

# Factors Related to Nurses and Physicians' Knowledge of and Attitudes Towards Palliative Care

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## Research Article

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## **Abstract**

## **Background**

With the increase of the elderly population, the need for palliative care has increased, which is one of the requirements of effective palliative care services, sufficient knowledge and positive attitude of nurses and physicians towards this care approach. The aim of this study was to determine the factors related to the knowledge and attitudes of nurses and physicians about palliative care.

## **Methods**

This descriptive correlational study was performed in 2021 on 277 nurses and physicians working in selected teaching hospitals in Iran who were selected by convenience sampling method. The data collection tool was an online and researcher-made questionnaire consisting of three sections: demographics and occupation, knowledge (30 items) and attitude (37 items) that were designed and validated in the present study. To analyze the data, spss-v24 software was used for descriptive statistics tests (means and frequency tables) and inferential tests (correlation and univariate regression).

## **Results**

The mean scores of knowledge and attitude of care providers were  $19.36 \pm 2.73$  and  $140.90 \pm 11.56$ , respectively. There was a positive relationship between knowledge and attitude variables ( $P$ -value = 0.000,  $r$  = 0.378). Meaning of relationship between the mean score of attitude and knowledge with age ranges of 31-60 and 60-51 years, level of education, workplace, work experience in palliative care, need for formal education in palliative care and need to pass palliative care course there was.

## **Conclusion**

Based on the results of this study, the level of knowledge and attitude of palliative care providers was moderate. Therefore, in order to further promote the knowledge and attitude of nurses and physicians, it is recommended to hold theoretical and practical training courses in the form of skill and retraining courses, reviewing the curricula of general medicine and bachelor's degree in nursing.

## **Background**

As a comprehensive care, which is based on clinical, cultural, and ethical standards, and has a holistic and interdisciplinary perspective [1, 2], palliative care improves the quality of life in the elderly and the patients with difficult-to-treat diseases, and their families by preventing and alleviating pain and suffering through early identification, as well as the evaluation and the flawless treatment of pain and other physical, psychological, social, and spiritual problems [3].

With the increase in the elderly population, the increasing number of chronic non-communicable diseases, and the proportion of the patients with difficult-to-treat diseases, the demand for high quality palliative care has

increased [3, 4]. However, in most countries, there are still many unmet needs for palliative care services [5]. Many of the patients suffering from life-threatening illnesses struggle with poor health in late life due to their unmet needs [6, 7]. According to the WHO Global Atlas of Palliative Care in 2020, a total of 56840123 people from all age groups, including the deceased and the non-deceased, are estimated to have global needs for palliative care; the need of the non-deceased to palliative care has been higher. Approximately 45.3% of all deaths in 2017 required palliative care. Cancer (28.2%), HIV / AIDS (22.2%), and cardiovascular diseases (14.1%) were among the most common adult diseases needing palliative care [8].

Palliative care services are influenced by the knowledge and the attitudes of care providers [9, 10]. Nurses and other health care workers are often not sufficiently prepared to perform their duties regarding palliative care, and need more expertise in pain and symptom management, communication, and confronting ethical problems [11]. The World Health Organization (WHO) has developed a Public Health Strategy (PHS) as an effective approach to the inclusion of palliative care in the country's health care system; one of these policies is the effective training of caregivers and policymakers [12]. Education plays a key role in the effectiveness and the continuity of palliative care services, and its inadequacy has been reported as a challenge in accessing these services [13]. Attitude, on the other hand, is influenced by people's knowledge and is an effective factor in people's performance. According to the conducted studies, the physicians who had little knowledge of palliative care also had a negative or unclear attitude [14]. Therefore, the existence of professional trained palliative care personnel is a potential solution to improving the quality of life in the patients facing life-threatening illnesses [15].

In Iran, palliative care is a new approach which is currently given incoherently for difficult-to-treat patients and no major steps have been taken to institutionalize it [16]. On the other hand, the concepts and the principles of this approach have not been seriously included in the curriculum of Medical sciences [17].

Therefore, it seems natural that care providers' knowledge and, consequently, their attitude is not at the desired level.

One of the most important barriers to providing palliative care services is the inadequate training of care providers, especially physicians and nurses [18]. Therefore, it is necessary to study the factors affecting knowledge and attitude, and to identify the improvable areas for better educational planning. Accordingly, and considering the increase in the country's elderly population, the development of training programs for physicians and nurses, and improving their ability to manage the patients needing palliative care seems necessary. The aim of this study was to determine the factors related to the knowledge and the attitudes of care providers about palliative care.

## Methods

### Study Design

The present study is a descriptive correlational study that was conducted to determine the factors related to the knowledge and the attitudes of care providers about palliative care in Iran in 2021.

### Study Environment and Participants

The study population included the physicians and the nurses of the country. The sampling method in this study was convenience sampling. Considering the appropriateness of using online questionnaires during COVID

pandemic, invitations for the participants, along with a brief explanation of the study and its purpose, were sent to several social networks as well as various groups on WhatsApp and Telegram and the participants were asked to send the questionnaire link to their other colleagues through snowball sampling. Willing to participate in the study, the participants signed the online consent form before accessing the questionnaire. In this study, the

formula used for determining the sample size was  $n = \frac{z^2 pq}{d^2}$  with Z equal to 1.96, p = q = 0.5, and d: 0.05. Considering 10% loss, the number of samples was estimated to be at least 200 people. At the end of the considered one-month period, 277 people completed the questionnaire.

## Data Collection Tools

In this study, a tool consisting of three sections was used including demographic characteristics, the attitudes and the knowledge of care providers towards palliative care.

