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Knowledge and Attitude Towards Total Knee Arthroplasty Among Health Education Students in Saudi Arabia

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ABSTRACT

Objectives: Total knee Arthroplasty (TKA) is considered the treatment of choice for knee osteoarthritis, and health educators can assist patients to choose the most appropriate treatment plan. This research aims to measure knowledge of and attitudevs towards TKA among health education students, as they are the health educators of the future.
Methods: A cross sectional design was used to study 227 health education students from four Saudi universities that offered a health education program. A questionnaire was distributed to eligible participants during the 7-month study period (20 September 2017 until 17 April 2018). Data were analyzed using SPSS. A chi-square test to measure the association between the different groups in terms of categorical variables and a Spearman's correlation test were conducted. Poor knowledge rated as 0-49%; fair knowledge 50-74%; and good knowledge 75-100%. A total score of more than 7.2 indicated positive attitude, more than 4.6-7.2 neutral attitude and less than 4.6 negative attitude.
Results: Of all participants, 71.40% had poor knowledge of TKA, while 76.20% had a neutral attitude towards it. Participant's level of knowledge was significantly associated with having previously heard about TKA and having a family member who had undergone surgery. Participants' attitude was significantly associated with having previously heard about TKA.
Conclusions: Overall, knowledge of TKA was poor, and attitude towards it was neutral. A correlation was found between participants' level of knowledge and attitude. Further studies for exploration are needed among health-care professionals including orthopedic surgeons and health educators.

1. Background

Knee pain is a public health concern as it affects mobility and leads to disruption of many daily life activities [1]. Although knee pain might be caused by a variety of conditions, in many cases it could be a sign of osteoarthritis (OA) which is a common disease worldwide [2]. A study conducted in Al-Qassim, which is a province located in Saudi Arabia, showed that OA is prevalent in the community as 53.3% of male patients and 60.9% of female patients are suffering with OA [3]. Nonsurgical interventions such as; weight loss, physical therapy and local injections could be useful for pain relief. Nevertheless, these treatments have not been successful in treating severe OA or in stopping the development of the disease. For such severe and progressive OA cases, Total Knee Arthroplasty (TKA) is considered to be an effective treatment of choice because it improves patients' conditions by relieving the pain [4]. TKA is an orthopedic surgical surgery which takes around 1 to 2 hours. During the surgery, a damaged knee-joint is replaced with an artificial one [5]. A patient is considered a candidate for TKA upon the existence of three indications; knee pain, functional limitation and stiffens [3]. In most cases these indications are caused by arthritis of the knee, specifically; OA rheumatoid arthritis, and post-traumatic arthritis [6]. Furthermore, obesity was found to increase the risk of OA leading to a demand for TKA [7].

TKA is considered as a reliable surgery that is effective on various aspects [8]. It is found to be a safe and cost-effective surgery [9]. Additionally, TKA effectively relieve pain and improve function [10]. TKA was also found to improve the Quality of Life (QOL) one study assessed the effectiveness of TKA by measuring QOL of patient pre-post undergoing TKA and the results showed a significant improvement in the participants' QOL as the pain was relieved and there were improvements on participants' mobility [11]. By abstaining from undergoing TKA when needed, patients' QOL is hindered resulting to unhealthy life which does not support one of the strategic objectives of the Saudi vision 2030, that is offering a fulfilling and healthy life [12].

Ever since TKA has been introduced in 1960's and 1970's, there has been a dramatic increase in the numbers of TKAs performed [13]. A study stated that almost 600 thousand TKA surgeries are performed yearly in the USA, also the same study anticipated a rise in TKA rates up to 673% by 2030 based on the fact that there is an increase in age and obesity rates [14]. In the Middle East and Gulf region there is a low rate of up-taking the surgery due to the lack of having the right perception and understanding regarding TKA, its benefits and complications [1]. TKA has generally proven to show satisfactory outcomes [7,11]. A study was conducted in the context of Saudi Arabia showing that the satisfaction rates among Saudi patients who underwent the procedure reached as high as 93%, however 67% of Saudi patients, who needed to undergo TKA refused the procedure because of their misconceptions and negative attitude which included a fear of disability and death [15]. Although age is not considered as a condition to undergo the TKA, but it is mostly performed on people ageing between 60 and 80 [2]. With regard to gender it was found that the number of women undergoing TKA is higher than men [16].

