

RESEARCH ARTICLE

Physicians and nurses' knowledge and attitudes towards advance directives for cancer patients in Saudi Arabia

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Abstract

This study aimed to investigate physicians' and nurses' knowledge and attitudes toward advance directives (ADs) for cancer patients, which empower patients to take decisions on end-of-life needs if they lose their capacity to make medical decisions. A cross-sectional study was conducted using convenience sampling. The outcomes were responses to the knowledge and attitude questions, and the main outcome variables were the total scores for knowledge and attitudes toward ADs. This study included 281 physicians and nurses (60.5%). Most physicians were men (95, 80.5%), whereas most nurses were women (147, 86.5%). The mean (standard deviation; SD) total knowledge score was 6.8 (4.0) for physicians and 9.1 (3.0) for nurses ($p < 0.001$). There was a significant difference in the total knowledge score between nurses and physicians, with an adjusted mean difference of 1.54 (95% confidence interval [CI]; 0.08–2.97). Other significant independent predictors of knowledge of ADs were female sex (1.60, 95% CI; 0.27–3.13) and education level (master's versus bachelor's: 1.26, 95% CI; 0.30–2.33 and Ph.D. versus bachelor's: 2.22, 95% CI; 0.16–4.52). Nurses' attitudes appeared to be significantly more positive than those of physicians, and the mean total attitude score (SD) was 19.5 for nurses (6.2) and 15.1 (8.1) for physicians ($p < 0.001$). The adjusted mean difference (95% CI) for nurses versus physicians was 3.71 (0.57–6.98). All participants showed a high level of knowledge of ADs; however, nurses showed considerably more positive attitudes than physicians.

Introduction

Advanced care planning is a patient-centered mutual process that focuses on engaging them in treatment course. Healthcare providers assess patients' values and preferences regarding their future care [1]. A significant part of these discussions is the streamlining and completion of advance directives (ADs), a legal document that empowers patients to make end-of-life (EOL) arrangements, particularly concerning their EOL care. This practice ensures that EOL needs are adequately met in the event of them losing their capacity to make medical decisions [2].

ADs aim to promote and protect the patient's autonomy based on the conviction that patients who either choose a proxy decision maker, document their living will in advance, or both are more likely to receive essential care if they become incompetent. At least, the process assures noninterference with previously asserted healthcare plans [3,4].

Among patients with terminal malignancies, delirious status and cognitive impairments are highly prevalent [2]. EOL decisions are emotionally and intellectually challenging for patients and their healthcare providers [5]. Therefore, ADs must be discussed with a mentally competent patient who is not overwhelmed by the burden of the disease or other psychosocial and financial factors [6].

Several studies have reported the impact of ADs on improving the patient's quality of life (QoL), enhancing patient-related outcomes, decreasing healthcare costs, decreasing in-hospital mortality rates, and optimizing the utilization of hospice service [6–10]. Furthermore, ADs promote the patient's autonomy when stipulating their complete medical decisions, decrease the practice of physicians' paternalism, and avoid any potential confrontation between the families and healthcare providers [11]. Conversely, the absence of ADs might perhaps lead to undesirable aggressive care when the patients have diminished decision-making capacity, compromise the patient's QoL, and cause a pitiable bereavement for the caregivers as well [12,13]. However, despite the anticipated benefits, the rate of completion of ADs varies enormously [2,14–16].

Several factors affect the use of ADs, including patient and caregiver characteristics, patient's perception of the AD objectives, and physicians' and nurses' limited knowledge of ADs [15,17–21]. Other factors comprise difficulties faced in articulating and interpreting ADs, reservations about their necessity, impact of tradition, hesitancy to converse openly about death, and preference of physicians or family members to make decisions on behalf of the patients when the latter becomes mentally incompetent [22]. Physicians' attitudes toward the patient's fear of becoming burdensome to families and having an undignified death were reported as essential factors influencing the completion of ADs [23].

Cultural dogmas, sociocultural beliefs, and values influence the meaning of death as well as the practice of EOL decision-making and use of ADs [19,24]. Although there is huge support for the use of ADs at EOL and several rules and regulations have been enacted worldwide, the Islamic world continues to lack literature on the debate surrounding AD legalization. In a single narrative article, Al-Jahdali (2012) described the Islamic perspective on ADs and reported that ADs are not as widely adopted by the Islamic community as by the West [25]. Hence, to systemically judge the need for and the value of ADs, we evaluated physicians' and nurses' knowledge and attitudes toward ADs.

