Knowledge and Attitude towards Patient Safety among a Group of Undergraduate Medical Students in Saudi Arabia

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Abstract:

Objectives: This study aimed to measure knowledge and attitude of undergraduate medical students towards patient safety concepts, and to detect variation by the mode of learning.

Methodology: A cross sectional study administrated an anonymous questionnaire to a random sample of 150 medical students graduated from two national medical schools, one follow the traditional lecture based learning (LBL) and the other applies innovative learning strategy (ILS). Students' self-ratings of knowledge level and attitude towards patient safety in relation to the mode of learning were measured. The study was conducted in April 2010.

Results: More than half of the participants (52.7%) self- rated their general knowledge on patient safety on good level compared to 27.3% for the specific knowledge issues score. Most participants (60.7%) agreed the importance of patient safety. The majority agreed to support peers who make unintentional errors and not to blame them for their own mistake (76.0 and 80.7% respectively). Less than half (44.7%) of the participants agreed the patients' role in error prevention and 47.3% agreed error disclosure to the patient. ILS participants were significantly more recognizable of the patient safety issues: problem solving (P< 0.01 OR: 3.0) and error management (P< 0.001 OR: 2.4) than the ILS colleagues.

Conclusion: The study revealed unsatisfied percentages of the participants who self- rated 'good' for their general and specific knowledge on patient safety. The unsatisfied rate was reported for the participants' 'agree' score towards patient safety issues. Basic relevant educational interventions with focus on deficient issues are recommended.

Key words: Patient safety, Medical errors, Medical students, Saudi Arabia

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Introduction

Patient safety is a fundamental principle of health care. The simplest definition of patient safety is the prevention of errors and adverse effects to patients associated with health care. [1] It was defined by the Institute of Medicine as "the prevention of harm to patients". [2] In developed countries as many as one out of 10 patients is harmed while receiving hospital care with higher probabilities in developing countries. [1] The US medical errors cost the US economy $19.5 billion in 2008. [3] With the growing recognition of the harms caused by health care, attention has been made to the importance of teaching about patient safety in graduate medical education. [4] A report from the Institute of Medicine emphasized that incorporating patient safety education into clinical training programs is a key mechanism for improving patient safety. [5]

Furthermore, it is recommended that the initial exposure to patient safety should occur early in undergraduate and graduate medical education programs and be ongoing throughout medical education. [4] In literature, less attention has been paid to the perception of patient safety/ medical error by medical students and to the role they could have in error prevention. [6] It is important to assess students' attitude regarding the patient safety/ medical errors to have a baseline data to design and implement a relevant educational programs. Attitudes drive behavior, if we can change a person's attitude we may change his or her behavior. [7] Differences in attitudes may to some extent be linked to differences in teaching methods and/or curriculum designs, [8] thereby helping medical educators in finding new ways of improving and refining teaching in medical schools.

Recently, in Saudi Arabia, many medical colleges are planning to incorporate patient safety/medical errors content into their curriculum. Recognition of the students' attitude towards this topic is important for the design and implementation of the educational program. As there is no related local published data, the aim of this study was to explore the knowledge and attitudes of undergraduate medical students towards patient safety concepts. What is their attitude towards learning this topic in the curriculum? Is there a difference in this attitude by mode of learning?

Methods

Study settings

This study was conducted at two new national medical schools: Taibah College of Medicine which follows the traditional lecture based learning (LBL) and Qassim College of Medicine which applies innovative learning strategy (ILS) of integrated problem based and community based learning. Both colleges have curricula lasting 5 years in two phases academic and clinical. Participants were students who completed the academic phase and joined clinical training in hospitals. Students of Qassim College of Medicine exposed to a community training program in primary care centers and to a short training hospital based course on clinical skills during the academic phase.