The refusal to undergo the procedure could be driven by the beliefs, concerns, familiarity with the procedure, and patients' expectations (8,15). A previous study conducted by Al-Mohrej et al. (2017), found that only 29.7% of the general Saudi population have had information about TKA with many misconceptions among the public concerning

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TKA, and its indications. These findings were presented in the first national and international study which examined the knowledge and attitude regarding total knee Arthroplasty among the public [17]. On the other hand, a study that measured knowledge of patients about total joint Arthroplasty including TKA in Hong Kong showed a good knowledge about the benefits and outcome of the surgery [18].

The KAB model was used as a framework to guide our study. This model suggests that there is a relation between level of knowledge, attitude and adopting a behavior [19]. An application of the KAB model to guide healthy behavior was effective in several instances [20]. Thus, this study tends to understand the knowledge and attitude of health education students, on the assumption that knowledge and attitudes will affect the educators' behaviors.

Patients' decision and choices related to undergoing TKA are affected by their knowledge, attitudes, as suggested by Knowledge, Attitude and Behavior (KAB) model, and by their socio-cultural factors [17,20]. Patient education should be provided by the multidisciplinary team, including health educators to improve knowledge, change preconceived beliefs, and misconceptions, which may ultimately affect decision-making [21]. Based on the literature review, this study is the first to assess the knowledge and attitudes of health education students towards TKA. By understanding of the indications, complications and outcomes of TKA, health educator can help in filling the gaps in patients' knowledge and overcoming communication barriers between the patients and doctors [22]. Health educators aim to change health beliefs and improve practices in the public and through the process of achieving their aim, some aspects have to be considered including; knowledge, attitudes, goals, perceptions, social status, cultural traditions and other aspects [23]. Health educators influence the process of decision making of options related to health among society as they educate individuals and communities about the behaviors that boosts their willingness and they can help by teaching them how to deal with their health conditions [22]. Health educators are responsible to give patients all information related to their health status, explaining the diagnosis and required surgery and tests pre-operative and give instructions post-operative [24].

So, this study aims to measure the level of knowledge and attitude of health education students regarding TKA as they are the future health educators, and its objectives are to assess the level of knowledge about total knee Arthroplasty among health education students', to assess health education students' attitude toward total knee Arthroplasty, and to identify the relationship between the socio-demographic characteristics and level of knowledge and attitude among the study participants.

2. Methodology

2.1. Study design

A cross-sectional study was conducted, in four Saudi universities. The population of the study were health education students who are enrolled in universities which offer health education bachelor's degree. Health education undergraduate students were included to the study. Health education interns were excluded as the study was targeting students who are still in the process of learning.

2.2. Ethical consideration

Prior to conducting the study ethical approval was obtained from Princess Nora University (PNU) IRB (H-01-R-059) and approval was obtained from all concerned universities. Informed consent was distributed along with the questionnaire.

2.3. Sampling

Stratified random sampling technique was used. The number of total population equals 764 students divided between the four universities. 82 of which are students of PNU, 342 students of Jazan University, 147 students of King Saud University (KSU) and 193 students of Umm Al-Qura University. proportional allocation was applied in each stratum using a sampling fraction of how they are represented of the total population.

OpenEpi web application was used for calculating the sample size [25]. Based on assuming that 29.7% has the right knowledge about TKA from a nation-wide study among Saudi population [17]. And considering an error margin of 5%, a minimum sample size of 227 was considered as sufficient for this study. The sample size consisted of 11% (n=25) PNU students, 45% (n=102) Jazan students, 19% (n=43) KSU students and 25% (n=57) Umm Al-Qura students.

2.4. Data collection

An English questionnaire was developed, validated and then translated to Arabic. The Arabic version was sent to the students via WhatsApp. The questionnaire consisted of 15 questions and divided into 3 sections, which were; socio-demographic characteristics, level of knowledge and attitude toward TKA. All the questions were mandatory to answer in order not to have missing data. The questionnaire took approximately one to two minutes to complete.

