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Learning of Patient Safety in Health Professions Education

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Abstract

The awareness of patient safety became one of the emerging topics over the last two decades. However, in medical curricula, the knowledge of its principles is still facing challenges concerning its proper timing and the suitable methods of instruction. Many studies have shown several trials dealing with the introduction, implementation, and evaluation of patient safety courses in health professions institutions. Moreover, the training of healthcare professionals focuses on the clinical and curative competencies rather than preventive skills. Therefore, the knowledge about patient safety is a necessity for all graduates in health professions careers. Thus the World Health Organization (WHO) have developed a curriculum guide for patient safety to help health professions institutions integrating patient safety principles in their curricula. This chapter will focus on the educational aspects of patient safety topics in health professions education.

Keywords: patient safety, curriculum, healthcare professionals, instructional methods, training

1. Introduction

Healthcare has been improved and developed to cope with the rapid evolution of knowledge. Hospitals, resources, and drugs are also continuously enhanced. Still, there are risks of the human errors which are always inevitable. Safety measures are now included in modern industries to overcome these errors. As the patients are the main customers of the health care system, patient safety is an important issue to maintain developing this system. The essential step towards lowering errors and harms to the patients is educating healthcare professionals about patient safety.

There are many involuntary but preventable adverse events that affect patients and may lead to temporary or permanent harms, including increased admission duration, or even causing the death of patients. These harms are most probably related to health care management system failure regardless of the competencies of the healthcare professionals. They also affect the general people and cause economic problem in both developed and developing countries. These events include diagnostic errors, medication errors, postoperative infections and complications, miscommunication, lack of personal and other identities. The problem may be higher in the developing countries because of the poorer infrastructure and lack of financial resources compared to developed countries [1, 2]. We should know that 80% of these events are system driven rather than individual mistakes. So, in order to reduce these adverse events, there is a need to implement a program incorporated in the healthcare system. This program requires the individual commitment towards patient safety rather than financial resources. We need to foster the culture of patient safety and this in turn will reduce the occurrence and impact of harms.

Patient safety is about reducing the risk of unintentional but preventable harm related to health care system to an acceptable minimum. Patient safety is an attribute of the health care system as well as its relation to the physician skills. To develop a curriculum for patient safety, we must consider the complexity of healthcare system and the involvement of many individuals in the delivery of health services. Nowadays, patient safety is considered as a discipline that applies the safety measures and increases the effectiveness of health care system [3].

Necessary steps are to be followed while developing patient safety curriculum. Identification of the problem and the rationale for implementing such curricula is the first step. Then, assessing the needs of healthcare professionals and formulating objectives and selecting the appropriate content and instruction methods according to these needs are the next steps. Evaluating the implemented curriculum is then conducted for improving the process and taking actions and decisions regarding the other steps.

2. Problem and rationale for implementing patient safety curriculum

Hospitalized patients may be affected by adverse effects. Meanwhile, patients on drugs could be harmed from side effects. Health professions education students should know how to deal with these harms. They should also know the outcomes of miscommunication [4]. Therefore, patient safety is one of human rights issues and a major health problem [1]. In the developed countries one of 10 hospitalized patients is harmed while in the developing countries the rate is higher than that in the industrial countries. A high percentage of these adverse events, reaches 83%, were preventable, while 30% caused the death of the patient [1]. The cost of additional hospitalization, legal actions, infection acquired in hospitals, and disabilities, is estimated in some countries between US \$ 6 billion and US \$ 29 billion in a year. So, there is a growing attention to the income benefits from improving patient safety [5]. Additionally, international accreditation guidelines and standards recommend teaching and learning skills related to patient safety [6].

As there are many adverse events caused by unfollowing the patient safety measures, training and supervision of the clinical staff, establishing clear guidelines and improving the record keeping are stated as priorities within the prevention strategies. Other causes, as low number of clinical staff and low resources are reported of low priorities [1].

Studies have identified that teaching patient safety to undergraduate students is a necessity, still, there is no either consensus on how to deliver it nor agreed upon priority areas [7, 8]. Even students themselves rated patient safety as important topic that should be included in their curricula [9].

Skilled health care professionals, who are using patient safety principles by intuitive practice, could not transfer it to practice. Meanwhile, the challenges of patient safety principles induction in curricula are mainly that non-academics or who in administrative responsibilities probably are not skilled in teaching and learning such new principles [9, 10].

So, the need of informed, skilled staff constitutes a major problem in delivering such courses. They should have the preplanned changes in their teaching to cope with the current recommendations of teaching patient safety. Another factor that may contribute to the problem is the current deficiency of performance and knowledge of the healthcare professionals regarding patient safety. Thus educational intervention is the main solution to this problem.