Study design

A cross sectional design was used to carry out this study. The total number of the students of both colleges in the studied batch (study year 2009-2010) was 210 students. Assuming a 50% prevalence of good knowledge and attitude, 5% bond-on error, and 10 % non-response rate, the required sample size to fulfill the objectives of this study at a 95% confidence level was calculated to be 150 students. The students were randomly chosen according to the probability of proportionate size of the classes in the two colleges. Selected undergraduate medical students completed an anonymous self- administrated questionnaire regarding their knowledge and attitudes towards patient safety issues. All the students returned the completed form and were included in the analysis.

Data collection

The frame work of the used questionnaire was based on the need to educate medical students on concepts of patient safety. Based on literature review, [1], [2], [4], [5] a structured questionnaire was developed and consisted of two main parts:

Part 1 explored participants' self-rating of their knowledge level about patient safety issues. Query about the general knowledge level (1 item) and specific knowledge elements (5 items). Participants rated their knowledge level on a 100 point scale where 50% and more was considered good knowledge level

versus poor. Part 2 explored the attitudes of the participants toward patient safety issues. Four main issues were explored: Firstly, the importance of the topic 'patient safety' globally and the role of health care staff (5 items); two main issues explored patient safety culture: a. Problem solving included six items related to participants' commitment to patient safety and b. errors management regarding the willing of participants to report errors and attitude towards error disclosure (4 items). Last paragraph explored the fourth issue about the attitude of the participants towards teaching patient safety (4 items). Participants ranked each item on a 5-point Likert's scale, transposed into numerical values ranging from 1 to 5 (from low to high score, 1= strongly disagree, 2=disagree, 3= neutral, 4= agree, 5= strongly agree). Higher values reflected a more positive attitude.

The questionnaire was reviewed by the authors and relevant colleagues, pilot- study tested for clarity, simplicity, and reasonability on a sample of undergraduate medical students and revised accordingly. Instructions for completing and a statement of information confidentiality were stated at the start of the questionnaire. The questionnaire did not included background data to assure confidentiality.

After approval by the ethical committees at the studied colleges and seeking students' verbal consent, the students were asked to complete anonymous hard copy of the questionnaire in a series of class room settings by the end of a pre-defined educational day. The students returned completed questionnaires to the researcher on the same session.

The Outcome measures were: 1. student's self-ratings of knowledge level; general and specific. 2. Students' attitudes towards the studied four issues of patient safety.

For data analysis SPSS package 13 was used. Likert's scale responses were dichotomized as follows: agree and strongly agree labeled 'agree' versus neutral, disagree and strongly disagreed labeled 'disagree'. For each student two scores were calculated: 1.Specific knowledge score and 2. Attitude score towards the studied patient safety issues. A mean 50 % and more was considered good knowledge score and agree attitude score.

The frequency distributions of responses were calculated. Chi- square test was used to test the difference between students of the two modes of learning (ILS and LBL) among the different patient safety issues.

Results

Responses to patient safety knowledge items were shown in table 1. About half of the participants (52.7%) rated their general knowledge on patient safety "good" with insignificant difference between the studied two groups ((ILS & LBL).

Specific knowledge score was rated 'good' among only 27.3 % of all participants, however, ILS group rated significantly more than twice 'good' score than LBL group ($P<0.05$, OR: 2.3). Regarding the specific knowledge items, less than half of the participants rated 'good' for their knowledge about the frequency of medical errors (item 1), the factors influencing patient safety (item 2), and the different types of medical errors (item 3) (36.0%, 42.0% & 37.3% respectively). The practical knowledge items about what should happen if an error is made (item4) and the role of the patient safety committee (item 5) were rated 'good' by 28.0% and 26.0% of the participants respectively and ILS group showed significant more than twice good scores than LBL group for both items ($P<0.05$, OR: 2.4) and ($P<0.05$, OR: 2.5 respectively).

