

Mobile Assisted Nurses' Education toward Improving Functional Ability for Patient's with Traumatic Brain Injury

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Abstract

Background: Traumatic brain injury (TBI) consider a one of the most serious injury type that can cause several effects on individual long life and occurs when an external force object affect the head by any cause that produce brain injury. Education through mobile can supports a wide range of educational practices in formal education settings as well as in clinical environments and one of the latest educational methods. **Aim:** The aim of the current study to determine effect of using mobile assisted nurses' education toward improving functional ability for patients with traumatic brain injury through the following: 1. Assess nurses' knowledge and practice pre and post using mobile assisted nurses' education. 2. Design educational materials for nurses toward improving functional ability for patients with traumatic brain injury. 3. Assess nurses' opinions on the use of mobile in achieving learning objectives. **Design:** Quiz experimental design was used to achieve the aim of the current study. **Setting:** The study was conducted at emergency department and emergency intensive care unit, EL-Hussein University Hospital. **Subject:** A convenient sample of 40 nurse who are work in emergency department and emergency intensive care unit, EL-Hussein University Hospital. **Tools:** Four tools were used to collect data include: Tool .I: Nurse's demographic characteristics data. Tool II: Nurse's knowledge assessment sheet. Tool III: Observational checklist and Tool. IV: Mobile assisted nurse's education assessment. **Results:** Present study revealed that nurses' knowledge and practice was statistically significant improved post using mobile assisted nurse's education at $p\text{-value} \leq 0.05$. Also study indicates that, a high percentage (53.0%) of nurse's opinion toward mobile education. **Conclusion:** The findings of this study concluded that, there are lacking of nurses knowledge and practice toward improving functional ability of patient with TBI, so using of mobile for nurses education consider is an important aspect in improving nurse's knowledge and practice. **Recommendations:** Based on the results of the current study the following recommendations are suggested: - 1. Designing educational guidelines for nurses about nursing care of TBI patients, 2. Continuous feed nurses with essential updated information to improve their knowledge, practice and professionalism and 3. Integrate technology with education for keeping them uptodate

Keywords: Functional ability, mobile assisted nurse's education, traumatic brain injury

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I. Introduction

Traumatic brain injury (TBI) consider a one of the most serious injury type that can cause negative effect on individual long life and occurs when an external force object affect the head by any cause that produce brain injury. The TBI classifications depend on severity, and mechanism which includes closed or open head injury. TBI usually associated with damage can occur in soft tissue or disorders to another head structures such as the scalp and skull. As well as TBI can result in a lot of problems which can cause physical and emotional affect for both the individual and their family, also can cause cognitive, social and behavioral symptoms (Centers for Disease Control and Prevention (CDC), 2019). Also TBI can cause temporarily or permanent damage to brain tissue, the most common causes of TBI are; motor car accident and transportation, sport injury, falling from highest and violence (Thornton & Carmody, 2009)

The clinical manifestations of TBI may be localized or diffused, so the soft part of the brain tissue that can be affected. According to severity of injury the signs and symptoms are classified, if the patient had severe injury suffer from loss of conscious level. The patient sometimes remains conscious if mild injury may lose his/her consciousness for a few seconds or minutes. The signs and symptoms of mild TBI include headache can't be relieved, vomiting, nausea, loss of physical mobility and lack of coordination, dizziness, difficulty balancing, blurring vision, problem with hearing, bad taste, fatigue or lethargy, and changes in sleep patterns. Cognitive changes and emotional symptoms, confusion, memory changes, decrease concentration, attention, or thinking. If the patient with severe injury complaining of severe continuous headache, persistent vomiting, inability to

stand, walk and move, inability to speech or slurred speech and also after acute phase patient may have physical, social, psychological, and occupational problems (**Parikh, Koch & Narayan, 2007**).

