had better practice towards DNR. Male nurses had a higher mean score for the P-DNR than female nurses by 4.10 points (95% CI=1.01~7.19,  $p=0.010$ ).

### **Path modeling of knowledge, attitude, and practice toward DNR signature of the terminal patient caregiver among nurses**

The path modeling demonstrated that self-efficacy, dispositional resilience, master/junior college, and religious beliefs directly affected practice. The relationships between self-efficacy (Coefficients=0.272,  $p < 0.001$ ), dispositional resilience (Coefficients=0.202,  $p = 0.006$ ), master/junior college (Coefficients=0.149,  $p = 0.040$ ), and religious belief (Coefficients=0.155,  $p = 0.033$ ) were significant by standardized coefficient estimates for the paths. The above data are shown in Table 4.

## **Discussion**

### **Factors affecting the KAP-DNR among nurses**

This study found that participation in DNR signature and participation in education related to palliative care were positive predictors of knowledge towards the DNR. Most prior studies indicate similar results. A study in Taiwan showed that a higher level of knowledge toward palliative care consultation service among nurses was associated with participation in education related to palliative care [20]. Having a bachelor of science or a higher degree in nursing, working in an Emergency department, having a daily experience of caring for chronically ill patients and taking part in a training on end of life care were significantly associated with good knowledge of nurses toward the end of life care [21]. Nurses with poor knowledge of palliative care were the main limitation to providing good palliative care [3]. The level of knowledge of nurses as well as experience in advance directives (ADs) discussions reported a moderate level of confidence to explain ADs to patients and their families [22]. Nurses can improve their knowledge through in-service education and on job retraining to promote the quality of palliative care services for the patients [3]. Therefore, it is crucial to participate in the DNR signature with patients or family and receive education related to palliative care to improve the nurses' knowledge toward DNR.

This study established that the DNR knowledge, mindfulness, self-efficacy, dispositional resilience, and religious beliefs were significant positive predictors of the attitude of nurses toward the DNR signature. Nurses with good knowledge had a favorable attitude toward the end of life care [21]. A study reported that the knowledge level of nurses has an impact on their confidence to discuss end of life care decisions with patients and their families [22]. A mixed-method systematic review indicated that mindfulness can improve nurses' mental health and promote performance at work, such as better communication with patients, higher sensitivity to patients' conditions, clear analysis of complex situations and emotional regulation in stressful situations [9]. The self-efficacy of nurses showed a significantly positive correlation with end of life care attitude. Self-efficacy is important in fostering confidence in nurses to help patients and their family make appropriate medical decisions and to provide appropriate end of life care [23]. Dispositional resilience is as hardiness, a protective factor against perceived stress and a facilitating factor for happiness in nurses [24]. Nurses with resilience were more likely to report a better quality of care and having a higher personhood status [25]. A study in Palestinians reported that professionals' attitudes toward DNR were highly

influenced by their religious and cultural background [26]. Religion plays an important role in the lives of many people, such that spiritual and religious issues are usually aroused or strengthened as patients near the end of life [27].

This study showed that DNR attitude, dispositional resilience, and male nurses were significant positive predictors of the practice of nurses toward DNR. These findings were similar to prior studies. Nurses with precise knowledge and positive attitude toward the end of life care are important in raising confidence in nurses to communicate actively with patients and their families and help them make suitable medical decisions and to provide appropriate end of life care [23, 28]. Dispositional resilience refers to the psychological resilience that can enable nurses to effectively face stress when signing DNR for families of end-stage patients [29]. This situation is special in male nurses because they have a higher confidence level to actively discuss DNR with patients or family caregivers [30].

## **Path modeling of knowledge, attitude, and practice**

Path analysis is a method for examining causal patterns among a set of variables [31]. The results of our path analysis indicated that self-efficacy, dispositional resilience, master/junior college, and religious belief directly affected the practice of DNR.