Table 1- Self- rating 'good' knowledge level about patient safety concepts by mode of learning

Items		Self-rating knowledge 'good'					
		Total		ILS (89) %	LBL (61) %	P	OR (95 % CI)
		N	%				
General knowledge		79	52.7	53.2	46.8	0.105	0.6 (0.3-1.2)
Specific knowledge score		41	27.3	73.2	26.8	0.034*	2.3 (1.0-5.5)*
Specific knowledge items							
1	Frequency of medical errors	54	36.0	55.6	44.4	0.480	0.8 (0.4-1.6)
2	Factors influencing patient safety	63	42.0	57.1	42.9	0.642	0.9 (0.4-1.7)
3	Different types of medical error	56	37.3	60.7	39.3	0.790	1.1 (0.5-2.3)
4	What should happen if an error is made	42	28.0	73.8	26.2	0.024*	2.4 (1.0-5.8)*
5	Role of patient safety committee	39	26.0	74.4	25.6	0.026*	2.5 (1.0-6.0)*

C I: Confidence Interval * P < 0.05

Attitude towards the importance of patient safety subject was presented in table 2. The majority of the participants (60.7 %) considered patient safety as a global problem (item 1) with no significant difference between the studied two groups. Half of all participants agreed that 'most clinical errors can be prevented' (item 2), participants of ILS group showed significant twice more 'agree' than LBL group (p < 0.05, OR: 2.1). Concerning the role of staff in error occurrence, more than half of participants of both studied groups (56.0%) agreed that most health care staff make errors (item3), the ILS group showed significant more 'agree' than LBL group (P <0.001, OR 10.3). However, the majority of the participants (82.0%) agreed that 'competent physician don't make errors' (item 5), among those 17.3 % agreed that most errors are out of staff control (item 4) with insignificant difference between both studied groups.

Table 2 also, presented the attitude of the participants towards patient safety culture issues:problem solving and error management. Participants' responses to problem solving items were varied. Less than half (44.7%) of the participants agreed towards the patients' role in error prevention (item 1), the majority (76.0 %) agreed to support peers who make unintentional errors (item 2) and 80.7 % agreed not to blame peers for their own mistake (item 3) with insignificant difference between the studied groups (ILS & LBL). ILS group showed significant more 'agree' towards the items of: Cooperate with the staff (item 4) (54.0 %) and willing to share information (item 5) (28.0%) [(P < 0.01 OR: 3.2) & P < 0.05 OR: 2.7) respectively]. Majority of both groups reported 'agree' regarding the item 6 'willing to change practice habits to improve patient safety (74.0%) with insignificant difference in between studied groups.

How the participated undergraduate medical students thought about medical error management? In table 2, more than half of the participants (52.0%) were willing to report medical errors whether or not the patient was harmed (item 7) while ILS group showed significant more willing than the LBL group (P <0.05 OR: 3.0). Concerning item 8, most participants (67.3%) agreed no fear from the negative consequences associated with error reporting. Participants in the ILS group agreed significantly more than those of the LBL group (P<0.001, OR 4.1).

How studied groups think to behave regarding error disclosure? The majority (74.7 %) were likely to disclose the error to the faculty member (item 9) However, only 47.3% agreed to disclose error to the patient (item 10). ILS group agreed significantly more towards both items than LBL group [(P<0.05, OR: 8.1) & (P<0.001, OR: 3.5) respectively].