3. Healthcare professional needs

Medical educators are interested in introducing patient safety in medical programs, on the other side, there is a little training of the undergraduates' students regarding this topic [11].

Inadequate training and the failure of the clinicians and the assistant staff to follow guidelines and protocols contributed to the adverse events [1]. Students' needs should be assessed concerning the topics to be included in patient safety curricula. The goal-directed patient safety curriculum leads to an opened culture and improving the satisfaction of both patients and students [12].

Many factors contributed to this deficiency of training of the healthcare professionals such as: low recognition by the health professions institutions that integrating the principles of the patient safety in their curriculum is important, lack of familiarity and reluctance of the educators to teach these principles, emphasis of educating treatment rather than prevention of the disease and the perceived role of the teachers as only information provider or an expert [13].

Moreover, educational interventions for the healthcare students proved to enhance the prescription of the medications and the adherence to the guidelines by the physicians [14].

The target learners' needs differ from one context to another. Previous training and experiences relevant to curriculum, existing proficiency and perceived deficiency of the learners should be assessed to adjust the suitable course. The preferences regarding different learning strategies and resources available to the learners help to conduct a learner-oriented course.

Formulating the rationale and assessing the needs of the healthcare professionals are essential steps for formulating objectives and identification of the course content.

4. Formulation of objectives and identification of the content of patient safety curriculum

The main addressed areas into the content of the patient safety include; good communication skills, development of team work skills, improving skills of managing risks and solving problems while a harm was detected for the patient [11].

4.1. Models of patient safety curriculum

I. The Australian Patient Safety Education Framework

It is a model for learning patient safety includes different seven areas with 22 topics and describes knowledge and performance that are required from each personal in the health system in order to provide safe care. Each objective is divided into four levels. Each level includes a category according to the position or the responsibility of each individual.

The seven areas are as follow:

- **Communicate effectively:** patients and their carers are among the health team. They are considered as a second pair of eyes for a doctor. Communicating effectively will reduce the risk for patients. This area includes involvement of both patients and their carers in their health care, communicating risk, obtaining consent, being honest, and being knowledgeable and sensitive to cultural difference.
- **Using evidence:** in this area, health care workers should know and apply principles of evidence-based practice in their work and use information technology.
- **Adverse events:** we cannot reduce errors unless we know causes and nature of errors. Most adverse events are system failure determined rather than professional carelessness or misconduct. In this area individuals should learn how to record errors, to perform quality measure, and to improve performance, managing risks and complains.
- **Working safely:** this area is about teamwork and knowing roles and responsibilities within the healthcare team. It includes leadership, understanding complex organization, human factor, continuity of care, and managing fatigue and stress.
- **Being ethical:** health care workers should know and apply ethical codes of practice and maintain their fitness to practice.
- **Learning and teaching:** health care information expands rapidly and continuously, so health care workers need to continuously update their knowledge and skills, and this requires learning and teaching in the workplace.
- **Specific issues:** this area is to ensure that the right treatment is delivered to the right patient, and to eliminate wrong procedure and site, and to medicate safely [3].

II. The Canadian Framework (The safety competencies – Enhancing patient safety across the health professions)

This framework is an inter-professional, and it includes six domains which are as follow: contribute to a culture of patient safety; Work in teams for patient safety; Communicate effectively for patient safety; Manage safety risks; Optimize human and environmental factors; Recognize, respond to and disclose adverse events [2]. Each domain contains the needed knowledge, skills, and attitude.

III. Scottish Patient Safety Fellowship

It includes six topics and general aims to be fulfilled.

1. Improvement theory, methods and tools

a. Theory of profound knowledge b. Model for improvement c. Quality improvement as core business strategy d. Planned experimentation.

2. Leading clinician through change.

a. From stable delivery model to adaptability and growth within an organization. b. Principles and difference of adaptive versus technical changes. c. Building a compelling case for change. d. Developing a shared vision. e. Sponsorship, champions, alignment and feedback f. compacts

3. Measurement for improvement.

a. Data, variation, reporting b. Measure for improvement versus research and judgment

4. Communication, presentations and marketing skills.

5. Reliability theory, system, design for safety.

6. Working with people, motivation, team building [15].

IV. WHO patient safety curriculum guide

World Health Organization provided a Multi-Professions Edition of Patient Safety Curriculum Guide to assist the health professions institutions in implementing the curriculum of patient safety. The guide includes some suggested topics, teaching, and evaluation methods for preparing students who have the knowledge, skills, and attitude for improving their clinical practice and patient safety. Each institution after performing a needs assessment, could integrate these topics into its curriculum. A medical guide was produced by the WHO in 2009; the multi-professional edition was developed after consulting dentists, nurses, midwives, and pharmacists. The guide is divided into two sections: part A: Teacher Guide; and part B: patient Safety Topics. The Teacher Guide helps to build the capacity of the educators. It offers information about the efficient instructional methods to teach the topics and suggested techniques for integrating the module into the existing curriculum. The patient safety topics are suggested to be implemented as parts or as a whole [4].