The demographic and occupational characteristics questionnaire included age, gender, field of study, specialty, and work experience, work experience in the field of palliative care, previous attendance in workshops related to palliative care, and the need for passing training courses related to palliative care.

Considering the multiplicity of the questionnaires for examining the knowledge and the attitudes of care providers towards palliative care in the world, and the limited number of validated Iranian questionnaires, the researchers designed the relevant tools and performed the psychometric evaluation of them as part of the study.

The initial draft of the questionnaires was designed using a systematic review of the tools available in the world. Regarding the attitude tool, the initial draft consisted of 61 statements. In order to evaluate the content validity, the opinions of seven palliative care specialists, oncologists, and nurses working in the oncology ward were used. At this stage, 15 statements were removed due to semantic similarity. Then, to evaluate the face validity, the questionnaire was provided to 20 physicians and nurses, and they were asked to examine the statements in terms of difficulty, comprehensibility, and fluency. Changes were made in some items. In the next step, a 46-item questionnaire was filled out by 277 physicians and nurses working in medical centers, and its factor structure was examined using exploratory factor analysis. The 37 items of the final questionnaire were loaded on 4 factors. The subscales include "Attitude towards the Principles of Palliative Care" with 13 items, "Attitude towards Family Participation in Palliative Care" with 6 items, and "Attitude towards End-of-Life Care" with 9 items, and "Attitude towards Patient Autonomy" with 9 items.

The questionnaire was scored on a 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = no opinion, 2 = disagree, 1 = strongly disagree). The Cronbach's alpha of the whole tool  $\alpha = 0.80$ , and its dimensions were calculated to be 0.65- 0.80. In this tool, the items 11, 13, 20, 21, 22, 23, 24 and 29 are reverse scored, and the item (strongly disagree) has 5 scores. The total score of the subject's attitude is obtained from the sum of these 4 subscales, falling between 37 and 185.

The third part was the questionnaire of caregivers' knowledge towards palliative care, the initial draft of which consisted of 40 items, which were reduced to 30 items after evaluating the face validity and the content validity, and performing exploratory factor analysis. This questionnaire has 4 subscales.

The first subscale, "General Concepts", includes 5 items, the second, "Pain Management", 9 items, the third, "Physical Symptoms Management", 10 items, and, finally, the fourth, "Psychological Symptoms Management",

contains 6 items. This tool is scored as correct or incorrect, where each correct answer has one point, and each incorrect one has none. Items 2, 3, 4, 5, 6, 10, 12, 17, 23, 28, 30 are reverse scored, i.e. the wrong answer has one point, and the correct answer, none. The total knowledge score is the sum of these 4 subscales, which ranges from 0 to 30. In other words, the higher the scale's score, the higher the knowledge of the care providers.

### **Statistical Analysis**

SPSS-V24 software was used for data analysis. To evaluate the normality of the data, Kolmogorov-Smirnov test was used, and P-value < 0.05 was considered as the statistical significance level. Descriptive statistics tests (median, mean, frequency tables, and diagrams), and dispersion measures (variance and standard deviation) were used to report the frequency and the percentage of variables. Independent t-test, Mann-Whitney, and Kruskal-Wallis tests were used to examine the relationship between the demographic variables and knowledge and attitude in terms of normality. In addition, to investigate the relationship between knowledge and attitude, first, Spearman and Pearson correlation tests were used according to the type of variable, and if the relationship between some variables was significant, univariate linear regression was used.

## **Results**

277 care providers participated in this study, including physicians and nurses working in different wards, whose demographic and occupational information are given in Table 1.

The mean score of care providers' attitudes towards palliative care was  $140.90 \pm 11.56$ , and the mean score of care providers' knowledge towards palliative care was  $19.36 \pm 2.73$  (Table 2).

Independent t-test, the analysis of variance, and Kruskal-Wallis tests in terms of normality were used to examine the relationship between demographic and occupational variables, and the mean score of care providers' attitudes toward and knowledge of palliative care. Table 3 shows the demographic and occupational characteristics of the participants in the research, and the correlation between each of these characteristics and the mean scores of knowledge and attitude.

Accordingly, a statistically significant and positive relationship was found between gender, educational level, and workplace ward, work experience in the field of palliative care, the need for formal education to provide care, and the need to pass a palliative care course with the mean score of attitude. In addition, the mean score of knowledge had a statistically significant and positive relationship with educational level, work experience, work experience in the field of palliative care, the need for formal education to provide care, and the need to pass a palliative care course.

The results of univariate regression to examine the relationship between demographic and occupational variables with the mean scores of care providers' attitudes towards and knowledge of palliative care are shown in Table 4. Considering the regression coefficients, the mean score of knowledge has a significant relationship with the age range of 51-60 years, master's and PhD degrees, working in pediatrics and other wards, work experience in the field of palliative care, and the need for formal education in palliative care. Considering that the significance level mentioned for these variables is lower than 0.05, it can be said that these variables are good predictors for the dependent variable or the mean score of knowledge.

Moreover, according to the regression coefficients, the mean score of attitude has a significant relationship with the age range of 31-60 years, female gender, master's and PhD degrees, fellowship, job, working at the CCU, work experience in the field of palliative care, the need for formal education in the field of palliative care, and the need to pass a course of palliative care. Considering that the significance levels of these variables are lower than 0.05, it can be said that these variables are good predictors of attitude.