Table 2- 'Agree' attitude towards patient safety issues by mode of learning

Issues		Agree					
		Total		ILS (89) %	LBL (61) %	P	OR (95 % CI)
		N	%				
Importance of 'patient safety topic							
1	Patient safety is a global problem	91	60.7	63.7	36.3	0.172	1.6 (0.8-3.3)
2	Most clinical errors are preventable	75	50.0	68.0	32.0	0.031*	2.1 (1.0-4.3)*
3	Most health care staff make errors	84	56.0	61.9	38.1	0.001*	10.3 (4.2-25.8)*
4	Most errors are out of staff control	26	17.3	65.4	34.6	0.490	1.4 (0.5-3.6)
5	Competent physician don't make error	123	82.0	56.9	43.1	0.197	0.6 (0.2-1.5)
	Culture issues						
	Problem solving						
1	Patients play a role in preventing errors.	67	44.7	62.7	37.3	0.453	1.3 (0.6-2.6)
2	Support peers who make un intentional errors.	114	76.0	61.4	38.6	0.358	1.4 (0.6-3.2)
3	Not blame peers for their own mistakes.	121	80.7	60.3	39.7	0.612	1.2 (0.5-3.0)
4	Cooperate with staff to resolve patient safety issues.	81	54.0	71.6	28.4	0.001*	3.1 (1.5-6.5)*
5	Willing to share information about clinical errors.	42	28.0	73.8	25.2	0.024*	2.4 (1.0-5.6)*
6	Do not hesitate to change practice habits to improve patient safety.	111	74.0	55.9	44.1	0.468	1.2 (0.7-2.3)
Error management							
7	Willing to report errors whether or not patient was harmed.	78	52.0	71.8	28.2	0.012*	3.0 (1.5-6.2)*
8	Not Fear from negative consequences associated with reporting errors	101	67.3	70.3	29.7	0.001*	4.1 (1.9-9.0)*
9	Likely to disclose an error to the faculty	112	74.7	54.5	45.5	0.037*	8.1 (3.2-20.7)*
10	Likely to disclose error to the patient	71	47.3	74.6	25.4	0.001*	3.5 (1.7-7.5)*

C I: Confidence Interval * P < 0.05

Regarding the attitude towards teaching patient safety to medical students, Table 3 showed that the majority of the participants (77.3%) agreed introducing patient safety topic in undergraduate medical schools curricula (item 1). Most participants agreed patient safety should to be a routine work of health staff (item 2) and agreed the necessity of the continuous training of staff (item 3) (90.0% & 84.7% respectively). No significant difference was detected between the two learning groups.

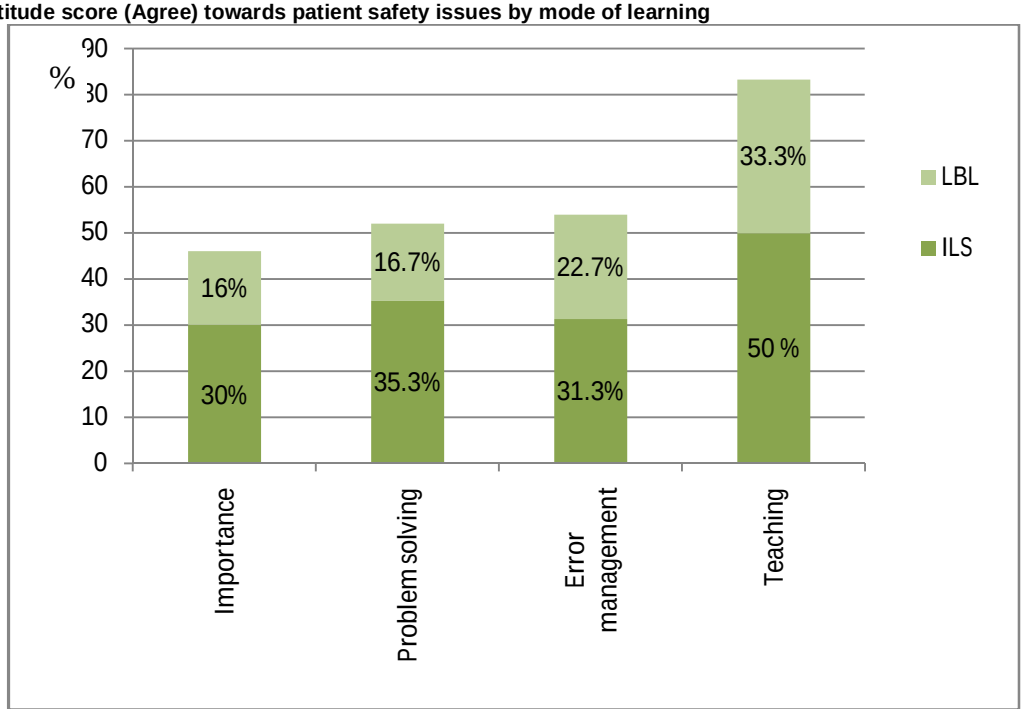
Table 3- 'Agree' attitude towards teaching patient safety issues by mode of learning