Materials and methods

Study design and settings

A self-administered survey was developed for this descriptive cross-sectional study. Convenience sampling was used to recruit physicians and nurses providing care to cancer patients at three specialized medical areas (Cancer Center, National Neuroscience, and Intensive Care Unit) in a tertiary care medical city in Riyadh, Saudi Arabia.

Participants and sample size

All physicians and nurses providing care to terminally ill cancer patients were offered the opportunity to participate in the study and complete the survey. In this study, 170 (response rate 70.8%) nurses and 111 (response rate 74%) physicians were recruited using nonprobability convenience sampling, and the survey was completed between August and December in

2017. convenience sampling was used to collect information from participants who were easily accessible. Also, we assumed that the members of the target sample are homogeneous. Thus, there would be no difference in the research results obtained from a random sample.

Survey instrument

The theory of planned behavior postulates that behavioral intentions and actual behavior are molded by the individual's attitudes, normative beliefs, and perceived control over the behavior [26,27].

The development of the knowledge and attitude survey was steered by the theory of planned behavior and was designed on the basis of detailed literature reviews [25,28], author's professional experiences in cancer care and clinical research, and the recommendations of two national palliative care experts.

The scale consisted of three main parts [S1 File]. The first part captured demographic data (age, gender, place of work, level of education, and total years of experience). The second part assesses the participants' knowledge using 12 questions related to the definition of ADs, types of ADs, living will, and the durable power of attorney. In addition, the questions assessed participants' knowledge of the onset of AD's validity, itemizing of several clinical practices into the AD document (e.g., life-sustaining technology, cardiopulmonary resuscitation, and withholding nutrition and hydration), ideal timing of AD discussion, nomination of a person as a health care proxy, and the incorporation of that person in the discussion of ADs. The range of answers was "1 = yes" and "0 = no or I do not know." Responses of "no" and "I do not know" were combined to score as they reflect the absence of knowledge. For the total knowledge scale, cutoffs (scores at 75th percentile) were considered as a satisfactory knowledge level (score: 8 out of 12).

The third part assesses the participants' attitudes using 27 questions, with the range of answers being "1 = yes" and "0 = no or I do not know." The "no" and "I do not know" answers were combined as they reflect a lack of positive attitudes. The attitude questions were clustered into 4 subscales as follows: (i) planning of ADs (6 questions; cutoff score for positive attitudes is ≥ 4 out of 6), (ii) comfort and confidence in discussing ADs (8 questions; cutoff score for positive attitudes is ≥ 6 out of 8), (iii) application of ADs (9 questions; cutoff score for positive attitudes is ≥ 7 out of 9), and (iv) challenges of ADs (4 questions; cutoff score for positive attitudes is ≥ 3 out of 4). For the attitudes total scale and subscales, cutoffs (scores at 75th percentile) were considered as positive attitudes.

Statistical analyses

Initially, the data were stored in SPSS version 21.0 (IBM Corporation, Armonk, NY, US) and converted into Stata version 15 for further analysis. Before the main analysis, the survey was piloted to assess the reliability and validity, besides identifying any difficulties or ambiguities. Internal consistencies in the knowledge (12 items) and attitude scales (27 items) were assessed using Cronbach's alpha.

The participants' responses to the questions were converted into binary variables (yes = 1 and "no" or "I do not know" = 0), and the total score for knowledge and attitudes toward ADs was computed. Correlation between the total scores for knowledge and attitudes was examined using Spearman's correlation coefficient.