2.5. Socio-demographic Characteristics

The first section identified five socio-demographic characteristics, which were; sex (Male/Female), university (PNU/KSU/Umm Al-Qura/Jazan), level of education (1st year/2nd year/ 3rd year), whether they had heard of the surgery previously (yes/no) and if they had a family member who underwent the surgery (yes/no).

2.6. Knowledge

The second section assessed the level of knowledge including eight questions. The questions were True/ False/ Don't know (TFD) statements, which were; the surgery is common in Saudi Arabia, number of female patients is higher than male, arthritis is the main risk factor, age does not affect the surgery, BMI affects the outcome of surgery, the surgery is irreplaceable with non-surgical treatments, refusing the surgery leads to disability and the chance of complications occurrence after the surgery is low.

Following the Angoff method to set cutoff scores, each correct answer was awarded a score of one and each incorrect answer was awarded a score of zero [26]. All the awarded scores were summed to calculate the total score which was then converted to a percentage. Level of knowledge was classified into three categories based on standards previously used by knowledge, attitude and behavior (KAB) study; poor knowledge rated as percentages from 0-49%; fair knowledge rated as 50-74%; and good knowledge rated as 75-100% [27].

2.7. Attitude

The third section assessed the attitude towards TKA with two questions using a Likert scale, which were; (strongly disagree, disagree, neutral, agree and strongly agree) if they as health educators thought that the surgery is dangerous and their attitude towards TKA.

The strongly favorable attitude was awarded a scoring of 5 points and the strongly unfavorable attitude was awarded a scoring of 1 point. A total score of more than 7.2 indicated positive attitude, more than 4.6 to 7.2 indicated neutral attitude and less than 4.6 indicated negative attitude [28].

2.8. Validity and reliability

The questionnaire was translated into Arabic by experts using the forward-backward method [29]. Face validity was done by an orthopaedic consultant who evaluated whether our study instrument measures what it is supposed to measure (30). Cronbach's α test result from our questionnaire was (0.804).

2.9. Feasibility

A pilot test was used to test the study feasibility, reliability and if any modifications are needed [31]. 10% of the sample size was selected from health education students randomly for the pilot test. These students were excluded from the participants since the questionnaire was modified according to their given feedback [32]. Based on the piloting result, the questionnaire was modified, one unclear question was removed, and the questionnaire was translated into Arabic.

2.10. Statistical analysis

Data analysis was done using the Statistical Package for Social Sciences (SPSS, version 23 for Mac). The data were assessed for normality by Shapiro-Wilk. Bivariate analysis was chosen to assess socio-demographic characteristics, knowledge and attitude provided by the study questionnaire [32]. Chi-square ($\chi2$) test was used to analyze the data and Spearman's Correlation Coefficient was used between the total knowledge and attitude. The test is considered significant if the p-value is less than 0.05.

3. Results

The questionnaire was distributed to measure knowledge and attitude towards TKA of health education students in Saudi Universities. The response rate was 100% as 227 of these students responded to the questionnaire and participated in the study.

3.1. Socio-demographic characteristics and hearing about TKA previously

Table (1) provides an overview of the socio-demographic characteristics of the participants. The participants were recruited from four Saudi universities 11% from PNU, 18.9% KSU, 25.1% Umm al Qura and 44.9% Jazan. Of these participants, the number of female participants was significantly higher making around 77%. The percentage of participants from first, second and third year students were 33.9%, 35.7% and 30.4% respectively. However, only 8% had a personal experience with a family member who underwent the surgery. With regard to their previous knowledge and experience with TKA, table (2) shows that 55.9% of the participants reported that they had heard about TKA previously.

Table 1: Socio-demographic characteristics of the participants

Variable	Categories	No. (227)	Percent (%)
Sex	Male	52	22.9
	Female	175	77.1
University	†PNU	25	11
	‡KSU	43	18.9
	Umm Al Qura	57	25.1
	Jazan	102	44.9
Level of education	1st year	77	33.9
	2nd year	81	35.7
	3rd year	69	30.4
Have you heard about total knee Arthroplasty?	Yes	127	55.9
	No	100	44.1
Do you have a family member who underwent the surgery of total knee Arthroplasty?	Yes	19	8.4
	No	208	91.6