There are several stages for patient with TBI to receive management; prehospital management, emergency room management, conservative and operating room management. 1. Prehospital management: the major aim of this stage is a patient life saving through avoiding hypoxia and hypotension which can result in brain damage, if the paramedics trained well, many complications can be avoided. 2. Emergency unit management: assess level of consciousness using Glasgow Coma Scale [GCS], maintain and secure patent air way, providing oxygen therapy, checkpulse, monitors and follow blood pressure, perform full laboratory studies, monitoring for draining of cerebrospinal fluid (CSF), correction of hypotension and hypoxia. 3. Conservative and operative management: firstly patient position should be neutral as well as the neck should be aligned with the body and head elevated to 30°. Maintain brain tissue oxygenation by providing oxygen therapy, maintaining body temperature and thermodynamic condition, avoiding of occurrence of stress gastric ulcer and maintaining adequate nutrition(**Roseminu, Jyothi & Girish, 2017**)

TBI patients usually require rehabilitation to improve their functional ability as well as physiotherapist, neuropsychologist, rehabilitation nurse, physical therapist and occupational therapist. The nurse play a vital role in providing care for the patient, in the same point rehabilitation nurse assists patients with brain injury in attaining maximum optimal wellbeing, and cope withlifestyle alteration. The rehabilitation nurse provides care for the patient on the nursing unit. The main important aspectof nursing care is a complete patient recovery, give proper nutrition in cooperation with dietitian, also the core nursing care is a prevention of potential aspiration, maintain skin integrity, manage bowel and bladder incontinence, assist in physical mobility, increase ability to take care of self, protect airway, manage sleep pattern,adapt with chronic pain, improve cognitive ability, deal with impaired verbal communication, and sexual dysfunction. Also the rehabilitation nurse, and all care provider of the patient should be working together to improve functional ability of the patient(**Maggio, et al, 2018**)

Nursingeducationin practiceconsider a very important aspect, that helpsboth educators and practitioners to share and transmit the actual practice of nursing educationrather than the experiencehe / she can practice it in the work realities of their working environments, that is both in the University/faculty and clinical settings. It is supportive. The nursing education can improve nursing profession through enhancing both education and practice. Mobiletechnologycan improves nurse's abilities and satisfaction toward improving patient care. In particular, mobile technology has played a significant role in this advancement. After the explaining how the technology has been introduced to nursing education and practice as well as focusing specifically on the use of mobile technology. Current challenges in clinical field will be addressed along with future trends in using mobile technology in nursing education and practice (**Asiri&Househ, 2017**)

Mobile and nursing educationbecome integrated together and are increasingly popularin nursing educationand practice. Mobile cansupports a wide range of educational clinical practicesin formal education settings as well as in clinical work setting, mobile consider a one of digital technology which can use it to support learning in clinical environment, the educator can be transfer and disseminate a large content at the same time to a large number of nurses, so it can save time and effort and consider one of cheapest methods of education. Also there are different aspects in which the nurse can use it, as problem solving, communication with team member and also patient relative communication. One of the most popular educational tools is a Facebook group with high levels of learning interactions which can be transmitted to a broad placement at the same time(**Pimmer, et al, 2014**)

Aim of the study:

The present study was conducted to fulfill the following aim:

To determine effect of using mobile assisted nurses' education toward improving functional ability for patients with traumatic brain injurythrough the following:

1. Assess nurses' knowledge and practice pre and post using mobile assisted nurses' education
2. Design educational materials for nurses toward improving functional ability for patients with traumatic brain injury
3. Assess nurses' opinions on the use of mobile in achieving educational objectives.

Research hypothesis :

The current study hypothesized that :Use of mobile assisted nurses' education will have a positive effect on nurses' knowledge and practicetoward improving functional ability for patients with traumatic brain injury

II. Subjects and methods

Research Design:

Quiz experimental design was used to achieve the aim of the current study.

Setting:

The study was conducted at emergency department and emergency intensive care unit, EL-Hussein University Hospital.

Subject:A convenient sample of 40 nurse who are work in emergency department and emergency intensive care unit, EL-Hussein University Hospital.

Tools for data collection:Four tools were used to collect data include:

Tool .I:Nurse's demographic characteristics data:This tool was developed by the researchers. It includes; age, sex, level of education, years of experience and previous training.