For the total scale and subscales of attitudes, cutoffs (scores at 75th percentile) were considered as positive attitudes. Participants' characteristics as well as knowledge and attitudes toward ADs were summarized separately for physicians and nurses using descriptive statistics, such as frequency, percentage, mean, and standard deviation (SD). To assess the differences

between physicians' and nurses' responses, chi-square tests were used. Initially, the mean total scores for knowledge and attitudes were compared between physicians and nurses using *t*-tests and Mann–Whitney test. Receiver operating characteristics (ROC) curve analysis was used to examine whether the knowledge and attitudes scores discriminate between the professional groups (nurse versus physician). In this analysis, the area under the ROC curve (AUC) is calculated to show, how well the knowledge can distinguish between two groups of profession. As the knowledge and attitude scores were not normally distributed, nonparametric regression analysis with bootstrap method was employed to examine the adjusted differences between the physicians and nurses and to identify further predictors of knowledge and attitude. In non-parametric regression, the functional form between the outcome and the covariates was not specified. In regression analysis, the total scores for knowledge and attitudes were considered as dependent variables, and the covariates assessed were profession (nurse versus physician), sex, age, and education level. From the regression analysis, coefficients (adjusted mean differences of the scores) with 95% bootstrapped confidence intervals (CIs) were reported.

Ethical consideration

The study was approved by the Institutional Review Board (IRB log #:16–369) of King Fahad Medical City. The participants were provided with a cover letter describing the study objectives. Anonymity was maintained and informed consent was implied by the completion of the survey.

Results

Reliability and validity of the knowledge and attitude scales

Cronbach's alpha revealed that the knowledge scale reached an acceptable reliability of $\alpha = 0.88$. Internal consistencies in the total attitude scale and four subscales were computed, and the following results were obtained: total attitude scale (27 questions), $\alpha = 0.93$; AD planning (6 questions), $\alpha = 0.89$; comfort and confidence (8 questions), $\alpha = 0.67$; application of ADs (9 questions), $\alpha = 0.79$; and challenges of ADs (4 questions), $\alpha = 0.71$. The internal consistency value of the total attitude scale suggests that the questions fitted well to measure the intended attitudes.

Participants' characteristics

A total of 111 physicians and 170 (60.5%) nurses participated in the study. Mean (SD) age of the physicians and nurses was 33.4 (7.6) and 33.9 (6.6) years, respectively. Most physicians were men (95, 80.5%), while most nurses were women (147, 86.5%). Eighty-five (77.3%) physicians and 81 (48.2%) nurses had <5 years of experience. Nearly two-thirds of the nurses, that is, 112 (67.9%) individuals and 66 physicians (60%) indicated receiving specialized education on ADs. The majority of physicians (69, 63.3%) and nurses (148, 93.1%) were bachelor's degree holders. A statistically significant difference was found between the physicians and nurses in terms of sex, education level, and years of experience ($p < 0.001$; [Table 1](#)).

Knowledge of ADs

Physicians. As shown in [Table 2](#), 72 (64.9%), 65 (58.6%), and 68 (61.8%) physicians provided the correct definitions for ADs, living will, and durable power of attorney, respectively. Fifty-one physicians (45.9%) reported that the appropriate time to discuss ADs is when the patient is terminally or seriously ill. [Table 2](#) also reveals physicians' knowledge regarding the items that can be incorporated into ADs. The responses that indicated poor knowledge (“no”

Table 1. Distribution of the study participants.

Demographics	Physician(n = 111)	Nurse(n = 170)	p value
Age	33.37 ± 7.57	33.90 ± 6.56	0.569
Female sex	16 (14.4%)	147 (86.5%)	<0.001*
Education level			
Bachelor's	69 (63.3%)	148 (93.1%)	
Master's	13 (11.9%)	11 (6.9%)	<0.001*
PhD	27 (24.8%)	0	
Years of Experience			
<5 years	85 (77.3%)	81 (48.2%)	
6–10 years	12 (10.9%)	49 (29.2%)	<0.001*
>10 years	13 (11.8%)	38 (22.6%)	
Place of work			
Cancer center	45 (45.5%)	66 (40.7%)	
Intensive care units	26 (26.3%)	54 (33.3%)	0.484
Neuroscience department	28 (28.3%)	42 (25.9%)	

*Significance at p < 0.05

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or “I do not know”) fell into 5 main categories: 49 (44.1%) for life-sustaining technology, 48 (43.2%) for cardiopulmonary resuscitation, 70 (63.1%) for withholding nutrition and hydration, 35 (35.1%) for healthcare proxy, and 44 (40%) for the place of terminal care and death.