The guide covers 11 topics and includes 16 subtopics which were selected from the Australian framework. The 11 WHO topics are shown in **Table 1**.

The listed topics in WHO guide

Topic 1: what is patient safety?

Topic 2: what are human factors and why is it important to patient safety?

Topic 3: understanding systems and the impact of complexity on patient care

Topic 4: being an effective team player

Topic 5: understanding and learning from errors

Topic 6: understanding and managing clinical risk

Topic 7: introduction to quality improvement methods

Topic 8: engaging with patients and carers

Topic 9: minimizing infection through improved infection control

Topic 10: patient safety and invasive procedures

Topic 11: improving medication safety

Table 1. The eleven topics presented in the WHO patient safety curriculum guide.

1. Topic 1: what is patient safety?

This topic presents the patient safety principles and concepts as a response to the requirement of healthcare professionals aiming to incorporate these principles and concepts into everyday practice [4].

2. Topic 2: what is human factor and why it is important to patient?

Students need to recognize how human factor can be used to decrease adverse events and errors by detecting how and why systems break down and how and why human beings miscommunicate. Using a human factor method, the human-system interface can be enhanced by providing systems and procedures which are better designed. This often involves improving communication, simplifying processes, and standardizing procedures [4].

3. Topic 3: understanding systems and the impact of complexity on patient care

The concept that a healthcare system is made up of different units that provide multiple services and practices should be introduced all healthcare workers. The complexity of health system increases by the existence of relationships between health care providers, patients and their career, supporting staff, administration, and community members. This topic introduce the concept of complex organization to students by using a system approach [4].

4. Topic 4: being an effective team player

This topic includes the fundamental knowledge required to be an effective team member. The importance of effective multidisciplinary teams for improving care and reducing errors. Students need to understand the culture of their workplace and how it influences team dynamics and functioning [3].

5. Topic 5: understanding the learning from errors

The poorly designed systems have contributed to making errors. Students should understand and appreciate happening of these errors to prevent their occurrence in the future. This systems-based approach and knowing the factors contributing to the cause of the errors is better than blaming individuals for their errors [3].

6. Topic 6: understanding and managing clinical risk

Risk management is a process of recognizing, dealing with and preventing risks. Clinical risk management is recognizing the events that could harm the patients and ways to prevent them from occurring again. Information that are emerged form patients' complaints, incidents, legal cases related to health care, can be used to set strategies for clinical risk management [2].

7. Topic 7: introduction to quality improvement methods

Quality management methods have been introduced from industries to healthcare. Students should be able to identify problems, measure the problem, develop strategies to fix this problem, and test whether these strategies worked or not. Knowing how every step in health care process is incorporated into the system is essential [4].

8. Topic 8: engaging with patients and carer

Students should understand and appreciate the role of the patients and their carers in the diagnosis and compliance with treatment. The outcomes of the treatment and the prognosis can be enhanced and the adverse effects could be reduced by the good patient-doctor relationship and communication.

9. Topic 9: minimizing infection through improved infection control

Hospital-acquired infection and healthcare associated infection are major causes of death and disability worldwide. Patients with invasive procedures are particularly predisposed to hospital-acquired infections. How to apply preventative measures and guidelines is crucial to be learned.

10. Topic 10: patient safety and invasive procedures

Miscommunication between healthcare providers before carrying out surgeries leads to perform wrong procedures, in the wrong sites for wrong patients. This is the main source of errors pre operatively.

11. Topic 11: improving medication safety

WHO has defined adverse drug reaction as any harmful response to medication, which is unintended and occurs at amounts used for prophylaxis, analysis or treatment. The main causes of medication errors are induced by low knowledge about the patients or the medication or calculation errors.

Concerning the learning outcomes in patient safety curricula, they should be competency-based and directly linked to the content [9].