Pearson correlation coefficient showed a positive and significant statistical relationship between the mean scores of knowledge and attitude ( $P$ -value = 0.000,  $r$  = 0.378). Considering the regression coefficients between the mean of these two scores ( $P$ -value = 0.000,  $b$  = 1.59, Beta: 0.378), it can be said that knowledge is a good predictor of attitude and affects it. The coefficient of determination ( $R^2$ ) was calculated to be 0.143, indicating that 14.3% of the variations in the mean score of attitudes towards palliative care have been explained by the variable of knowledge.

## Discussion

Palliative care is a cohesive, patient- family-centered approach provided by an interdisciplinary team with the aim of improving the quality of life in the elderly and the patients with difficult-to-treat diseases and their families. Therefore, it is necessary for care providers to have sufficient knowledge and a favorable attitude in this regard [19]. In the present study, which was conducted to determine the factors related to care providers' knowledge of and attitudes towards palliative care in Iran, the results showed that the samples had a moderate level of attitude towards palliative care. The attitude towards the principles of palliative care was at the highest level, and the attitude towards family participation in providing palliative care was at the lowest level. Consistent with the results obtained by Kim et al. [20], Parveen et al. [21], and Zeru et al. [22], despite the participants' low level of knowledge of palliative care, the attitude is at a moderate and acceptable level [23].

Based on the obtained results, the knowledge of palliative care providers is at a moderate level, which is insufficient, especially in responding to the specific items related to palliative care. The results of some other studies also show that nurses' level of knowledge in the field of palliative care is low [15, 20, 24] although in the study of Yamamoto et al. (2015), the level of palliative care knowledge in the study population was moderate or acceptable [25]. The reason for the difference observed in the results can be due to the tools used to measure the level of care providers' knowledge, the differences in the characteristics of the study population such as profession, educational level, work ward, and passing a training course in the field of palliative care [26, 27]. Jordan, which is located in the Middle East, and has a similar health system and social, economic, cultural, and religious conditions similar to those of Iran, in the field of human resources, training, and has been holding both optional and compulsory palliative care courses in the undergraduate curriculum of Nursing, in the subject of Principles of Internal Medicine-Surgery in several public and private universities, a palliative care Nursing program at postgraduate level at the school of Nursing, and an academic diploma program in the field of palliative care in collaboration with the university of Germany and the Palliative Care Association of Jordan [9].

In examining the relationship between the attitude and the knowledge of care providers with some variables, the results showed that age is among the demographic variables related to the participants' level of attitude and knowledge, and, especially, in the age range of 31-60 years, has a good predictive power. In addition, it is considered as a good predictor for the level of knowledge in the age range of 51-60 years. Although some studies have suggested that there is no relationship either between age and the attitude toward palliative care [23], or

between age and the knowledge of palliative care [13, 24], some other studies have shown that older health care providers have a better attitude [28] and younger health care providers have a more negative attitude towards palliative care [22, 29]. Moreover, the results of some studies confirm the relationship between age and palliative care knowledge [23, 30, 31]. In general, it can be concluded that an individual's age affects his/her ability to receive information, and with age, the ability to receive and analyze information increases, which is associated with the development of physical and cognitive functions. As age increases, one becomes stronger and more developed in terms of thinking and action [32]. Therefore, due to the low level of knowledge in younger people, it is recommended to focus more on training younger staff in training programs.

In the present study, female gender was mentioned as a predictor of the variable of attitude. Although no study has found a relationship between gender and knowledge of and attitudes towards palliative care [20, 21, 24, 30, 31, 33], female caregivers appear to be more inclined to provide palliative care and end-of-life care. Gender affects the quality of this type of care [34].

The results also show that when the educational level increases, care providers' knowledge of and attitude towards palliative care increases, too. The results of a study conducted by Paknejad et al., and Balicas et al., shows that the higher caregivers' educational level, the higher their knowledge of palliative care [24, 26]. Obviously, the increase in the educational level will be followed by an increase in the level of knowledge and professional skills [26] and it seems that care providers with higher educational levels receive more information regarding palliative care. In Iran, unlike geriatrics-related courses, palliative care education is not centralized, and non-university education is provided in the form of formulated and non-formulated education, and to a limited extent, by governmental and non-governmental educational institutions. In some postgraduate nursing courses, the concepts related to palliative care are briefly mentioned, and a limited number of its syllabi are taught both practically and theoretically as the role of the nurse in palliative care and oncology nursing, [18]. As a result, an increase in the educational level, which is accompanied by an increase in knowledge and deeper attitudes, leads to an increase in the motivation to provide quality services and an effective performance [35].

In the present study, work ward is related to the level of palliative care knowledge and is considered as a predictor in this regard. The caregivers in the pediatric ward have a higher level of palliative care knowledge, and participants working at the CCU had a more positive attitude towards palliative care. The findings of some studies also confirm the results [16-19]. Choi et al reported that the nurses working in oncology and cancer wards had a higher level of palliative care knowledge than those working in general and intensive care units [36]. Besides, Sato et al. noted that the level of palliative care knowledge is significantly higher in the care providers working in specialized cancer centers in comparison with the ones working in general hospitals, although the criteria for assessing the level of knowledge may be different in different studies [37]. However, contrasting findings were observed in the studies, too [4, 10]. Perhaps this is due to the fact that palliative care was first widely introduced and developed in the field of caring for end-stage cancer patients and their families, and the training programs were initially implemented for the health care group who provided care for these patients [2]. Therefore, the level of palliative care knowledge of the care providers to other patients with non-cancer diseases may be due to the lack of experience and special training in this field [1]. Thus, it is necessary to develop training programs for all health care providers according to their work ward and the type of patients who are hospitalized in these wards and will need palliative care.