Nurses. The majority of nurses were able to correctly articulate the definitions of ADs (140, 82.4%), living will (145, 85.3%), and durable power of attorney (131, 78%). Slightly more than three-quarters said that ADs become effective when the patient is mentally incapable. Moreover, 95 (56.2%) participants reported that the most appropriate time to discuss ADs is when the patient is terminally or seriously ill (Table 2).

Table 2. Participants' responses to the knowledge of AD questions by profession.

Knowledge of AD questions	Physicians (111)	Nurses (170)	p value
	Yes, n (%)		
Q1: Definition of ADs	72 (64.9)	140 (82.4)	<0.001*
Q2: Types of ADs	60 (55.1)	133 (79.6)	<0.001*
Q3: Definition of living will	65 (58.6)	145 (85.3)	<0.001*
Q4: Definition of durable power of attorney	68 (61.8)	131 (78.0)	0.003*
Q5: Onset of AD validity	62 (55.9)	130 (76.9)	<0.001*
Q6: Itemizing of life-sustaining technology into AD document	62 (55.9)	135 (79.4)	<0.001*
Q7: Itemizing of cardiopulmonary resuscitation into AD document	63 (56.8)	135 (79.4)	<0.001*
Q8: Itemizing of withholding nutrition and hydration into AD document	41 (36.9)	120 (70.6)	<0.001*
Q9: Itemizing of place of terminal care and death into AD document	66 (60)	133 (78.2)	0.001*
Q10: Ideal timing of discussing ADs	60 (54.1)	74 (43.8)	0.093
Q11: Nomination of a principal person as a healthcare proxy	72 (64.9)	125 (74.0)	0.103*
Q12: Incorporation of the healthcare proxy in the discussion of ADs	67 (62.6)	143 (86.1)	<0.001*
Mean total knowledge score (SD)	6.8 (4.0)	9.1 (3.0)	<0.001*

*Significance at p < 0.05

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Table 2 also displays nurses’ responses regarding the items that can be incorporated into ADs according to the patient’s preferences and decision. The responses that suggested poor knowledge (“no” or “I do not know”) fell into 5 main categories: 50 (29.4%) for withholding nutrition and hydration, 35 (20.6%) for life-sustaining technology, 35 (20.6%) for cardiopulmonary resuscitation, 44 (26%) for healthcare proxy, and 37 (21.8%) for the place of terminal care and death.

Difference in the knowledge of ADs between nurses and physicians

A significant difference was observed in all the knowledge questions between the nurses and physicians, except for the questions related to “the most appropriate time for discussing AD” and “nomination of a principal person as a healthcare proxy” ($p = 0.093$ and 0.103 , respectively; Table 2). The mean (SD) total knowledge score was 6.8 (4.0) for physicians and 9.1 (3.0) for nurses ($p < 0.001$). There was a significant difference in the total knowledge score between nurses and physicians, with an adjusted mean difference of 1.54 (95% CI; 0.08–2.97). Other significant independent predictors of the knowledge of ADs were female sex (1.60, 95% CI; 0.27–3.13) and education level (master’s versus bachelor’s: 1.26, 95% CI; 0.30–2.33 and Ph.D. versus bachelor’s: 2.22, 95% CI; 0.16–4.52; Table 3). Moreover, the sensitivity is plotted against (1-specificity) of the knowledge total score at various cut-off values. The area under a ROC curve (AUC) is a value between 0.5 and 1, which quantifies the overall ability of the knowledge score to discriminate between nurses and physicians. In this analysis $AUC = 0.675$ shows that nurses have higher knowledge score than physician. If the knowledge score would not discriminate between nurses and physicians, the AUC would be 0.5. If the knowledge score would perfectly predict either of the professions, then the value of AUC would be 1.00. (Fig 1).