Items	Attitude " Agree"					
	Total		ILS (89) %	LBL (61) %	P	OR (95 % CI)
	N	%				
1-Teaching on patient safety in medical schools is necessary	116	77.3	62.9	37.1	0.097	1.9 (0.8-4.4)
2-patient safety should be a routine work of Health care staff	135	90.0	59.3	40.7	0.955	1.0 (0.3-3.2)
3-Continuous training of health care staff is necessary	127	84.7	60.6	39.4	0.447	1.4 (0.5-3.6)

C I: Confidence Interval

Fig 1- illustrated the participants' attitude scores towards patient safety issues: importance of the subject, problem solving, error management and teaching. The total scores were 46.0 %, 52.0 % and 54.0 % & 83.3 % respectively. The ILS group showed significantly more 'agree' attitude scores than LBL group towards the issues of problem solving (P<0.001, OR: 3.0) and error management (P <0.001, OR 2.4).

Fig 1- Attitude score (Agree) towards patient safety issues by mode of learning



Discussion

To promote and enhance the status of patient safety worldwide implementing patient safety in undergraduate medical students is encouraged and supported by World Health Organization. [(1)] The study aimed to explore the knowledge and attitude towards patient safety topic among a group of undergraduate medical students in two medical colleges with different mode of learning.

The results of this study found that, only about half of the participants rated their general knowledge good and about one fourth

got the good specific knowledge score. Knowledge could be acquired from a formal curriculum or from job training. Patient safety topic is not included as a clear subject in the undergraduate curriculums which could be a factor of participants' low self- rating of good general knowledge. However, Saudi healthcare organizations work to promote patient safety culture through patient safety committees and continuing professional education program, [9] but the activities of these committees are directed to clinical settings. This could explain the significant more good self-rating of specific knowledge of the students in the ILS group towards the practical specific items like the actions when an error made and the role of the patient safety committee than the LBL group. Students in the ILS system of learning started training in primary health care centers and other clinical settings at early stage of the curriculum. [10] However, the limited knowledge regarding patient safety is not restricted to our participants, a multi-institutional survey among Harvard medical trainees demonstrated that, knowledge levels are limited across a broad range of training level, degrees and specialties; medical students scoring was significantly lower than residents. [11] Recently, a study in UK reported that medical students had little knowledge of how to report errors and were unsure about what to do if a colleague made an error or if a patient indicated that an error had been made. [12]

Medical students' attitude towards the importance and global problem of patient safety topic is agreed by most participants, this could be attributed to the commitment of Saudi healthcare organizations to promote patient safety culture [9] that raised the topic in the medical societies. However, this rate is considered too low when compared to the agree attitude of over 90% of medical students in Hong Kong. [13] This is not in line with a national survey by Harvard school of public health where neither physicians nor the public named medical errors as one of the largest problems in health care today. [14]

However, medical errors are usually considered to be "preventable adverse medical events, the results of this study showed that only half of the participants agreed this concept which could reflect their low knowledge regarding the topic. This is not in line with the report of a survey [15] in one academic institution in Philadelphia that most physicians in training believe adverse events are preventable. Considering the human factor in making error, half of the participants agreed that most staff make errors, however minority agreed that these errors are out of staff control. This view is strengthened with their 'agree' that competent physician don't make error. They follow the traditional approach assumed that well-trained, conscientious practitioners do not make errors. This traditional attitude could be generated from lack of fundamental knowledge and inefficient training on patient safety and nature of medical errors. [16] Human error is not the only factor responsible for medical error, the vast majority of medical errors result from faulty systems and poorly designed processes versus human factor of poor practices or incompetent practitioners. [17]