ToolIII: Nurse's knowledge assessment sheet: To assess nurse's knowledge toward improving functional ability for patients with traumatic brain injury, it was developed by the researchers after reviewing the recent related literature; it consists of (definition of TBI, its causes, signs and symptoms, complications, assessment and patient care) (Sharon, et al, 2013). Scoring system for this tool; tool contain 14 questions each question scored as one for correct answer and zero for incorrect answer; yes = one grade while no = zero to become all question grade for correct answer = 14 grades. The satisfactory level is calculated as >80% satisfactory (12/14) while <80% unsatisfactory.

Tool III: Observational checklist: To observe nurse's practice toward improving functional ability for patients with traumatic brain injury, it was developed by the researchers after reviewing the recent related literature; it consists of (assessment of patient with TBI and patient care requirements)(Janice & Kerry, 2018). Scoring system for this tool divided as the following, the tool contains 28 items scored as one grade for done and zero for not done as well as done = one grade and not done = zero, to become the total score 28 grades for all questions. The satisfactory level is calculated as >80% satisfactory (23/28) while <80% unsatisfactory

Tool IV: Mobile assisted nurse's education assessment sheet:To assess nurse's opinions toward using mobile in educational requirements process, it was developed by researchers after reviewing recent related literature (Gustavo, 2016). This tool is 4 likert scale ranged as: 4= strongly, 3= agree, 2 = fair, and 1 = disagree.

III. Tool validity and reliability

The validity of the tools was tested by offered to 5 academic expertise of medical surgical nursing from the Faculty of Nursing. To determine relevance, clarity, completeness and comprehensiveness of the tools, experts responses were either agree or disagree for the face validity. Then their opinions are reviewed and final tools were prepared and used. The reliability of the tools was measured through computation of internal consistency using Cronbach's alpha co-efficient as a measure of agreement between items and subscales

IV. Pilot study

Pilot study was performed on 10% of nurses who met the selection criteria to investigate and ensure the feasibility, objectivity and applicability of the study, in addition to clarity, adequacy and internal consistency of the study tools to determine possible problems in the methodological approach or instruments. The tools were completed without difficulty, adding support to the validity of the instruments. Little modification was done e.g. rephrasing and rearrangements of some sentences. Nurses who were involved in the pilot study were excluded from the main study sample.

V. Field work and procedure

Administrative design: To carry out the study, an official permission from the Director of EL-Hussein University Hospitals to conduct the study in their facilities. The study was carried out with full cooperation of the different levels of authority after official letters were issued from the nursing directors and nursing supervisors of the setting under the study, explaining the purpose and the methods of the data collection for the study.

Field work:

After obtaining official permission to carry out the study, the researchers were introduced themselves to the nurse's and explained the purpose of the study. The oral consent was obtained from the participants. The data collection of the study was covered a period of four months from beginning of February 2019 and to the end of May 2019 in the previously mentioned settings. The aim of this study was achieved through the following phases: 1. Assessment phase, the researchers explain the aim of the study and collect data to assess nurse's knowledge and observe nurse's practice. 2. Design educational materials in Arabic language after reviewing recent related literature and revise it based on assessment phase. 3. Implementation phase, the educational designed materials sent through whatsapp by using Smartphone mobile for each nurse included in

the study. 4. Evaluation phase, this phase accomplished by interviewing each nurse to assess knowledge, observe practice and assess their knowledge about using of mobile assisted nurses' education.

VI. Statistical design

The collected data were analyzed using (SPSS) version 20. Qualitative data was presented as number and percent, paired sample t-test. Relations between different qualitative variables were tested using correlation coefficient (person correlation). Probability (p-value) ≤ 0.05 was considered significant and < 0.001 was considered highly significant. While, > 0.05 was considered non-significant

VII. Results

Table (1): Demographic characteristics of the study subject (nurses' n 40)

Nurses demographic characteristics		No	%
1. Sex	A. Male	12	30.0
	B. Female	28	70.0
2.Level of education	A. Secondary nursing school	10	25.0
	B. Technical nursing institutes	27	67.5
	C. Bachelor nursing	3	7.5
	D. Post graduate nursing education	0	0
3.Years of experience	A. Less than 5 yrs	14	35.0
	B.5 yrs to 10 yrs	24	60.0
	C. More than 10 yrs	2	5.0
4.Previous training and courses	A. Yes	6	15.0
	B. No	34	85.0

Table (1) show that, regarding to nurses demographic characteristics, most of subject included in the study were female (70.0%). More than half of them have technical nursing institutes (67.5%) regarding to level of education as well as (60%) with a 5 yrs to 10 yrs of working experience and most of them with no previous training and courses (85.0%).