The self-efficacy of the nursing staff will directly affect the practice toward the signing of the DNR by the family members of the terminal patients. Many previous studies have demonstrated that self-efficacy was correlated with practice [32, 33]. The main reason is that self-efficacy can improve nurses' professional practice behaviors and make them feel confident to deliver the appropriate, timely and compassionate care [33, 34]. Therefore, self-efficacy is important for implementation in the workplace, since it may directly affect the nurse on performing the DNR signature of caregivers.

Dispositional resilience directly influenced the practice toward the signing of DNR by the family members of the terminal patients. Dispositional resilience had a positive correlation with hardiness, self-esteem, life, and job satisfaction. It was also a protective factor against perceived stress and a facilitating factor for happiness in nurses [24, 35]. The higher the dispositional resilience level, the lower the burnout situations in nurses who can successfully overcome obstacles, uncertainties, and negative conditions [36]. Therefore, they can provide a better quality of care in nursing practice.

Having a master's degree had also a positive direct effect on nurses' practice toward the DNR signature of family caregivers of the terminal patients. This implies that nursing staff with a higher educational level would have better practice behaviors about the DNR signature. This finding was similar to a prior study that holders of a master's degree indirectly and positively influenced good practice toward palliative care [20]. Higher educational levels among nurses meant having more confidence to deal with patients' problems in clinical nursing practices [37].

Our study showed that religious belief was directly and positively influenced the practice toward the signing of the DNR by the family members of the terminal patients. Prior studies have shown that religious beliefs are a major factor in forming caregivers' and health care providers' viewpoints about DNR decisions [38, 39]. This is because religious beliefs play an important role in the lives of many people since spiritual and religious issues are usually aroused or strengthened as patients near the end of life, as well as nurses on nursing practice behaviors toward the end of life care [27].

## **Limitations and recommendations**

This study has several limitations. First, our study population was limited to one medical center, the generalizability of our findings is limited. Second, the KAP-DNR was a nurse-reported assessment tool. This might be over-reported by

nurses and the true DNR signature rate of caregivers of the terminal patients was unknown. Finally, this study used a cross-sectional design, the change in KAP-DNR overtime in nursing staff was not explored.

Based on the limitations of this study, future research suggestions are indicated as follows: First, samples from different centers in Taiwan are needed to confirm our findings. Second, using extra empirical assessment tools and calculating the signature rate of DNR are needed to determine the DNR practice level in nurses. Finally, studies using a longitudinal study design are needed to explore the trend in KAP-DNR among the nurses.

## Conclusion

This study suggests that participation in DNR signature and participation in education related to palliative care were significant predictors of knowledge toward the DNR. DNR knowledge, mindfulness, self-efficacy, dispositional resilience, and religious beliefs were significant predictors of attitude towards DNR. Finally, DNR attitude, dispositional resilience, and male nurses were the key predictors of practices toward the DNR. Additionally, self-efficacy, dispositional resilience, master's degree, and religious beliefs directly influenced the practice regarding DNR. Based on the findings of this study, we suggest that nurses should improve their self-efficacy and dispositional resilience as well as receiving advanced education in nursing and have religious beliefs. This may allow nurses to appreciate the importance of practice toward DNR, and enhance the quality of care for the terminal patients receiving end of life care.

## Abbreviations

DNR: do-not-resuscitate; KAP-DNR: knowledge, attitude, and practice regarding DNR inventory; KAP: knowledge, attitude, and practice; ICU: intensive care unit; K-DNR: knowledge regarding DNR inventory; A-DNR: attitude regarding DNR inventory; P-DNR: practice regarding DNR inventory; CVI: content validity index; MAAS: Mindful Attention Awareness Scale; GSES: General Self-Efficacy Scale; DRS: Dispositional Resilience Scale; SD: standardized deviation; CI: Confidence interval; ADs: advance directives;

## Declarations

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### Availability of data and materials

The datasets analyzed during the current study are available from the first and corresponding author on reasonable request.