To ensure patient safety, the future physician must be prepared to know potential sources of errors and to recognize their own susceptibilities to error. An elective course in the open disclosure of the health care providers, which is communicating with the patients the errors and how it happened, can be introduced. This training of disclosure may decrease the harm of the future patients [16].

The course of patient safety necessities to be more focused. Writing objectives that are specific to the learners, measurable and relevant to their needs, help to focus the content course and essential for planning the appropriate instructional methods of conducting the course.

5. Instructional methods and implementation of patient safety education

Patient safety as a subject is new, generic, multidisciplinary and highly contextual course. It should be based on experiences, and learners should have the opportunity to reflect on their practices.

- Integrated with the existing curriculum.

Although patient safety is a new subject, it has many facets in the existing curriculum and links with basic and clinical sciences. Almost all healthcare curricula have restricted space and time for adding new courses. It is a good approach to review the existing curriculum to identify where to integrate patient safety topics. Thus, it could be vertically integrated into the existing curriculum. Topics of patient safety are generic and could be applied to any specialty. In the existing curriculum, we can find generic areas that are suitable to include patient safety principles e.g. communication skills, ethics, professionalism...etc.

Patient safety is related to all healthcare professionals' clinical practice so it should not be studied in isolation. Topics of patient safety curriculum were designed to be easily integrated into the existing medical teaching, for example, anatomy, pediatric, physiology, etc. Incorporation of all topics is essential for the development of safe health care providers [13]. Spiral approach is recommended while implementing patient safety curriculum. The curriculum should be spread over the undergraduate level program [17].

- Multi-professional/ Multidisciplinary.

The WHO Multi-professional Patient Safety Curriculum Guide (2011) was established responding to the need for providing harmless care. Being a safe healthcare provider requires different competencies that cover specific knowledge, skills, and attitude. Health care workers should collaborate together to provide safe service, to guarantee that patient safety learning is delivered in an incorporated way which should be single coordinated, system based, in a team dependent approach, and includes different specialties. Patient safety curriculum includes basic, behavioral and clinical sciences. It is a multi-professional subject needs the repeated application to the workplace settings. It has been reported that

medical students are positive about learning with other students who participated in clerkships of different specialties

- Experiential/ Provides opportunities for application and reflection

The course may include interactive lectures, e.g. problems with inappropriate supervision by a physician, to highlight the relation between theory and practice. Then the students had to reflect on incidents concerning patient safety based on their own personal experience and to complete an incident report card for each of these incidents. The course may also include presentations arranged by the students, which are followed by a 10-minute discussion for each presentation. Assessment of the students includes content, structure and presentation techniques [10].

Most courses in patient safety were introduced by lecturing and discussion which have short terms positive changes but the transfer of knowledge to the practice is low [9]. Learning patient safety could be enhanced by reflection, feedback, portfolio, and critical incident analysis, case discussions with senior clinicians, simulation environments and workshops. So, patient safety courses based on personal experiences and reflections enable students to transfer knowledge into practice and have a high impact on future career [10]. Some studies reveal that students emphasized active learning and experiential activities to reinforce safety principles [18].

- Contextual.

Patient safety is highly contextual, so, students should have adequate professional practices to learn patient safety, in this regard patient safety is best taught once students involved in the health services. However, some behavioral sciences-based subjects could be learned early such as; what is patient safety, what are human factors, and understanding systems modules. Students need to continuously reflect on their practices and apply the learned knowledge and performance to be a safer provider of health care. Using critical cards incidents to help students reflecting on their personal experiences seems to be useful in improving the transfer of knowledge [10].

5.1. Who should teach patient safety?

Advocates of patient safety are usually from administrative nonacademic staff. To integrate patient safety throughout the curriculum we need a large number of academic teachers who often are not familiar with concepts and principles of patient safety. Some of them may practice patient safety principles without being aware of such knowledge. Academic clinicians, administrators, nurses, engineers, behavioral scientists are all involved in teaching patient safety. They should have capacity building through training workshops and seminars. Some schools trained healthcare administrators to deliver patient safety curriculum for undergraduates' students [9].

5.2. Limitations

From the point of view of the tutors who were involved in the implementation of the patient safety curriculum, some recommendations emerged. For example, training of the tutors, and the participation of large number staff in implementation, which will reduce the load on one or two

tutors, are essential. The local support for implementation is also required for allocating more time and resources. They also recommended full integration of the curriculum in the undergraduate years [19]. Cost issues are limited to the time of the teachers and the students when the materials are available and the curriculum topics are provided as in the WHO guide [20].

6. Evaluation and student assessment methods

Evaluating the course content and the process of implementation is an opportunity for further improvement and reforming. Evaluation includes evaluation of the program as well as students' assessment.