Differences in attitudes toward ADs between physicians and nurses

Table 4 provides the results for the attitude toward ADs. Overall, physicians and nurses showed positive attitudes toward ADs. However, nurses’ attitudes appeared to be significantly more positive than those of physicians. The mean total attitude score (SD) was 19.5 (6.2) for nurses and 15.1 (8.1) for physicians ($p < 0.001$). Similar results were observed for the attitude subscales, with nurses performing better than physicians (Table 4). For example, in the case of AD planning, the subscale mean score (SD) for physicians was 3.2 (1.9), whereas that for nurses was 4.8 (1.6) ($p < 0.001$). Negative attitudes were more likely in physicians than in nurses when they were asked about the necessity of discussing ADs with every patient, irrespective of the diagnosis (36, 32.7% versus 120, 71.9%, $p < 0.001$), and with patients having life-threatening diseases who were willing to talk about their wishes for EOL care (66, 60.0% versus 135, 80.4%, $p < 0.001$). Both physicians and nurses appeared to have negative attitudes

Table 3. Predictors of the knowledge of ADs.

Variables	Unadjusted effect estimates			Mutually adjusted effect estimates		
	β	Bootstrapped: (95% CI)	p values	β	Bootstrapped: (95% CI)	p values
Nurses vs. physicians	2.02	(1.20, 2.78)	<0.001	1.54	(0.08, 2.97)	0.040
Female vs male	2.18	(1.38, 2.90)	<0.001	1.60	(0.27, 3.13)	0.023
Education level						
Master’s	0.01	(-0.11, 0.12)	0.863	1.26	(0.30, 2.33)	0.014
PhD	0.01	(-0.14, 0.13)	0.979	2.22	(0.16, 4.52)	0.050
Age	0.08	(0.02, 0.13)	0.011	0.06	(-0.01, 0.14)	0.143

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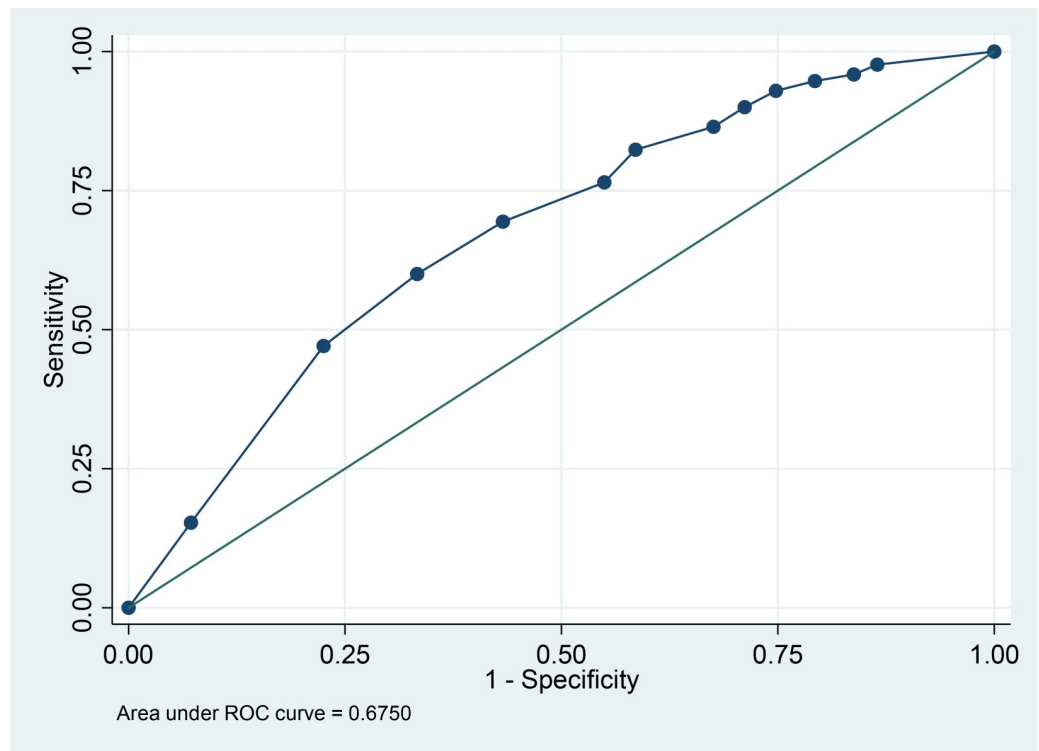


Fig 1. ROC curve analysis for the relationship between total knowledge score and profession (nurse versus physician).

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regarding the discussion of ADs as they diminish a sense of hope in patients. Moreover, positive attitude was more prevalent among physicians than nurses in their confidence of breaking the bad news to cancer patients (57, 51.8% versus 61, 36.5%, $p = 0.012$).