### Authors' contributions

H-H Pan, L-F Wu and L-J Chou developed and designed the study, drafted and revised the manuscript. S-J Tzou carried out the recruitment of study participants. L-F Chang, and Y-C Hung participated in data collection. Data were coded and

analyzed by H-H Pan and C Lin, and then reviewed by H-H Pan. All authors read versions of the manuscript and approved the final version.

### **Ethics approval and consent to participate**

The study was approved by the Institutional Review Board of Tri-Service General Hospital (IRB 2-108-05-066), and all participants provided informed written consent.

### **Consent for publication**

Not applicable.

### **Competing interests**

The authors declare that they have no competing interest.

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## Tables

### Table 1

Demographics and work-related characteristics (N=194)

Variable	n(%)/ Mean±SD
<b>Demographics</b>	
Age(year)	29.71±6.70
Gender	
Female	180(92.8%)
Male	14(7.2%)
Education level	
Junior college	23(11.9%)
Bachelor	165(85.1%)
Master	6(3.1%)
Religious Belief	
No	103(53.1%)
Yes	91(46.9%)
Marital Status	
Single	161(83.0%)
Married	33(17.0%)
<b>Work-related characteristics</b>	
Ward	
HemaOnco	21(10.8%)
Medical	29(14.9%)
Surgical	48(24.7%)
ICU	96(49.5%)
Length of service in nursing (year)	6.59±6.00
Caring terminal friends or relatives	
No	133(68.6%)
Yes	61(31.4%)
Participation DNR signature	
No	141(72.7%)
Yes	53(27.3%)
Frequency of caring terminal patients	3.47±0.78
Participation in education related to palliative care	
No	23(11.9%)
Yes	171(88.1%)
Participation in education related to DNR	
No	44(22.7%)
Yes	150(77.3%)

*SD* standard deviation; *DNR* do not resuscitate; *HemaOnco* Hematology and oncology; *ICU* Intensive care unit

**Table 2**

Knowledge, attitude, practice, mindfulness, self-efficacy, and dispositional resilience toward DNR signature to the family members of terminal patients among nurses (N=194)

Variable	Mean±SD
<b>Knowledge</b>	11.10±1.48
Percentage of correct answer	73.99±9.90
<b>Attitude</b>	42.53±4.46
<b>Practice</b>	38.30±6.25
<b>Mindfulness</b>	66.84±9.87
<b>Self-efficacy</b>	25.25±5.14
<b>Dispositional resilience</b>	27.49±5.10
Commitment	9.23±1.98
Control	9.59±2.06
Challenge	8.67±2.01

*DNR* do not resuscitation; *SD* standard deviation

**Table 3**

Predictors of knowledge, attitude, and practice toward DNR among nurses (N=194)