†PNU- Princess Nora University

‡KSU- King Saud University

Table 2: Hearing about Total Knee Arthroplasty previously

Variable	Categories	No. (227)	Percent (%)
Have you heard about total knee Arthroplasty?	Yes	127	55.9
	No	100	44.1

3.2. Participants' knowledge about TKA

Table 3: Frequency distribution of participants' answers of knowledge about Total Knee Arthroplasty

Variable	Categories	No. (227)	Percent (%)
Total knee Arthroplasty surgery is common in Saudi Arabia.	True	49	21.6
	False	14	6.2
	Don't know	164	72.2
The number of females who undergo Total knee Arthroplasty is higher than the number of males.	True	54	23.8
	False	8	3.5
	Don't know	165	72.7
Arthritis is the main risk factor for total knee Arthroplasty.	True	83	36.6
	False	8	3.5
	Don't know	136	59.9
Total knee Arthroplasty surgery is not affected by age.	True	33	14.5
	False	76	33.5
	Don't know	118	52
Total knee Arthroplasty outcome is affected by body mass index.	True	105	46.3
	False	1	.4
	Don't know	121	53.3
Total knee Arthroplasty is irreplaceable with the available non-surgical treatments. Such as physical therapy, injections and weight loss.	True	26	11.5
	False	73	32.2
	Don't know	128	56.4
Refusing total knee Arthroplasty could lead to disability.	True	57	25.1
	False	21	9.3
	Don't know	149	65.6
The chance of complications occurrence after undergoing total knee Arthroplasty is low.	True	43	18.9
	False	26	11.5
	Don't know	158	18.9

What stands out in figure (1) is that the majority of participants (71.4%) had poor knowledge about TKA and only 5.7% had good knowledge. A closer inspection of Table (3), which presents an overview of the knowledge of participants, shows the limited knowledge about TKA. To be explicit, only 11.5% knew that TKA surgery is irreplaceable with nonsurgical treatments, 14.5% knew TKA is not affected by age, 18.9% knew that the complications rate after TKA is low, 21.6% knew TKA is common in Saudi Arabia, 23.8% knew the number of females who underwent the surgery is

higher than males, 25.1% knew that refusing the surgery when needed could lead to disability. Higher rates were reported in term of the causes as 36.6% knew that arthritis is the main risk factor for the surgery and 46.3% knew BMI affects the surgery outcome. Finally, remarkably high rates of the participants (52%-72.7%) answered don't know to different questionnaire statements.
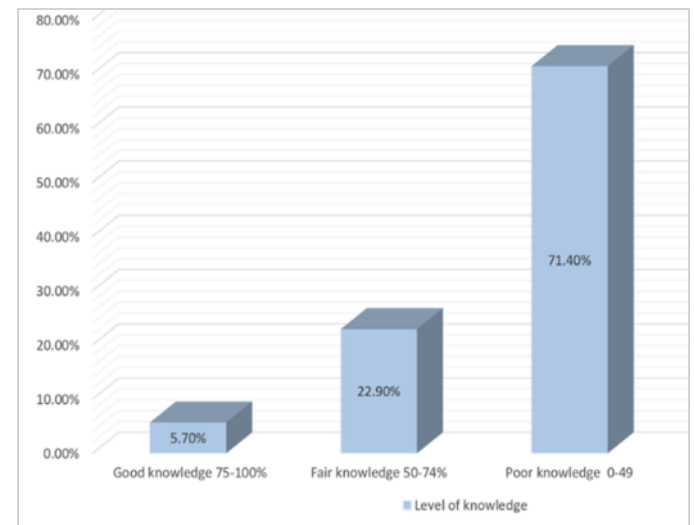

Figure 1: [Participants' level of knowledge about Total Knee Arthroplasty]

3.3. Participants' attitude towards TKA

Table (4) demonstrates participants' attitude towards TKA. Our result showed that 76.2% of the participants had a neutral attitude towards the surgery and its seriousness as shown in Figure (2).

Nearly a third of the participants consider TKA as a dangerous procedure, while a minority (8.8%) did not. Nevertheless, almost half the participants had a positive attitude toward the procedure and a minority (0.9%) had a negative attitude.