The adjusted mean difference (95% CI) for nurses versus physicians was 3.71 (0.57–6.98; Table 5). Participants' age was also found to be a significant predictor of the total attitude score; higher score indicated advanced age ($p < 0.001$).

The total attitude scores and subscale scores correlated well with the total knowledge scores ($p < 0.001$). Spearman's correlation coefficient for total scores was 0.576, and higher attitude scores predicted nurses (Table 6). The sensitivity is plotted against (1-specificity) of the attitude total score at various cut-off values. In this analysis $AUC = 0.670$ shows that nurses have higher attitude score than physician. If the attitude score would not decimate between nurses and physicians, the AUC would be 0.5. (Fig 2).

Discussion

The results of this study aided in validating a new scale for the assessment of physicians' and nurses' knowledge and attitudes toward ADs. Overall, nurses were more knowledgeable about ADs and had a significantly more positive attitude than physicians. The multivariable analysis revealed that the total score for knowledge of ADs was significantly associated with the female sex and education level; higher education (master's and Ph.D.) predicted elevated scores.

ADs empower cancer patients and their relatives to make informed decisions about EOL care. Efficiently providing ADs allows the healthcare institution to decrease the extra expenses that could be diverted to other healthcare priorities. Nevertheless, we hypothesized that the inscribed ADs could be principally authoritative in guiding the treatment of cancer patients.

Table 4. Physicians and nurses' attitudes toward ADs.

Subscale	Survey question	Physicians (N = 111)	Nurses (N = 170)	p value
		Yes, n (%)		
Attitudes about AD planning (Cronbach's α : 0.79)	Q1 Discussion of ADs with every patient irrespective of the diagnosis	36 (32.7)	120 (71.9)	<0.001*
	Q2 Discussion of ADs with patients diagnosed with life-threatening diseases	66 (60.0)	135 (80.4)	<0.001*
	Q7 Discussion of ADs improves patients' and families' satisfaction with EOL care.	74 (67.3)	136 (81.9)	0.005*
	Q9 Discussion of ADs is the physician's responsibility.	60 (55.1)	137 (81.6)	<0.001*
	Q11 Patients' willingness to know their diagnosis, prognosis, and care options	68 (62.4)	147 (88.6)	<0.001*
	Q12 Patients' willingness to communicate their wishes for EOL care	50 (45.9)	128 (76.9)	<0.001*
	Mean total subscale score (SD)	3.2 (1.9)	4.8 (1.6)	<0.001*
Comfort and confidence (Cronbach's α : 0.67)	Q3 ADs decrease EOL care decisional catastrophe.	66 (60.6)	120 (71.4)	0.060
	Q4 Confidence in the treatment choices if directed by ADs	69 (63.3)	126 (76.4)	0.019*
	Q5 Less worry about legal consequences of limiting treatment if directed by ADs	74 (67.3)	127 (76.1)	0.109
	Q6 Discussion of ADs demolishes patients' sense of hope.	39 (35.5)	59 (35.3)	0.983
	Q13 It feels easy when discussing matters related to EOL with patients and their families.	32 (29.1)	85 (50.9)	<0.001*
	Q14 Discussion of ADs produces confrontational relationship with the patient.	43 (39.1)	113 (67.7)	<0.001*
	Q16 It feels easy when discussing ADs with patients with progressive diseases.	30 (27.3)	100 (60.2)	<0.001*
	Q17 Confidence in breaking "bad news."	57 (51.8)	61 (36.5)	0.012*
	Mean total subscale score (SD)	3.7 (2.2)	4.7 (2.0)	<0.001*
Application of ADs (Cronbach's α : 0.89)	Q8 ADs decrease the likelihood of futile/unnecessary EOL care.	75 (68.8)	129 (77.3)	0.119
	Q10 Use of ADs is consistent with patient-centered care values in your health care institution.	66 (60.5)	136 (81.4)	<0.001*
	Q18 ADs decrease the cost of unnecessary treatment/care.	74 (67.9)	119 (72.1)	0.453
	Q19 ADs are useful in your institution	72 (66.7)	139 (83.2)	0.001*
	Q20 Your administration/colleagues would support the use of ADs.	65 (59.1)	124 (74.3)	0.008*
	Q24 ADs can be used in your institution if legalized.	66 (60.5)	133 (80.1)	<0.001*
	Q25 ADs positively affect the cost of total care and save medical expenditures in the long term.	78 (70.9)	135 (80.8)	0.055
	Q26 ADs improve and facilitate the discharge plan process.	79 (71.8)	137 (82.0)	0.045*
	Q27 Recommending your health care institution to adopt the use of ADs	78 (70.9)	143 (86.1)	0.002*
Mean total subscale score (SD)	5.9 (3.4)	7.1 (2.5)	0.006*	
Challenges of ADs (Cronbach's α : 0.71)	Q15 A potential problem of ADs is that patients' families could change their minds about treatment when the patient becomes terminally ill.	55 (50.0)	129 (78.2)	<0.001*
	Q21 ADs may be a relief for families in some circumstances.	73 (66.4)	135 (81.8)	0.003*
	Q22 ADs might be culturally accepted and established.	50 (45.5)	128 (77.6)	<0.001*
	Q23 ADs do not interfere with Islamic regulations.	63 (57.3)	94 (56.6)	0.916
	Mean total subscale score (SD)	2.2 (1.5)	2.9 (1.2)	<0.001*
Mean total attitude score (SD; Cronbach's α: 0.93)		15.1 (8.1)	19.5 (6.2)	<0.001*