Variables	Knowledge		Attitude		Practice	
	Adjusted $\beta$ (95% CI)	<i>p</i> value	Adjusted $\beta$ (95% CI)	<i>p</i> value	Adjusted $\beta$ (95% CI)	<i>p</i> value
<b>Knowledge</b>	--	--	0.10 (0.03 - 0.16)	0.004	-0.02 (-0.11 - 0.07)	0.671
<b>Attitude</b>	--	--	--	--	0.62 (0.42 - 0.81)	<0.001
<b>Practice</b>	--	--	--	--	--	--
<b>Mindfulness</b>	0.19 (0.04 - 0.33)	0.014	0.08 (0.01 - 0.14)	0.019	-0.06 (-0.14 - 0.03)	0.204
<b>Dispositional resilience</b>	0.10 (-0.25 - 0.46)	0.568	-0.16 (-0.32 - -0.01)	0.039	0.24 (0.04 - 0.44)	0.023
<b>Self-efficacy</b>	0.09 (-0.26 - 0.43)	0.627	0.20 (0.05 - 0.35)	0.010	0.07 (-0.13 - 0.26)	0.501
<b>Demographics</b>						
Age (years)	-0.06 (-0.59 - 0.48)	0.839	-0.13 (-0.37 - 0.10)	0.275	-0.10 (-0.40 - 0.20)	0.519
<b>Gender</b>						
Female	Reference		Reference		Reference	
Male	3.68 (-1.75 - 9.11)	0.186	-1.91 (-4.28 - -0.47)	0.118	4.10 (1.01 - 7.19)	0.010
<b>Education level</b>						
Junior college	Reference		Reference		Reference	
Bachelor	3.33 (-1.11 - 7.77)	0.143	0.21 (-1.73 - 2.16)	0.830	-0.58 (-3.09 - 1.93)	0.650
Master	7.74 (-1.73 - 17.21)	0.111	2.68 (-1.47 - 6.84)	0.207	3.04 (-2.35 - 8.42)	0.271
<b>Religious belief</b>						
No	Reference		Reference		Reference	
Yes	0.86 (-2.00 - 3.73)	0.556	2.23 (0.98 - 3.48)	0.001	0.38 (-1.29 - 2.05)	0.654
<b>Marital status</b>						
Single	Reference		Reference		Reference	
Married	-0.18 (-5.23 - 4.87)	0.945	0.24 (-1.96 - 2.44)	0.830	0.89 (-1.95 - 3.73)	0.541
<b>Work-related characteristics</b>						
<b>Ward</b>						
Hematology and oncology	Reference		Reference		Reference	
Medical	-0.19 (-5.79 - 5.42)	0.948	0.27 (-2.17 - 2.71)	0.829	0.50 (-2.65 - 3.65)	0.756
Surgical	-1.09 (-6.32 - 4.15)	0.685	1.54 (-0.74 - 3.82)	0.187	0.60 (-2.36 - 3.55)	0.692
Intensive care unit	1.40 (-3.43 - 6.22)	0.572	0.23 (-1.87 - 2.33)	0.832	-0.23 (-2.95 -	0.867

Length of service in nursing	0.06 (-0.57 - 0.69)	0.852	0.06 (-0.21 - 0.34)	0.647	2.48) 0.10 (-0.25 - 0.46)	0.564
Caring terminal friends or relatives						
No	Reference		Reference		Reference	
Yes	-0.72 (-4.21 - 2.77)	0.687	0.76 (-0.76 - 2.28)	0.327	-0.65 (-2.62 - 1.31)	0.516
Participation DNR signature						
No	Reference		Reference		Reference	
Yes	3.88 (0.26 - 7.50)	0.037	-0.19 (-1.79 - 1.41)	0.815	0.72 (-1.34 - 2.78)	0.495
Frequency of caring terminal patients	0.76 (-1.15 - 2.67)	0.437	0.73 (-0.10 - 1.57)	0.087	0.67 (-0.42 - 1.76)	0.228
Participation in education related to palliative care						
No	Reference		Reference		Reference	
Yes	9.18 (3.73 - 14.64)	0.001	1.61 (-0.84 - 4.06)	0.201	-0.38 (-3.56 - 2.80)	0.814
Participation in education related to DNR						
No	Reference		Reference		Reference	
Yes	-2.60 (-6.63 - 1.44)	0.209	-0.81 (-2.58 - 0.95)	0.369	0.91 (-1.38 - 3.19)	0.437

*HemaOnco* hematology and oncology; *ICU* intensive care unit; *CI* confidence interval; *DNR* do not resuscitation