Figure (1): Age distribution of the study subject (nurses N= 40)

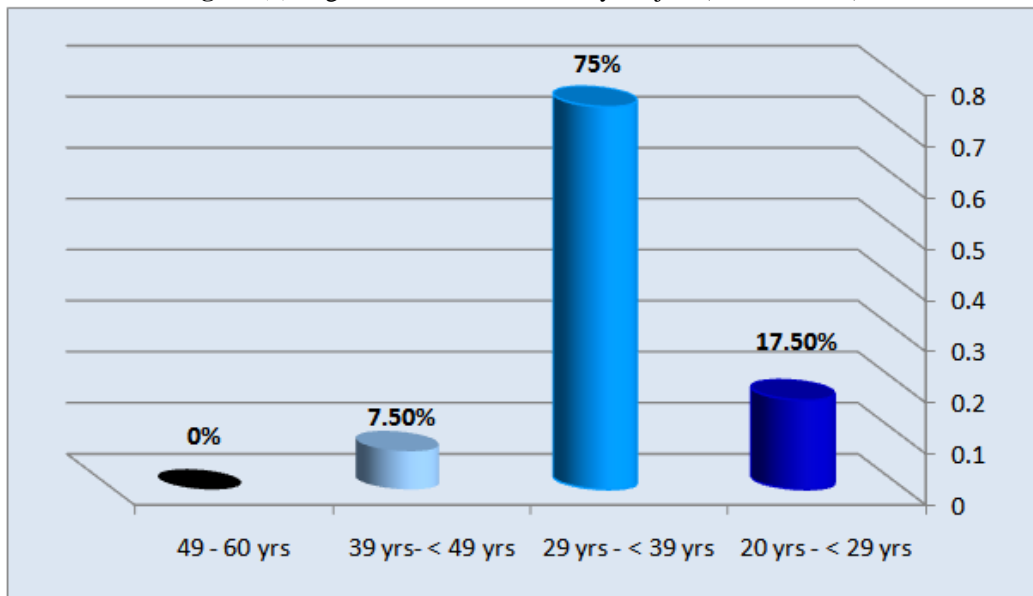


Figure (1) illustrate that, the most of nurses age group include in the study between 29 years to <39 years (75%).

Table (2): Nurses knowledge related to definition, causes and classification of traumatic brain injury pre and post education toward improving functional ability of traumatic brain injury (N = 40)

Nurses knowledge (part I)	Pre education				Post education				t-value	P-value
	Yes		No		Yes		No			
	No	%	No	%	No	%	No	%		
1.TBI known as intracranial injury	18	45.0	22	55.0	31	77.5	9	22.5	4.333	0.000**
2. TBI occurs when an external force injures the brain.	40	100	0	0	40	100	0	0	NC†	
3.TBI Caused by falls or vehicle collisions or violence	34	85.0	6	15.0	39	97.5	1	2.5	2.360	.023
4.TBI cause physical, cognitive, social, emotional, and behavioral symptoms	7	17.5	33	82.5	28	70.0	12	30.0	6.565	0.000**
5. TBI outcome can range from complete recovery to permanent disability or death.	40	100	0	0	40	100	0	0	NC†	
6.Brain trauma occurs as a consequence of a sudden acceleration or deceleration within the cranium	9	22.5	31	77.5	26	65.0	14	35.0	5.369	0.000**
7.Brain trauma caused by a complex combination of both movement and sudden impact	26	65.0	14	35.0	35	87.5	5	12.5	3.365	0.002*
8.TBI classified as according to severity, anatomical features and mechanism of causative agent	22	55.0	18	45.0	31	77.5	9	22.5	3.365	0.002*
9.Classification according to its mechanism; closed and penetrated head injury	40	100	0	0	40	100	0	0	NC†	
10.Classification according to severity, mild, moderate and sever	25	62.5	15	37.5	34	85.0	6	15.0	3.365	0.002*

*: Significant at $P \leq 0.05$. **: Highly significant at $P < 0.001$ NC†: Not computed because the variable is constant

Table (2) revealed that, regarding to nurse's knowledge, there are a highly statistically improvement in nurses knowledge post education than pre education in most of items at p-level ≤ 0.05 with t-value (4.333, 2.360, 6.565, 5.369 & 3.365) respectively.