Only half of the participants reported agree towards problem solving concept which could be attributed to the lack of knowledge as they self- rated. Participants didn't recognize their active role in cooperation, sharing information to solve patient safety problems however, they showed be willing to change practice habits to improve patient safety. A key aspect of a patient safety system is a culture that encourages clinicians, patients, and others to be vigilant in facilitating learning and redesigning of patient care processes. [2] This could explain the more significant 'agree' attitude of the participants in ILS towards problem solving items as it is part of their curriculum that enhance communication and team work skills. [10] The 'agree' attitude of the majority of the participants towards support peers who made unintentional mistake and not to blame them and also willing to report error whether cause harm or not to the patient and to disclose the error to the faculty could be explained by the ethical principles of our Islamic culture of forgive and peace. The Islamic concepts explanation is coincided with the results of a recent cross-sectional survey targeted general practitioners attending continuing medical education programs in Tehran (Islamic country) found that the most acceptable approach to dealing with a peer's medical error is to report it to the responsible doctor and encourage them to disclose it to the patient. [18] The biggest challenge in moving toward a safer health system is changing the

culture from one of blaming individuals for errors to one in which errors are treated not as personal failures, but as opportunities to improve the system and prevent harm. [5] The study results showed that only less than half of the participants agreed to disclose error to the patient and agreed the role of patients in safety control. Culture may have a great role in this attitude, in Arab countries; patients are told only the good news about their disease. However, recent study on the attendants of outpatient tertiary care in Saudi Arabia showed that most participants preferred to be informed by medical error. [19] The need for full disclosure of harmful medical errors is driven by both ethics and patient safety concerns," doctors and nurses are obliged to disclose medical errors, partly because it is in the patient's best interest and partly because it is the health care providers' duty to the patients. [20]

Patient safety education is an increasingly important component of the medical school curricula. One of the main findings arising from this study was the agreeability of the majority of both groups towards teaching patient safety on the level of undergraduate curriculum, continuous training of health care staff and implementing patient safety within the routine work of health care staff. Participants' recognition of their own knowledge gap related to patient safety could motivate and enhance the implementation of a formal teaching program in the curriculum. Learning how to manage errors effectively should enable future physicians to understand the impact of human limitations on clinical practice, improve patient care, reduce health care burdens, and engage in dynamic as opposed to defensive practice. [21] In contrast, a lack of formal teaching may result in unsatisfactory error reporting or an unwillingness to adopt safety practices. [22] Education of clinicians about quality and safety is best undertaken in work place, when training and education of health care workers is divorced from patients and the places they are treated, key learning areas such as complexity of care, communication, team work and patient engagement lose context and relevance. [23] The more significant agree of the ILS group than LBL group could be a sequence to their mode of learning.

This study had several limitations. First, the data was self- reported and therefore subject to recall bias. We did not obtain background data for the participants which may have added important information regarding the study objectives. It is important to note that our participants were limited to a single year of undergraduate medical students which was not representative to all medical students. Additional studies are necessary to incorporate sample representative to medical students in all levels.

Conclusions and Recommendations

In conclusion, the study revealed unsatisfied rate of the participants who self-rated 'good' for their general and specific knowledge on patient safety. However, participants in the ILS group showed significant more self- rating of practical specific knowledge items than the LBL group.

Most participants recognized the importance of patient safety topic and less recognition of the role of patient in preventing error. They considered competent physician don't make errors. Participants in the ILS group showed significant more 'agree' attitude towards problem solving and error management culture issues. Majority of the participants showed willing to change practice habits to improve patient safety.

The results of the study recommended strongly the need of effective structured educational interventions target undergraduate medical students. The program should educate patient safety concepts, basic knowledge and basic skills of problem solving and error management with focusing on the role of physician and role of patient.

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