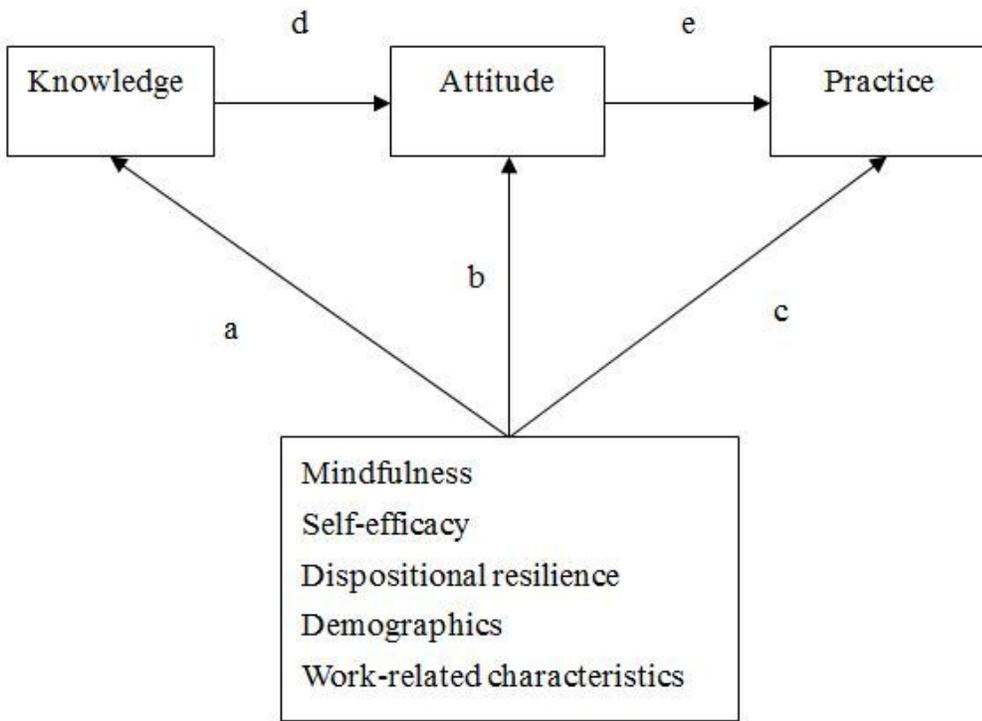
#### Table 4

Path modeling for knowledge, attitude, and practice toward DNR among nurses (N=194)

Variables	Knowledge→Attitude→Practice		Attitude→Practice		Practice	
	Coefficients	P value	Coefficients	P value	Coefficients	P value
<b>Mindfulness</b>	<0.001	1.000	<0.001	0.995	0.070	0.333
<b>Self-efficacy</b>	-0.001	0.987	0.088	0.225	0.272	<0.001
<b>Dispositional Resilience Scale</b>	-0.001	0.986	0.094	0.192	0.202	0.006
<b>Demographics</b>						
Age	<0.001	1.000	0.003	0.969	-0.005	0.945
Gender						
Female/Male	-0.001	0.990	0.070	0.330	0.130	0.073
Education level						
Bachelor/Junior college	-0.001	0.994	-0.042	0.559	-0.096	0.185
Master/Junior college	<0.001	0.997	0.047	0.512	0.149	0.040
Religious Belief						
Yes/No	<0.001	0.997	0.023	0.751	0.155	0.033
Marital Status						
Married/Single	<0.001	0.996	0.047	0.518	0.112	0.122
<b>Work-related characteristics</b>						
Ward						
Medical/HemaOnco	<0.001	0.998	0.020	0.784	0.035	0.628
Surgical/HemaOnco	<0.001	1.000	-0.005	0.948	0.007	0.923
ICU/HemaOnco	<0.001	1.000	0.015	0.835	0.029	0.688
Length of service in nursing	<0.001	0.999	0.008	0.907	0.005	0.945
Caring terminal friends or relatives						
Yes/No	<0.001	0.999	0.007	0.922	0.054	0.455
Participation DNR signature						
Yes/No	<0.001	1.000	<0.001	0.995	0.011	0.879
Frequency of caring terminal patients (1-5 points)	<0.001	0.999	0.014	0.842	0.105	0.147
Participation in education related to palliative care						
Yes/No	<0.001	0.999	0.026	0.722	0.138	0.057
Participation in education related to DNR						
Yes/No	<0.001	0.999	0.036	0.620	0.100	0.167

*ObsGyn* obstetrics and gynecology; *HemaOnco* hematology and oncology; *ICU* intensive care unit; *PCCS* palliative care consultation service

## Figures



**Figure 1**

Path modeling