In the present study, nursing profession was identified as a predicting variable for attitude. In line with the results obtained in a study, it was found that nurses had a positive attitude towards palliative care and end-stage care [38], and another study also showed that physicians were less inclined to provide palliative care [30]. Due to the nature of their profession, nurses have a major role and the most communication with patients and their families, and are responsible for providing most of the services in the health sector. They also have a great desire and interest in communicating with patients and their families and solving their problems [39]. Nursing and palliative care are inseparable parts of clinical practice, and the necessary knowledge and skills in this field are to be acquired by all nurses. The principles of high quality palliative care are consistent with the values and the beliefs governing nursing [40]. The task of providing effective palliative care is primarily the responsibility of nurses [41].

Another factor influencing care providers' level of knowledge and attitude was their work experience in providing palliative care. In this regard, some studies indicate that the history of exposure to the patients needing palliative care has a direct and positive effect on care providers' knowledge and attitude [29, 33]. As an expected result, the level of knowledge and attitude was lower in those who had reported the need for formal education to provide palliative care and taking palliative care courses, although some studies have reported that there is no relationship between knowledge and prior training in palliative care [9, 29, 42]. Various studies have emphasized the importance of recognizing educational needs in the form of training workshops to improve care providers' knowledge and attitude both theoretically and practically [43, 44], and the lack of palliative care training courses in academic and clinical training programs has been reported as one of the most important executive barriers to palliative care [45].

As the last statement of the study, a significant relationship was found between the care providers' knowledge and attitudes. As experts' level of knowledge increases, their attitudes improve, too. The results of a study by Jiratha Budkaew et al. (2013), and Shih et al. (2010) suggest that learning palliative care through medical school education may reinforce physicians' positive attitudes toward providing end-of-life care to cancer patients by providing the right concepts and palliative care knowledge [46, 47]. The findings of these studies emphasize that if experts are encouraged to learn the correct principles of palliative care, along with training in the medical program, a positive attitude towards palliative care will be created.

## **Study Limitations**

One of the limitations of the present study was that due to COVID-19 pandemic, it was not possible for the researchers to be present in the research environment, therefore, the questionnaire was prepared online, which made it impossible to control the proportion of population groups in care providers. As a result, there were more female nurses than other groups.

## **Conclusion**

The findings of the present study show that care providers in Iran have a moderate level of knowledge and attitude towards palliative care. Studying the factors affecting the level of knowledge and attitude, it was found that work experience in the field of providing palliative care was a predictor for both variables of knowledge and attitude. Educational level, work experience, and work ward are related to the level of knowledge and the attitude towards palliative care. The findings of this study emphasize the need for educating and training the care providers to provide quality palliative care services as an essential element, which should become part of the

educational curricula of various disciplines, and continuous medical and nursing education programs. Further studies in this field are needed to clearly understand the problems existing in the educational environment in order to adopt a model of palliative care that is culturally sensitive and meets the needs of the Iranian society.

## Declarations

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### Authors Contributions

L.KH, ME.A, H.A, S.B, S.B, A.ED, M.K, F.KH, E.K, A.SHF and M.R designed the study, E.K and M.R supervised and directed the study, L.KH, ME.A, H.A, S.B, S.B, A.ED, M.K and F.KH carried out the implementation, L.KH, H.A, TSKH and S.B processed the experimental data, performed the analysis and drafted the manuscript, L.KH, H.A and S.B aided in designing the study and worked on the manuscript. All authors discussed the results, commented on the manuscript and approved the final manuscript.

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### Availability of data and materials

The data that support the findings of this study are available from [Cancer Research Center of Shahid Beheshti University of Medical Sciences] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [Cancer Research Center of Shahid Beheshti University of Medical Sciences].

### Ethical approval and consent participate

Research involving human participants have been performed in accordance with the Declaration of Helsinki and code of ethic from Institutional review board approval was obtained from the Ethics Committee the Cancer Research Center of Shahid Beheshti University of Medical Sciences, Tehran (IR.SBMU.CRC.REC.1400.018). Prior to study enrollment, informed written consent was obtained for all study participants.

### Consent for publication

Not applicable.

### Competing interests

The authors declare that they have no competing interests.