Table 4: Participant's attitude towards Total Knee Arthroplasty

| Variable	Categories	No. (227)	Percent (%)
As a health educator, do you think that total knee Arthroplasty is dangerous surgery?	Strongly disagree	2	.9
	Disagree	36	15.9
	Neutral	102	44.9
	Agree	67	29.5
	Strongly agree	20	8.8
As a health educator, what is your attitude toward total knee Arthroplasty?	Strongly disagree	2	.9
	Disagree	13	5.7
	Neutral	102	44.9
	Agree	93	41
	Strongly agree	17	7.5
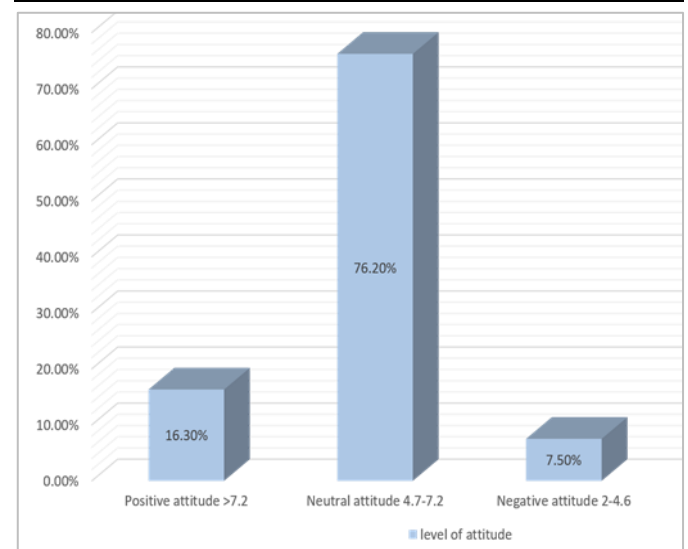
Figure 2: [Participants' level of attitude towards Total Knee Arthroplasty]

3.4. Relationships to the level of knowledge

Table (5) shows a relationship between socio-demographic characteristics and level of knowledge about TKA. A highly significant association was found between having a family member

who underwent TKA surgery and the level of knowledge ($p < 0.001$). Also, as shown in table (6), a highly significant association was found between hearing about TKA previously and the level of knowledge ($p < 0.001$)

Table 5: Relationship between Socio-demographic characteristics and level of knowledge about Total Knee Arthroplasty

Socio-demographic characteristics	No. (227)	Knowledge			P-value by chi-square test
		Good %	Fair %	Poor %	
Sex					.644
Male	52	7.7	19.2	73.1	
Female	175	5.1	24	70.9	
University					.944
†PNU	25	4	32	64	
‡KSU	43	7	18.6	74.4	
Umm AlQura	57	5.3	22.8	71.9	
Jazan	102	5.9	22.5	71.6	
Level of education					.191
1st year	77	6.5	18.2	75.3	
2nd year	81	8.6	25.9	65.4	
3rd year	69	1.4	24.6	73.9	
Do you have a family member who underwent the surgery of total knee Arthroplasty?					.000**
Yes	19	31.6	42.1	26.3	
No	208	3.4	21.2	75.5	

** P-value ≤ .001

†PNU- Princess Nora University

‡KSU- King Saud University

Table 6: Relationship between hearing about Total Knee Arthroplasty previously and the level of knowledge

Variable	No. (227)	Knowledge			p-value by chi-square test
		Good %	Fair %	Poor %	
Have you heard about total knee Arthroplasty?					.000**
Yes	127	9.4	40.2	50.4	
No	100	1	1	98	

3.5. Relationship between hearing about TKA previously and the attitude

Table (7) shows the relationship between hearing about TKA previously and the attitude towards TKA. A significant association was found between hearing about TKA before and the participants' attitude towards TKA ($p < 0.05$)

Table 7: Relationship hearing about Total Knee Arthroplasty and the attitude

Variable	No. 227	Attitude			p-value by chi-square test
		Positive %	Neutral %	Negative %	
Have you heard about total knee Arthroplasty?					.026*
Yes	127	22	70.1	7.9	
No	100	9	84	7	

* p < .05

3.6. Spearman's Correlation between knowledge and attitude

Table (8) presents the correlation between level of knowledge and attitude towards TKA. A positive correlation was found between level of knowledge and attitude, r=0.228, p =.001.