6.1. Evaluation approaches

Evaluation of any program is variable and has a direct relationship to the intended learning outcomes (ILOs) of the course. It takes various forms, may be either formative or summative, or even both as conducted in WHO patient safety curriculum guide. In the latter, each school selects the patient safety topics in the Curriculum Guide and has the flexibility to do that with plans on how to incorporate these topics in their existing curricula. Then, formative evaluation is conducted where assess the medical schools' different experiences in using the WHO curriculum guide. The aim of this evaluation was to provide feedback to WHO stakeholders and concerned bodies regarding capacity building, implementation, with suggestions for improvement. This also will help other schools who want to use this guide in the future. On the other hand, in summative evaluation, the scope was to the evaluation of the effectiveness of the curriculum guide to develop patient safety curriculum. Retrospective data emerged from conducted interview while prospective data excluded from pre-and-post surveys of students receiving the courses [4].

Overall, the main aim of the conducted evaluative studies of the Patient Safety Curriculum Guide is to assess its effectiveness for teaching patient safety to both undergraduate and graduate medical students [3]. The results of these evaluative studies will guide others when planning for their curriculum guides and promotes in depth background of successful methods used in introducing patient safety to curricula [10].

6.2. Evaluation steps

Evaluation of the designed course is a necessity. Evaluation involves three main steps, developing an evaluation plan; collecting and analyzing information; disseminating the findings to appropriate stakeholders action [3].

6.2.1. Step 1: the evaluation plan

In the evaluation plan, it is the framework for the process. So, you should first identify what's to be evaluated, who are your stakeholders, the purpose of the evaluation which is closely related to the evaluation questions.

Identification of users of these evaluations is an important step in the evaluation plan. Participants in patient safety courses have sake to provide their own views and participate in the assessment process concerning their own performance and the designed curriculum. These evaluations can provide feedback and be a source of motivation for continuous improvement for learners, faculty, and curriculum developers. An Example for this was the evaluation study of the WHO patient safety curriculum guide, its main aim was assessing the effectiveness of using the guide in teaching patient safety for postgraduate and graduate medical students. Concerning the feedback from this evaluation, it was utilized to guide through future versions of the Curriculum Guide and enhance the understanding of the successful methods of introducing patient safety to curricula [21].

The evaluation results should be publicized as this would be interesting to educators from other institutions that are willing to introduce patient safety principles in their curricula.

After identifying users, we should identify uses of the evaluation, which are generic and specific ones. The generic uses refer to whether the evaluation is used to appraise the performance of individuals, the performance of the entire program, or both. The assessment of learners is closely related to whether they have achieved the cognitive, affective, or psychomotor or competency objectives of a curriculum or not. Meanwhile, it refers to whether an evaluation is used for formative purposes, for summative ones or for both purposes as discussed before. One more thing that should be considered is the specific needs of different users (stakeholders) and the specific ways in which they will put the evaluation to use [21]. Specific uses for evaluation results might include the following: feedback on individual learners' performance to assign grades or detect mastery in certain skills. Feedback on and improvement of program performance is also included in specific uses as the evaluation results could be used to identify parts of the curriculum that are effective and parts that are in need of improvement. Evaluation results may also provide suggestions about how parts of the curriculum could be improved [21].

Identifying resources that will be used, followed by choosing measurement methods, and constructing instruments were also included in evaluation plan.

6.2.2. Step 2: collecting and analyzing data

Data collection methods that were used to evaluate the patient safety curriculum guide ranged from simple methods as getting students' perception about the course after receiving a patient safety teaching, and complex methods such as having faculty to review the conducted whole curriculum. These complex methods involve a varieties of tools such as surveys, interviews, and focus group with students, faculty or administration, observation and other methods. Reported data collection tools by previous studies either were face to face or telephone interviews with key stakeholders: teaching staff, and executives at the involved medical schools. Students' surveys regarding patient safety topics were collected before and after teaching patient safety curricula. The two methods were used to get different data. The pre-teaching ones to get information about students' perceptions and attitude towards patient safety and to test their knowledge of patient safety facts and actions. Meanwhile, the post teaching collected data measures two domains the effectiveness of the topics and the effectiveness of

teaching; through measuring the change of students' perception, knowledge and attitude towards patient safety taught topics after completing the course [4].

Concerning the timing of data collection, it is better to start as early as possible. It is better to start from the first week of teaching and end within three weeks up to two months after completion of the course. This depends on the availability of faculty staff and executives to complete the interviews and focus groups [4].