## References

1. de Queiroz MEG: **Atenção em cuidados paliativos/Palliative care.** *Cadernos Brasileiros de Terapia Ocupacional* 2012, **20**(2).
2. Kain VJ, Chin SD: **Conceptually Redefining Neonatal Palliative Care.** *Advances in Neonatal Care* 2020, **20**(3):187-195.
3. Organization WH: **WHO definition of palliative care.** 2019.
4. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A: **Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries.** *CA: a cancer journal for clinicians* 2018, **68**(6):394-424.
5. Organization WH: **Planning and implementing palliative care services: a guide for programme managers.** 2016.
6. Lu Y, Gu Y, Yu W: **Hospice and palliative care in China: development and challenges.** *Asia-Pacific journal of oncology nursing* 2018, **5**(1):26.
7. Dowla R: **C07-B The 2015 Quality of Death Index—Why We Rank Second Last?** *Journal of Pain and Symptom Management* 2016, **52**(6):e23-e24.
8. Alliance WHPC: **Global Atlas of Palliative Care.** 2020, **1**(1):1-119.
9. Al Qadire M: **Nurses' knowledge about palliative care: A cross-sectional survey.** *Journal of Hospice & Palliative Nursing* 2014, **16**(1):23-30.
10. Skår R: **Knowledge use in nursing practice: The importance of practical understanding and personal involvement.** *Nurse education today* 2010, **30**(2):132-136.
11. Williams A, Montelpare W, Wilson S, Cheng S, Tremelling K, Wells C: **An assessment of the utility of formalized palliative care education: a Niagara case study.** *Journal of Hospice & Palliative Nursing* 2002, **4**(2):103-110.
12. Stjernswärd J: **Palliative care: the public health strategy.** *Journal of public health policy* 2007, **28**(1):42-55.
13. Ansari M, Rassouli M, Akbari ME, Abbaszadeh A, Sari AA: **Educational needs on palliative care for cancer patients in Iran: A SWOT analysis.** *International journal of community based nursing and midwifery* 2018, **6**(2):111-121.
14. Butola S: **A study on knowledge, attitude, and practices regarding palliative care among doctors in Border Security Force.** *Progress in Palliative Care* 2014, **22**(5):272-279.
15. Etafa W, Wakuma B, Fetensa G, Tsegaye R, Abdisa E, Oluma A, Tolossa T, Mulisa D, Takele T: **Nurses' knowledge about palliative care and attitude towards end-of-life care in public hospitals in Wollega zones: A multicenter cross-sectional study.** *PLoS one* 2020, **15**(10):e0238357.
16. Kristanti MS, Setiyarini S, Effendy C: **Enhancing the quality of life for palliative care cancer patients in Indonesia through family caregivers: a pilot study of basic skills training.** *BMC palliative care* 2017, **16**(1):1-7.
17. Hassankhani H, Rahmani A, Dehghannezhad J: **"Letter to Editor"Development of Palliative Care in Cancer Patients: A Neglected Necessity.** *Iran Journal of Nursing* 2018, **31**(115):1-5.
18. Sajjadi M, Rassouli M, Khanali Mojen L: **Nursing education in palliative care in Iran.** *J Palliat Care Med* 2015, **4**(1):1-5.

19. Sleeman KE, de Brito M, Etkind S, Nkhoma K, Guo P, Higginson IJ, Gomes B, Harding R: **The escalating global burden of serious health-related suffering: projections to 2060 by world regions, age groups, and health conditions.** *The Lancet Global Health* 2019, **7**(7):e883-e892.
20. Kim S, Lee K, Kim S: **Knowledge, attitude, confidence, and educational needs of palliative care in nurses caring for non-cancer patients: a cross-sectional, descriptive study.** *BMC Palliative Care* 2020, **19**(1):1-14.
21. Parveen A, Sultana K, Waqas A, Tasneem S, Jabeen R: **Knowledge and attitude of nurses about palliative care.** *Journal of Bioresource Management* 2020, **7**(1):8-14.
22. Zeru T, Berihu H, Gerensea H, Teklay G, Teklu T, Gebrehiwot H: **Assessment of knowledge and attitude towards palliative care and associated factors among nurses working in selected Tigray hospitals, northern Ethiopia: a cross-sectional study.** *The Pan African Medical Journal* 2020, **35**(3):121-130.
23. Fauziningtyas R WDER, Indarwati R, Candra Panji Asmoro C.P: **Determinants of Knowledge and Attitude related to Palliative Care Nurses.** *International Journal of Psychosocial Rehabilitation* 2020, **24**(7):1475-7192.
24. Paknejadi F, Hasavari F, Khaleghdoost Mohammadi T, Kazemnejad Leili E: **Nurses' Knowledge of Palliative Care and Its Related Factors.** *Journal of Holistic Nursing and Midwifery* 2019, **29**(4):236-242.
25. Yamamoto R, Kizawa Y, Nakazawa Y, Ohde S, Tetsumi S, Miyashita M: **Outcome evaluation of the palliative care emphasis program on symptom management and assessment for continuous medical education: nationwide physician education project for primary palliative care in Japan.** *Journal of palliative medicine* 2015, **18**(1):45-49.
26. Balicas D: **The effect of palliative care nursing education to improve knowledge in palliative care of hospital-based nurses caring for patients with chronic, serious illness.** *Himmelfarb Health Sciences Library, The George Washington University Health Sciences Research Commons* 2018, **1**(1):351.
27. Cleary AS: **Graduating nurses' knowledge of palliative and end-of-life care.** *International journal of palliative nursing* 2020, **26**(1):5-12.
28. Achora S, Labrague LJ: **An integrative review on knowledge and attitudes of nurses toward palliative care: Implications for practice.** *Journal of Hospice & Palliative Nursing* 2019, **21**(1):29-37.
29. Al-Drees O, AlHubail M, Elzubair AG: **Palliative care: knowledge and attitude among Saudi residents,** 2016. *Journal of palliative medicine* 2019, **22**(11):1401-1409.
30. Nair M, Kumar P, Mahajan R, Harshana A, Kurup KK, Moreto-Planas L, Burza S: **Knowledge, Attitudes, and Practices Regarding Palliative Care: A Mixed-Methods Study from Bihar, India.** *Journal of Palliative Care* 2021, **36**(1):9-11.
31. Farmani AH, Mirhafez SR, Kavosi A, Pasha AM, Mohammadi G, Moeini V, Far MRA, Movahedi A: **Dataset on the nurses' knowledge, attitude and practice towards palliative care.** *Data in brief* 2019, **22**:319-325.
32. Abudari G, Zahreddine H, Hazeim H, Assi MA, Emara S: **Knowledge of and attitudes towards palliative care among multinational nurses in Saudi Arabia.** *International journal of palliative nursing* 2014, **20**(9):435-441.
33. Aghaei M, Mohajjel Aghdam A, Bodaghi S, Azami Agdash S: **Knowledge and attitude of nurses toward caring for end of life patients.** *Iran Journal of Nursing* 2017, **30**(107):74-82.
34. Morgan T, Ann Williams L, Trussardi G, Gott M: **Gender and family caregiving at the end-of-life in the context of old age: A systematic review.** *Palliative Medicine* 2016, **30**(7):616-624.