*Significance at $p < 0.05$

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Concerning the knowledge of ADs, nurses fared better in our study, similar to the cited data among US nurses [29–31]. Furthermore, the good knowledge may be attributed to the provision of AD education programs and in-service professional development in cancer nursing training. On the other hand, physicians lacked knowledge in the concept of ADs. We could attribute this observation to the absence of AD training, governing guidelines, unfamiliarity with the concept *per se*, or infrequent encounter with ADs. These findings are consistent with those derived from similar studies [32,33]. Physicians, nurses, and other caregivers should

Table 5. Predictors of the participant’s attitudes toward ADs.

Variables	Unadjusted effect estimates			Mutually adjusted effect estimates		
	β	Bootstrapped: (95% CI)	<i>p</i> values	β	Bootstrapped: (95% CI)	<i>p</i> values
Nurses vs. Physicians	3.97	(2.45, 5.47)	<0.001	3.71	(0.57, 6.98)	0.026
Female vs Male	3.39	(2.05, 4.76)	<0.001	1.52	(-1.32, 4.78)	0.337
Years of experience	-	-	-			
6–10 vs <5	0.77	(0.19, 1.39)	0.012	-0.21	(-2.19, 1.29)	0.807
>10 vs <5	0.66	(0.00, 1.31)	0.043	-0.48	(-4.00, 2.43)	0.767
Age	0.23	(0.12, 0.36)	<0.001	0.25	(0.12, 0.41)	0.001
Education level						
Master’s	0.04	(-0.19, 0.29)	0.726	0.23	(0.12, 0.36)	<0.001
PhD	0.06	(-0.20, 0.30)	0.646	0.25	(0.12, 0.41)	0.001

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be adequately trained for proficiency in delivering ADs. We suggest that both physicians and nurses should complete AD training uniformly during their care and have access to AD registers.

There is variation in the provision of ADs for cancer care worldwide, and this study investigated a couple of variables that partly explain this phenomenon. The important one is the disparity between physicians’ and nurses’ knowledge of ADs and their attitudes toward them. Moreover, cultural dogmas, sociocultural beliefs, and values influence the meaning of death and dying, as well as the practice of EOL decision-making and use of ADs [19,24]. In addition, we argue that respect for the sanctity of life is a crucial value in Islamic societies, and this might have influenced physicians’ knowledge and attitudes toward ADs. The involvement of political, cultural, and religious leaders might also be required to design an efficient caregiving system and provide confidence to the professionals for delivering ADs and EOL care.

Healthcare system can dispel the myth that ADs are associated with imminent death [34], but instead enable more control over future care [35]. ADs offer patients the opportunity to manage their medical care should they ever lose their decision-making capacity. Furthermore, patients with ADs had better quality of care with reduced requirement of resuscitation and ventilation. Besides, they exerted control over the place of death and experienced the best utilization of the hospice care; further, their caregivers also had superior QoL [2].