The survey questions were grouped in four domains as reported in many studies: patient safety knowledge; Healthcare system safety; Personal influence over safety; Personal attitude about safety. The WHO staff has developed questions of patient safety knowledge those were reviewed by the developers of the patient safety curriculum guide [3].

The contents of the interview and students' surveys were developed to collect data for answering four research questions defined for evaluation. These questions proposed for WHO curriculum evaluation guide as follow:

1. Does the curriculum guide contains the necessary as well as sufficient information and topics to allow its effective use in undergraduate training of healthcare professionals?
2. What is the impact upon students' learning of the inclusion of patient safety teaching in the curriculum?
3. In what ways can this curriculum guide be used to support the widespread implementation of explicit patient safety education globally?
4. How could the curriculum guide be modified in the future to best support teaching of patient safety to students in different environments? [3]

One of the reported data collection tools is reflection. Self-reflection has an important role in evaluation and represented a chief activity for a medical or clinical educator. For a reflection to be effective, it may include: experience of teaching or feedback received from others; description of how you felt as a learner and whether you were surprised by those feelings; re-evaluating your experience. Self-reflection will enhance the development of new perspectives in terms of improving the teaching or learning of patient safety approaches and procedures [4].

It is worth mentioning that some studies used a mixed method triangulation design to evaluate their patient safety course. A Course Evaluation Questionnaire (CEQ) completed by participants to assess the overall perceptions and effects of the course and data from incident report cards were used as quantitative measures. Focus groups with participants of the course were used as qualitative tools to get in depth information of the course effect.

During the focus groups, students were asked questions related to their experience with the course, what they believed they had learnt from it, whether they had experienced situations in which patient safety was compromised, if they felt more capable to act safely in their daily practice, and how this feeling was influenced by their environment [10, 22].

Data analysis: data collection may be using any of the previously mentioned tools, may also involve others. They may be just quantitative, qualitative or a combination of both as the case in mixed methods approach.

In either case, there are three interconnected elements to consider in terms of data analysis [23]:

- Data display; which refers to organizing information collected in a meaningful way;
- Data reduction; which means simplifying and in other words transforming the raw information into a more workable or usable form;
- Conclusion drawing; which is closely related to constructing meaning from the data, with respect to the evaluation question(s).

So, by this time, we have developed our evaluation plan, collected our data and analyzed their results. Here comes the stage of disseminating these results to the relevant bodies.

6.2.3. Step 3: disseminating findings and taking action

This is a crucial step that should not be overlooked. In some cases the conclusions and recommendations of evaluations are not acted upon, and as a consequence this will lead that the reached valuable information is not feed-backed in a meaningful way to all relevant stakeholders. In some instances, the results of evaluation are concerned with the quality of patient safety teaching, so these results (e.g. from student questionnaires, peer observed teaching sessions) must be relayed to and discussed not only with administration, but also with the teachers. The key here in education is to provide an effective constructive feedback. Brinko provided an excellent review of best practice on the process of giving feedback for students or colleagues. It is important that any feedback is received in a way that encourages growth or improvement of learners. Meanwhile, If the evaluation focuses on the effectiveness of the patient safety curriculum, any conclusions and recommendations for improvement must be communicated to all who had a share in implementing the curriculum (e.g. at faculty, teacher and student levels).

The dissemination step may be in the form of reports or concerned bodies meetings and its format must be meaningful and relevant. Effective communication of evaluation outcomes, findings and recommendations is a key catalyst for improvements in patient safety teaching and curriculum design [24].

6.3. Used evaluation models

One of the reported evaluation models was evaluation of patient safety initiative using the CIPP which stands for (Context, Input, Process, and Product) model. The framework emphasizes multiple stakeholders' interests (e.g. patients, providers, researchers). In this context, many methods fundamental to formative evaluations were used, including use of logic models to frame the evaluation, use of interview and focus group techniques to collect data, triangulation of results from multiple stakeholders, and feedback about the findings to help to strengthen the program.