Table 8: Correlation between knowledge and attitude towards Total Knee Arthroplasty

		Knowledge	Attitude
Knowledge	R	1.000	.228
	P-value by correlation test	.	.001**
	N	227	227
Attitude	R	.228	1.000
	P-value by correlation test	.001**	.
	N	227	227

** p-value ≤ .001

†r = Correlation

‡N = Number of sample size

4. Discussion

Our study attempted to find out the relation between health education students' socio-demographic characteristics, knowledge and attitude towards TKA in Saudi universities. Numbers of female participants were significantly higher than male participants due to the fact that PNU is a female-only university and the number of male students enrolled in health education program in other universities is less than females. More than half of the participants had heard about TKA previously and few of the participants had a family member who underwent TKA.

Most participants had a poor level of knowledge about TKA, although more than half of the participants had heard about TKA previously, which is consistent to a previous study conducted by Al-Mohrej et al. (2017) in Saudi Arabia which reported similar findings [17]. The minority of the participants had good level of knowledge which is contradictory with the findings of a previous study conducted in Hong Kong where the majority of their participants had a good level of knowledge about TKA [18]. This inconsistency could be explained by the fact the Hong Kong study was conducted in OA or inflammatory arthritis patients, who have already got information about the surgery from their physicians while our study was on randomly selected students.

High rates of participants were not knowledgeable about TKA indicating a gap in educational sessions and campaigns. More than half of the participants did not know if non-surgical treatments such as physical therapy and injections can replace TKA surgery. This finding is consistent with Al-Mohrej et al. [17]. The number of participants who thought TKA is affected by age is more than the ones who did not. A possible explanation for this is that in Saudi Arabia most TKA surgeries are performed on patients with age mean 65.7 [33].

Overall, a low rate of participant had a positive attitude towards TKA and its seriousness. This could be attributed to their poor level of knowledge as KAB model suggests that attitude is driven by knowledge [19].

Our findings indicated a highly significant association between hearing about TKA previously and having a member who underwent TKA surgery with the level of knowledge, and it seems possible to explain this by taking the member who underwent the surgery as their source of information about TKA. Also, a significant association was found between hearing about TKA previously and their attitude toward it as they have acquired a perception about TKA, which is also be explained by the KAB model [20].

Finally, our study found a correlation between the participants' knowledge about TKA and their attitude toward it. This correlation can be interpreted by the KAB model as it proposes that knowledge affects attitude contributing to a change in behavior [19].

5. Conclusion

Based on our study findings, we conclude that, the level of knowledge of most participants was poor. Most of the participants had a neutral attitude towards TKA. Also, more than half of the participants had heard about TKA previously, which was found to have a significant association with their attitude. Additionally, a significant association was found between having a family member who underwent TKA surgery and hearing about TKA before with the level of knowledge. Finally, a correlation was found between level of knowledge and attitude.

6. Recommendations

The following strategies were recommended to raise knowledge and attitude towards TKA among health education students and public;

- Integration of the most common diseases in Saudi Arabia and their treatments in the curriculum of health education programs.
- Public education about TKA through media and health education campaigns.
- Further researches are needed to assess the knowledge and attitude towards TKA and its benefits in order to promote the awareness of the community and increase the utilization of TKA
- Further studies are needed among orthopaedic surgeons, health care professions involved in OA treatment and OA patients to identify the gap in doctor-patient communication to provide a more comprehensive result and to explore reasons for refusal to utilize this surgery

- Further studies are needed among patient educators working in hospitals and healthcare centres to identify their role in providing and correcting information about TKA

- **Acknowledgement**

- **Declaration**

The authors declare that there are no conflicts of interest. The authors are exclusively responsible for the content and the writing of this research paper.

- **Limitations**

While this study met the intended objectives, it has some limitations. First there are few studies measuring knowledge and attitude towards TKA, resulting in unavailability of a standard questionnaire that measures the study objectives requiring development and validation of a questionnaire. So a questionnaire was developed, validated and used for this study. Second, the number of female participants is higher than the males. However, this is understandable as the number of female students enrolled in health education program is higher than male students which makes the sample representative of the population of the study.

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