35. Ayed A, Sayej S, Harazneh L, Fashafsheh I, Eqtait F: **The Nurses' Knowledge and Attitudes towards the Palliative Care.** *Journal of Education and Practice* 2015, **6**(4):91-99.
36. Choi M, Lee J, Kim S-s, Kim D, Kim H: **Nurses' knowledge about end-of-life care: where are we?** *The Journal of Continuing Education in Nursing* 2012, **43**(8):379-384.
37. Sato K, Inoue Y, Umeda M, Ishigamori I, Igarashi A, Togashi S, Harada K, Miyashita M, Sakuma Y, Oki J: **A Japanese region-wide survey of the knowledge, difficulties and self-reported palliative care practices among nurses.** *Japanese journal of clinical oncology* 2014, **44**(8):718-728.
38. Tait V, Higgs M, Magann L, Dixon J, Davis JM, Fernandez R: **Attitudes of nonpalliative care nurses towards palliative care.** *International Journal of Palliative Care* 2015, **2015**(1):115-121.
39. Azami-Aghdash S JH, Bakhshian F, Shafeai L, Shafeai S, Kolahdouzan K, Mohseni M: **Attitudes and knowledge of Iranian nurses about hospice care.** *Indian journal of palliative care* 2015, **21**(2):209-215.
40. Becker R: **Palliative care 1: principles of palliative care nursing and end-of-life care.** *Nursing times* 2009, **105**(13):14-16.
41. Seven A SH: **The Nurses Attitude for Dying Patients and Their Knowledge about Palliative Care.** . *How Bezmialem Science* 2020, **8**(3):250-257.
42. Alamri SH: **Knowledge of the residents at King Abdul-Aziz University Hospital (KAAUH) about palliative care.** *Journal of family & community medicine* 2012, **19**(3):194.
43. Cortegiani A, Russotto V, Rainieri SM, Gregoretti C, Giarratano A, Mercadante S: **Attitudes towards end-of-life issues in intensive care unit among Italian anesthesiologists: a nation-wide survey.** *Supportive Care in Cancer* 2018, **26**(6):1773-1780.
44. Lewis SL: **Palliative care in the neonatal intensive care setting: our past and our future.** *Journal of Hospice & Palliative Nursing* 2012, **14**(2):149-157.
45. Kain V, Gardner G, Yates P: **Neonatal palliative care attitude scale: development of an instrument to measure the barriers to and facilitators of palliative care in neonatal nursing.** *Pediatrics* 2009, **123**(2):e207-e213.
46. Shih C-Y, Chiu T-Y, Lee L-T, Yao C-A, Chen C-Y, Hu W-Y: **What factors are important in increasing junior doctors' willingness to provide palliative care in Taiwan? An educational intervention study.** *Journal of palliative medicine* 2010, **13**(10):1245-1251.
47. Budkaew J, Chumworathayi B: **Knowledge and attitudes toward palliative terminal cancer care among Thai generalists.** *Asian Pac J Cancer Prev* 2013, **14**(10):6173-6180.

## Tables

**Table1** Demographic and professional characteristics of the participants in the study (n=277)

Variables		Frequency	Percent
Age (year)	20-30	59	<b>21.3</b>
	31-40	121	<b>43.7</b>
	41-50	75	<b>27.1</b>
	51-60	20	<b>7.2</b>
	61+	2	<b>0.7</b>
Sex	Female	243	<b>87.7</b>
	Male	34	<b>12.3</b>
Educational status	Bachelor	203	<b>73.3</b>
	Master of sciences	57	<b>20.6</b>
	Medical Doctor	1	<b>0.4</b>
	PhD	15	<b>5.4</b>
	Fellowship	1	<b>0.4</b>
Job	General Practitioner	1	<b>0.4</b>
	Oncologist	1	<b>0.4</b>
	Nurse	239	<b>86.3</b>
	Faculty member	19	<b>6.9</b>
	Other	17	<b>6.1</b>
work experience (year)	>1	4	<b>1.4</b>
	1-3	25	<b>9</b>
	4-5	15	<b>5.4</b>
	6-10	66	<b>23.8</b>
	<10	167	<b>60.3</b>
Workplace section	Internal ward	16	<b>5.8</b>
	Surgery ward	7	<b>2.5</b>
	Maternity ward	8	<b>2.9</b>
	Emergency	19	<b>6.9</b>
	Pediatrics	6	<b>2.2</b>

	CCU	62	<b>22.4</b>
	ICU	28	<b>10.1</b>
	Hematology- oncology	29	<b>10.5</b>
	NICU	4	<b>1.4</b>
	Neurology- Neurosurgery	3	<b>1.1</b>
	Psychology	3	<b>1.1</b>
	Other	92	<b>33.2</b>
Do you have working experience in the field of PC?	Yes	72	<b>26</b>
	No	205	<b>74</b>
Is receiving formal education such as participating in workshops and attending lectures or courses necessary for providing PC?	Yes	244	<b>88.1</b>
	No	33	<b>11.9</b>
Do you need to take a PC course?	Yes	243	<b>87.7</b>
	No	34	<b>12.3</b>

Table 2 Descriptive characteristics of Attitudes and knowledge towards palliative care