In CIPP framework, evaluation emphasizes on documenting what happens in a program including the contextual factors that influenced what occurred. The evaluation shifts its focus according to changes occurring in the program over time, and its intention is to influence

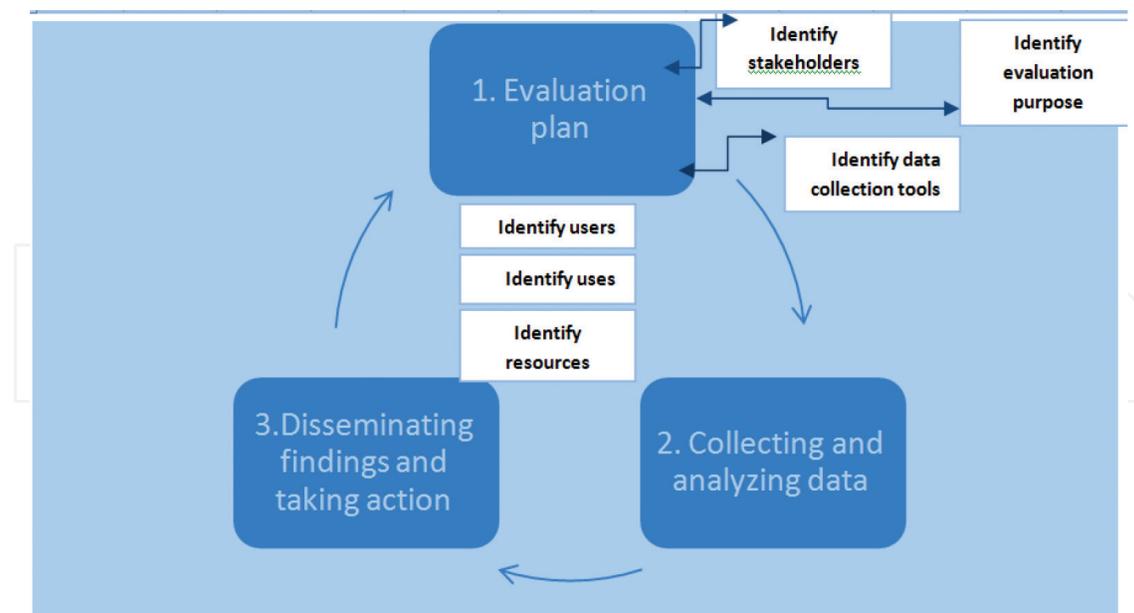


Figure 1. Diagram of the steps of the curriculum guide evaluation.

these changes. In this model, evaluation takes several steps, in the first evaluation year, the context and input aspects of the CIPP model are the main focus as well as early experiences in implementing the initiative. The context and input portions of the evaluation were used to examine the strategic aspects of the initiative, which are the circumstances leading to the development of the patient safety initiative (context) and, the strategies followed to carry out the initiative (input). Thereafter, in later evaluation years, the focus is directed towards the process evaluation addressing the operational aspects of carrying out the activities involved, taking into consideration how these activities contributed or may be contributing to the main goal of improving patient safety curricula. Meanwhile, there is a regular update on the information on context and input to assess how changes in the strategic aspects of the initiative had effect. Finally, the last step is the product evaluation, this is performed by measuring the effects of the patient safety initiative on various stakeholder groups [25].

The steps of the evaluation process for WHO curriculum guide are summarized in the below diagram. Three steps of evaluation are represented: first, evaluation plan which is followed by the second step which is collecting and analyzing data, then the third step of disseminating findings and taking actions (**Figure 1**).

7. The conceptual framework for patient safety curriculum development

In this chapter, we propose some essential steps while developing a curriculum in patient safety for healthcare professionals. In these steps, the developed curriculum is best tailored to the learners' needs.