Table (3): Nurses knowledgepre and post educationtoward assessment, complications and care of traumatic brain injury (N = 40)

Nurses knowledge (part II)	Pre education				Post education				t-value	P-value
	Yes		No		Yes		No			
	No	%	No	%	No	%	No	%		
1.Level of consciousness assessed by Glasgow Coma Scale	28	70.0	12	30.0	40	100	0	0	4.088	0.000**
2.Patient treatment may be medical treatment or surgical treatment	8	20.0	32	80.0	30	75.0	10	25.0	6.904	0.000**
3.Complications; may by physical, cognitive, emotional, and behavioral complications	4	10.0	36	90.0	29	72.5	11	27.5	8.062	0.000**
4. Patients require Physical therapy, speech therapy, recreation therapy, occupational therapy and vision therapy rehabilitation. Counseling, supported employment, and community support services to improve functional abilities	6	15.0	33	85.0	27	67.5	13	32.5	6.565	0.000**

** : Highly significant at $P < 0.001$.

Table (3) shows that, highly statistically significant improvement in nurse's knowledge post education than pre education in all items at p-level ≤ 0.05 at all items.

Table (4): Total nurses knowledge pre and post education (N = 40)

Total nurses knowledge	Mean ± Std. Deviation	X ² - value	P-value
Total nurses knowledge pre education	20.35 ±1.42	16.226	0.000**
Total nurses knowledge post education	16.25 ±1.19		

***: Highly significant at P <0.001*

Table (4) explain that regarding to total nurses knowledge, there are statistically significant improvement post education than to pre education at p-level ≤ 0.05

Table (5): Nurses practice toward patient assessment of traumatic brain injury (N = 40)

Nurses practice (part I)	Pre education				Post education				t-value	P-value
	Done		Not done		Done		Not done			
	No	%	No	%	No	%	No	%		
1. Assess mechanism of injury	9	22.5	31	77.5	30	75.0	10	25.0	6.565	0.000**
2. Assess duration and severity of injury	0	0	40	100	20	50.0	20	50.0	6.245	0.000**
3. Assess immediate and current symptoms (level of consciousness, post traumatic amnesia, headache, dizziness, memory difficulties, and balance disturbance)	23	57.5	17	42.5	36	90.0	4	10.0	4.333	0.000**
4. Assess history of prior concussions (number, age at occurrence)	12	30.0	28	70.0	32	80.0	8	20.0	6.45	0.000**
5. Perform neurologic examination using Glasgow coma score (GCS)	14	35.0	26	65.0	33	82.5	7	17.5	5.940	0.000**
6. Assess occurrence of seizures, vomiting, vision changes, worsening headache, disorientation, confusion and irritability	40	100	0	0	40	100	0	0	NC†	
7. Assessment of balance to identify postural stability	11	27.5	29	72.5	33	82.5	7	17.5	6.904	0.000**
8. Assess fatigue and sleep difficulties as well as pain level and severity	12	30.0	28	70.0	31	77.5	9	22.5	5.940	0.000**

***: Highly significant at P <0.001*

NC[†]: Not computed because the variable is constant

Table (5) revealed that regarding to nurses practice show highly statistically improvement in nurses practice post education than to pre education with p-value < 0.001.