Variables	Subscales	Mean	SD	Minimum	Maximum
Attitudes towards palliative care	Total score of Attitudes	140.90	11.56	102	<b>172</b>
	principles of palliative care	52.45	4.16	38	<b>61</b>
	end-of-life care	29.02	3.75	20	<b>43</b>
	family participation in palliative care	24.99	3.39	10	<b>30</b>
	patient's autonomy	4.96	1.27	0	<b>7</b>
knowledge towards palliative care	Total score of knowledge	19.36	2.73	10	<b>26</b>
	Physical Symptom management	6.27	1.66	2	<b>10</b>
	Pain management	5.29	1.29	2	<b>9</b>
	Psychological symptom management	4.24	0.87	1	<b>6</b>
	General concept	3.55	1.22	0	<b>5</b>

**Table 3 Relationship between Demographic and professional characteristics and total score of attitude and knowledge**

Variables		Attitude (Mean ± SD)	Knowledge (Mean ± SD)
Age (year)	20-30	137.50 ± 11.43	18.18 ± 2.91
	31-40	141.55 ± 11.29	19.36 ± 2.66
	41-50	141.76 ± 11.85	19.32 ± 2.65
	51-60	143.20 ± 11.69	20.85 ± 2.73
	61+	147.00 ± 7.07	21.00 ± 1.41
	P-value	0.064***	0.126***
Sex	Male	135.61 ± 11.64	18.64 ± 2.74
	Female	141.64 ± 11.38	19.46 ± 2.72
	P-value	0.005**	0.459*
Educational status	Bachelor	138.70 ± 10.32	19.03 ± 2.72
	Master of sciences	143.92 ± 11.47	20.10 ± 2.59
	PhD	157.26 ± 8.38	20.46 ± 2.41
	Medical Doctor	-	-
	Fellowship	-	-
	P-value	<0.000***	0.004***
Job	General physicians	-	-
	Oncologist	-	-
	Nurse	139.87 ± 10.61	19.32 ± 2.73
	Faculty member	156.73 ± 8.32	20.00 ± 2.49
	Other	139.82 ± 11.90	19.35 ± 3.21

	P-value	0.175***	<b>0.723***</b>
work experience (year)	>1	133.25 ± 15.81	<b>18.75 ± 4.34</b>
	1-3	141.28 ± 12.12	<b>19.76 ± 2.27</b>
	4-5	136.93 ± 13.96	<b>18.26 ± 2.63</b>
	6-10	138.93 ± 10.54	<b>18.74 ± 2.65</b>
	<10	142.16 ± 11.42	<b>19.67 ± 2.76</b>
	P-value	0.061***	<b>0.048***</b>
Workplace section	Internal ward	141.06 ± 13.35	<b>18.25 ± 3.25</b>
	Surgery ward	141.28 ± 5.87	<b>19.14 ± 1.57</b>
	Maternity ward	141.12 ± 10.49	<b>19.12 ± 2.69</b>
	Emergency	144.10 ± 7.89	<b>19.15 ± 2.03</b>
	Pediatrics	149.33 ± 11.79	<b>20.66 ± 1.21</b>
	CCU	135.24 ± 10.68	<b>18.66 ± 3.13</b>
	ICU	144.00 ± 9.79	<b>19.64 ± 2.98</b>
	Hematology-oncology	141.10 ± 12.61	<b>19.65 ± 2.22</b>
	NICU	-	-
	Neurology-Neurosurgery	-	-
	Psychology	-	-
	Other	-	-
	P-value	0.005***	<b>0.279***</b>
Do you have working experience in the field of PC?	Yes	143.45 ± 11.42	<b>20.15 ± 2.33</b>
	No	140.00 ± 11.50	<b>19.09 ± 2.82</b>
	P-value	0.018**	<b>0.081*</b>
Is receiving formal education such as participating in workshops	Yes	141.96 ±	<b>19.50 ±</b>

and attending lectures or courses necessary for providing PC?		11.42	<b>2.64</b>
	No	133.09 ± 9.48	<b>18.39 ± 3.23</b>
	P-value	<0.000**	<b>&lt;0.000**</b>
Do you need to take a PC course?	Yes	141.56 ± 11.16	<b>19.43 ± 2.62</b>
	No	136.17 ± 13.36	<b>18.91 ± 3.44</b>
	P-value	0.010**	<b>0.010**</b>
<b>Note:</b> Values are expressed as Mean±SD.			
(*Based on independent sample T-test for normal variables)			
(**Based on Mann-Whitney test and ***KrusKai-Wallis test for un normal variables)			

**Table 4 Result of univariate regression between Demographic and professional characteristics and total score of attitude and knowledge**