The strengths of this study include the large sample size representing the diverse care areas and the use of a culturally sensitive, valid, and reliable questionnaire. Our findings were limited by several factors including the use of convenience sampling and the single site of study. In addition, we did not investigate patient knowledge as a part of this research.

Table 6. Correlation between the total scores for knowledge and attitudes.

	Spearman’s correlation coefficient
Attitudes about AD planning	0.495*
Comfort and confidence	0.496*
Application of ADs	0.554*
Challenges of ADs	0.499*
Total attitude scale	0.576*

*Significance at *p* < 0.001

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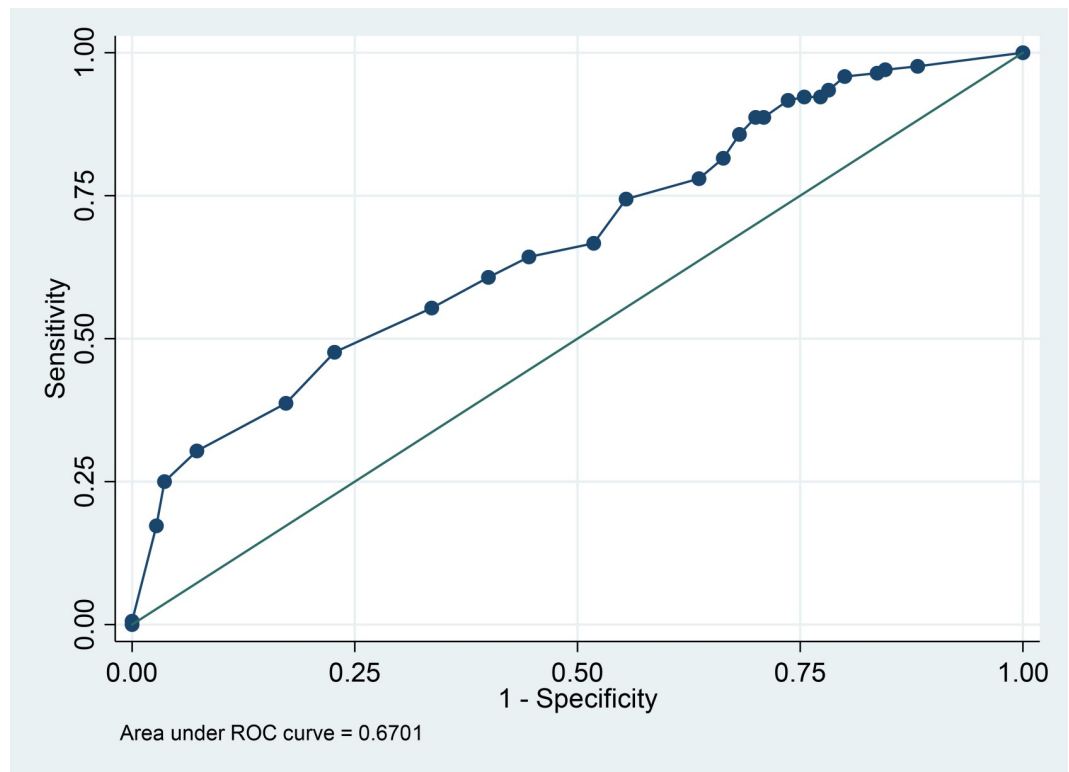


Fig 2. ROC curve analysis for the relationship between total attitude score and profession (nurse versus physician).

<https://doi.org/10.1371/journal.pone.0213938.g002>

Conclusion

A high level of knowledge of ADs was found among all participants; however, there was a significant disparity between nurses and physicians, with the former having considerably more positive attitudes than the latter. This may partly explain the variations in cancer care ADs in Saudi Arabia. Nonetheless, further investigations are required on this topic. This study describes a challenging and interesting subject that warrants further systematic work and opens a pertinent dialogue in the field of cancer care.

Supporting information

S1 File. KAAD scale: Knowledge and attitudes towards advance directives.
(DOCX)

S2 File. ADs data set.
(SAV)

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