Table (6): Nurses practice toward patient care of traumatic brain injury (N = 40)

Nurses practice (part II)	Pre education				Post education				t-value	P-value
	Done		Not done		Done		Not done			
	No	%	No	%	No	%	No	%		
1. Maintain pO ₂ and SaO ₂ is above >95%	40	100	0	0	40	100	0	0	NC†	
2. Maintain pH between 7.35 and 7.45	13	32.5	27	67.5	31	77.5	9	22.5	5.649	0.000**
3. Perform endotracheal suctioning if clinically indicated	40	100	0	0	40	100	0	0	NC†	
4. Bolus of sedation prior to suctioning if indicated	10	25.0	30	75.0	31	77.5	9	22.5	6.565	0.000**
5. Prior to suctioning, preoxygenate for 1 min with 100% FiO ₂	30	75.0	10	25.0	38	95.0	2	5.0	3.122	0.003*
6. Minimize suctioning duration <15 s and a maximum of 2 passes	28	70.0	12	30.0	37	92.5	3	7.5	3.365	0.002*
7. Allow for a 10-min rest period before any further interventions are undertaken	0	0	40	100	22	55.0	18	45.0	6.904	0.000**
8. Ensure head is maintained in neutral head alignment at all times	24	60.0	16	40.0	34	85.0	6	15.0	3.606	0.001*

9.Ensure knee and hip flexion are avoided	12	30.0	28	70.0	32	80.0	8	20.0	6.245	0.000**
10.Ensure that the end of the bed is not touching patient's feet	13	32.5	27	67.5	34	85.0	6	15.0	6.565	0.000**
11.30° head elevation	40	100	0	0	40	100	0	0	NC†	
12.Ensure a calm and quiet environment	15	37.5	25	62.5	32	78.0	9	22.0	1.749	0.088
13.Avoid unnecessary noise and painful procedures	0	0	40	100	23	57.5	17	42.5	7.264	0.000**

*: Significant at $P \leq 0.05$. **: Highly significant at $P < 0.001$. NC†: Not computed because the variable is constant

Table (6) indicate that the nurses practice was statistically significant improved post education in most items at p level ≤ 0.05 with t-value(5.649, 6.565, 3.122, 3.365, 6.904, 3.606, 6.245, 6.565, 1.749 & 7.264) respectively.

Table (7): Nurses practice toward improving physical and neuropsychological abilities for traumatic brain injury patients (N = 40)

Nurses practice (part III)	Pre education				Post education				t- value	P-value
	Done		Not done		Done		Not done			
	No	%	No	%	No	%	No	%		
1.Use appropriate personalized explanation and communication with patient	25	62.5	15	37.5	36	90.0	4	10.0	3.846	0.000**
2.Encourage family visiting and keep them updated on patient's condition	9	22.5	31	77.5	34	85.0	6	15.0	8.062	0.000**
3.Encourage communication between patient and their family	0	0	40	100	26	65.0	14	35.0	8.510	0.000**
4.Educate patient family about patient condition and rehabilitation	14	35.0	26	65.0	31	77.5	9	22.5	5.369	0.000**
5.Improve patient mobility and physical ability by assistance of the physical therapist	22	55.0	18	45.0	34	85.0	6	15.0	4.088	0.000**
6.Improve patient thinking, mood and behavior by assistance of neuropsychologist	16	40.0	24	60.0	33	82.5	7	17.5	5.369	0.000**
7.Improve patient activity of daily living by assistance of occupational therapist	15	37.5	25	62.5	33	82.5	7	17.5	5.649	0.000**

** : Highly significant at $P < 0.001$

Table (7) refers to highly statistically significant improvement in nurses practice post education rather than to pre education with p-value < 0.001 .

Table (8): Total mean scores of nurses practice pre and post education (N =40)

Total nurses practice	Mean ± Std. Deviation	X ² - value	P-value
Total nurses practice pre education	43.82±2.29	23.180	0.000**
Total nurses practice post education	33.13 ±2.31		

** : Highly significant at $P < 0.001$

Table (8) show that statistically significant improvement in total nurses practice at p-level ≤ 0.000 .

Table (9): Correlation between nurse's demographic data, nurses knowledge and practice pre and post education (N = 40)

Total nurses Knowledge & practice Nurses demographic characteristics	Total nurses knowledge pre education		Total nurses knowledge post education		Total nurses practice pre education		Total nurses practice post education	
	r	p	r	p	r	p	r	p
Age	.123	.448	-.130-	.424	.120	.461	.279*	.081
Level of education	.048	.771	.108	.509	-.107-	.512	.058	.722
Years of experience	.166	.306	.114	.482	.177	.274	.030	.857
Previous training	.055	.737	-.030-	.856	-.002-	.992	.054	.742

***. Correlation is significant at the 0.01 level (2-tailed).r= person correlation coefficient*

Table (9) show positive significant correlation between demographic data, total knowledge pre and post education, total practice pre and post education, while show negative correlation between total knowledge post education in relation to level of education and previous training. Also there are a negative correlation between total nurses practice pre education in relation to level of education and previous training.