Outcomes	Total score of knowledge					Total score Attitude				
Parameter	Beta	SE	95% CI for Beta	t	P	Beta	SE	95% CI for Beta	t	P
<b>Age</b>										
20-30	Ref	-	-	-	-	Ref	-	-	-	-
31-40	0.48	0.42	[ -0.35, 1.32]	1.27	0.259	4.04	1.80	[ -0.47, 4.95]	5.00	<b>0.025</b>
41-50	0.43	0.46	[ -0.47, 1.35]	0.87	0.349	4.25	1.98	[ 0.09, 5.89]	4.60	<b>0.032</b>
51-60	1.96	0.69	[ 0.60 , 3.33]	7.98	<b>0.005</b>	5.69	2.94	[ 0.37, 9.12]	3.72	<b>0.053</b>
61+	2.11	1.93	[ -1.67, 5.91]	1.19	0.274	9.49	8.18	[ -7.19, 18.89]	1.34	0.246
<b>Gender</b>										
Male	Ref	-	-	-	-	Ref	-	-	-	-
Female	0.82	0.49	[ -0.15, 1.79]	2.72	0.099	6.02	2.08	[ 1.94, 10.11]	8.38	<b>0.004</b>
<b>Educational status</b>										
Bachelor	Ref	-	-	-	-	Ref	-	-	-	-
Master of sciences	1.07	0.39	[ 0.29, 1.85]	7.22	<b>0.007</b>	5.22	1.57	[ 2.14, 8.30]	11.06	<b>0.001</b>
Medical Doctor	4.96	2.66	[ -0.25, 10.18]	3.47	0.062	0.29	10.50	[ -20.29, 20.88]	0.001	0.978
PhD	1.43	0.71	[ 0.03, 2.82]	4.05	<b>0.044</b>	18.56	2.80	[ 13.06, 24.05]	43.83	<b>0.000</b>
Fellowship	4.96	2.66	[ -0.25, 10.18]	3.47	0.062	33.29	10.50	[ 12.70, 53.88]	10.04	<b>0.002</b>
<b>Job</b>										
General Practitioner	Ref	-	-	-	-	Ref	-	-	-	-
Oncologist	2.00	3.85	[ -5.55, 9.55]	0.26	0.604	43.00	14.80	[ 13.99, 72.00]	8.44	<b>0.004</b>
Nurse	1.32	2.73	[ -4.03, 6.67]	0.23	0.629	37.87	10.48	[ 17.31, 58.42]	13.04	<b>0.000</b>
Faculty member	2.00	2.79	[ -3.48, 7.48]	0.51	0.475	54.73	10.73	[ 33.69, 75.78]	25.98	<b>0.000</b>
Other	1.35	2.80	[ -4.14, 6.85]	0.23	0.630	37.82	10.76	[ 16.71, 58.93]	12.33	<b>0.000</b>
<b>work experience</b>										

<b>&gt;1</b>	Ref	-	-	-	-	Ref	-	-	-	-
<b>1-3</b>	1.01	1.44	[-1.83, 3.85]	0.48	0.86	8.03	6.13	[-3.98, 20.04]	1.71	0.190
<b>4-5</b>	-0.48	1.51	[-3.44, 2.48]	0.10	0.750	3.68	6.40	[-8.87, 16.24]	0.33	0.565
<b>6-10</b>	-0.00	1.35	[-2.72, 2.70]	0.00	0.996	5.68	5.86	[-5.80, 17.18]	0.94	0.332
<b>&lt;10</b>	0.92	1.36	[-1.74, 3.58]	0.45	0.499	8.91	5.76	[-2.37, 20.20]	2.39	0.122
<b>Workplace section</b>										
<b>Internal ward</b>	Ref	-	-	-	-	Ref	-	-	-	-
<b>Surgery ward</b>	0.89	1.20	[-1.47, 3.26]	0.54	0.461	0.22	4.98	[-9.54, 9.99]	0.00	0.964
<b>Maternity ward</b>	0.87	1.15	[-1.39, 3.14]	0.57	0.449	0.06	4.76	[-9.27, 9.39]	0.00	0.990
<b>Emergency</b>	0.90	0.90	[-0.86, 2.68]	1.00	0.316	3.04	3.73	[-4.27, 10.35]	0.66	0.415
<b>Pediatrics</b>	2.41	1.27	[-0.08, 4.92]	3.57	<b>0.059</b>	8.27	5.26	[-2.04, 18.59]	2.46	0.116
<b>CCU</b>	0.41	0.74	[-1.05, 1.87]	0.30	0.583	-5.82	3.08	[-11.86, 0.22]	3.56	<b>0.059</b>
<b>ICU</b>	1.39	0.83	[-0.24, 3.03]	2.77	0.096	2.93	3.44	[-3.81, 9.69]	0.72	0.394
<b>Hematology-oncology</b>	1.40	0.83	[-0.22, 3.03]	2.85	0.091	0.04	3.42	[-6.67, 6.75]	0.00	0.990
<b>NICU</b>	1.00	1.49	[-1.92, 3.92]	0.44	0.503	-5.81	6.14	[-17.86, 6.23]	0.89	0.344
<b>Neurology-Neurosurgery</b>	3.08	1.67	[-0.20, 6.37]	3.36	0.066	-0.06	6.91	[-13.62, 13.50]	0.00	0.993
<b>Psychology</b>	1.75	1.67	[-1.54, 5.04]	1.08	0.294	-4.39	6.91	[-17.95, 9.16]	0.40	0.525
<b>Other</b>	1.53	0.72	[0.11, 2.95]	4.49	<b>0.034</b>	1.75	2.97	[-4.08, 7.59]	0.34	0.556
<b>Do you have working experience in the field of PC?</b>										
<b>Yes</b>	Ref	-	-	-	-	Ref	-	-	-	-
<b>No</b>	-1.06	0.36	[-1.78, -0.33]	8.25	<b>0.004</b>	-3.44	1.56	[-6.52,-0.37]	4.83	<b>0.028</b>
<b>Is receiving formal education such as participating in workshops and attending lectures or courses necessary for providing PC?</b>										
<b>Yes</b>	Ref	-	-	-	-	Ref	-	-	-	-

No	-1.10	0.50	[ <b>-2.09,</b> -0.12]	4.84	<b>0.028</b>	-8.87	2.07	[ <b>-12.93,</b> -4.80]	18.30	<b>0.000</b>
<b>Do you need to take a PC course?</b>										
Yes	Ref	-	-	-	-	Ref	-	-	-	-
No	-0.52	0.49	[ <b>-1.50,</b> 0.45]	-2.21	0.298	-5.39	2.08	[ <b>-9.48,</b> -1.29]	6.66	<b>0.010</b>