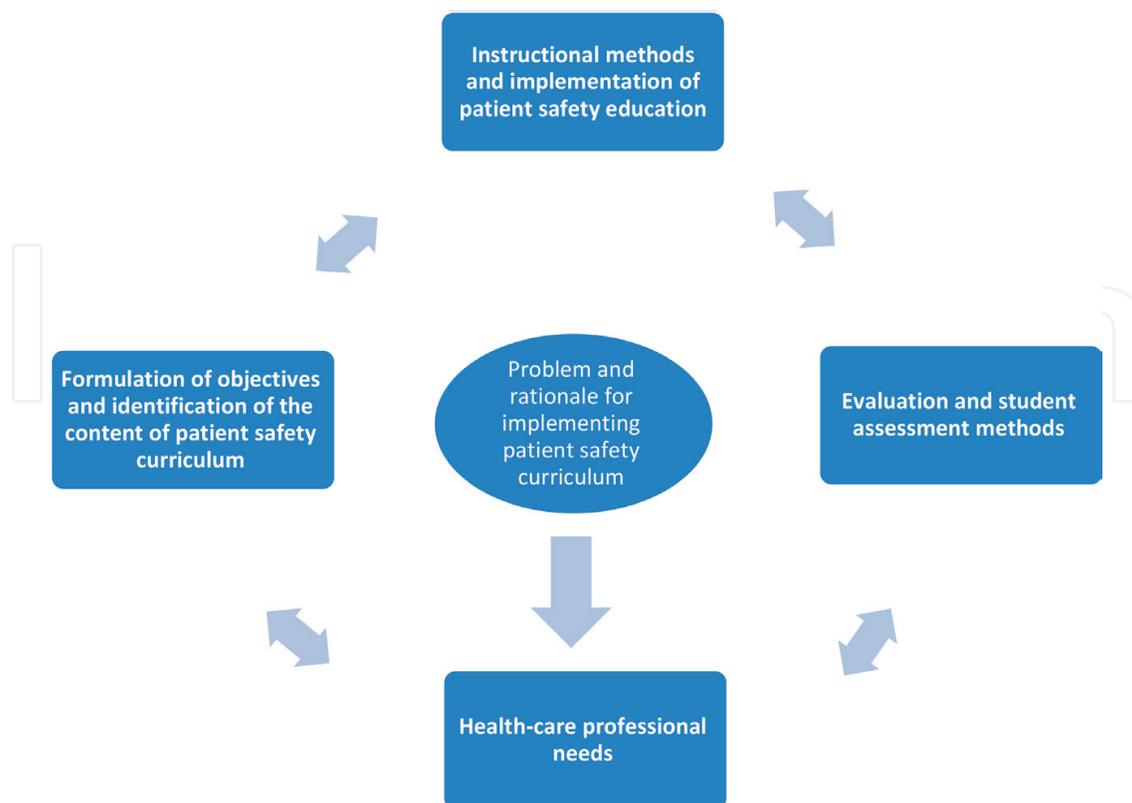


Figure 2. The conceptual framework for patient safety curriculum development.

The topics are selected according to the recourses available and it is better integrated into the whole undergraduate curriculum. The objectives are well-defined, competency-based and directly related to the selected content. The instruction should be practice-based and student-centered. Following this systematic approach maximize the role of the evaluation of students and curriculum in judging the merits of the implemented curriculum. These steps are illustrated in the conceptual framework (**Figure 2**).

8. Conclusion

In brief, patient safety is now of international interest and healthcare providers need to learn its principles. Meanwhile, educational strategies involve learning by doing and reflections are essential to bridge the gap between theory and practice. Therefore, patient safety curriculum should be integrated with all levels and years of education. It should be also multidisciplinary and multi-professional. Students should be involved in the health services and have the opportunity to apply the learnt knowledge and performance and reflect on their practices. The outcomes and impact of the implemented curriculum should be continuously evaluated to ensure that skills of the health professionals regarding keeping a safe environment, for both them and the patients, are acquired and such skills are recognized as other clinical and professional skills. All this will increase the effectiveness of health care system and decrease

the occurrence of adverse events associated with health services. Thus, teaching patient safety is mandatory.

Vignette 1.

Mr. Hassan is 75 years old male. He suffered from hypertension several years ago. He began to complain of numbness of his left jaw 2 days ago. He went to a large hospital, an intern who is still under training performed neurological examination and said he is neurologically free, and he did not record his main complaint. He decided to go to a private clinic, the doctor measured his blood pressure which was elevated and prescribed him drugs for hypertension and ignored his main complaint.

Two days later, Mr. Hassan's condition deteriorated, his speech became sluggish and he became delirious and unable to stand steadily, later he became unconscious. Then, he arrived to the emergency and a CT was performed which revealed a cerebral hemorrhage.

Vignette 2.

Mr. Ali is 60 years old male, he is diabetic, he had Hyperglycemic coma and transferred to the emergency department. Doctor A examined him and wrote down the exact medication and gave the prescription to the nurse. She was on the last minutes of her shift after 12 hours work time. She gave Mr. Ali the proper medication, and then she left the workplace without informing her teammate. Another nurse saw the doctor's note and gave Mr. Ali the same medication again. Few minutes later, Mr. Ali began to sweat and he developed tremors and tachycardia. Then he became drowsy with respiratory distress.

Vignette 3.

Mrs. Samah is 45 years old female. She underwent cholecystectomy. Few weeks after operation, she felt abdominal pain and she went to another doctor who diagnosed her condition as gastroenteritis and prescribed her antibiotics and analgesics. Her condition worsened and she felt severe pain in her abdomen and when she arrived to the emergency she was diagnosed as having acute abdomen. The ultrasound revealed that a part of the intestine was sutured with the previous surgical wound, effusion and adhesion were developed, and the patient had to undergo another operation.

Conflict of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the chapter.

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