Table (10):Nurses Opinions toward using mobile assisted nurse's education (N = 40)

Nurses Opinions	Strongly agree		Agree		Fair		Disagree	
	No	%	No	%	No	%	No	%
1. Is a mobile using effective of task execution?	10	25.0	25	62.5	5	12.5	0	0
2. Is a mobile using has ability to facilitate the execution of task?	13	32.5	18	45.0	8	20.0	1	2.5
3. Is a mobile using minimizing the time and effort?	30	75.0	10	25.0	0	0.0	0	0.0
4. Is a mobile using decrease costs?	17	42.5	15	37.5	6	15.0	2	5.0
5. Is a mobile using effective way of communication?	22	55.0	13	32.5	5	12.5	0	0.0
6. Is a mobile using available all day?	35	87.5	5	12.5	0	0.0	0	0.0
7. Is a mobile using allowing questions easy through whatsapp?	28	70.0	7	17.5	2	5.0	3	7.5
8. Is a mobile using delivering education to a large number at the same time?	21	52.5	10	25.0	9	22.5	0	0.0
9. Is a mobile using considered as an easy method of teaching?	17	42.5	13	32.5	6	15.0	4	10.0
10. Have everyone have a Smartphone?	40	100	0	0.0	0	0.0	0	0.0
11. Do you find it difficult to use mobile?	0	0.0	0	0.0	0	0.0	40	100

Table (10) explain that, regarding to nurses opinions toward using mobile assisted learning most of them was strongly agree to use mobile in education process because they find that the mobile minimizing the time and efforts, also its available all the day, every one have a smart phone, and allowing questions easy through whatsapp.

Figure (2): Total percentage of nurse's opinionstoward using mobile assisted education

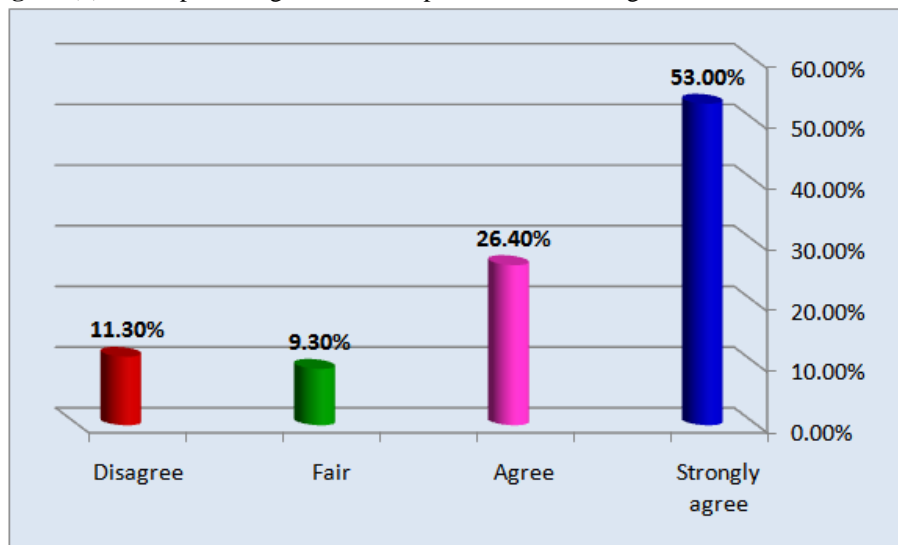


Figure (2) shows that about (53.0 %) of nurse's opinions toward using mobile assisted learning was strongly agree, while (9.3 %) was fair to use mobile in education.

VIII: Discussion

TBI consider one of the most common causes of disability and death in adults and also among age group. The injury categorized as mild as a bump, bruise (contusion), or cut on the head, or can be moderate to severe which can caused by a concussion, very deep or deep injury or open wound, fractured skull bone(s), or from internal bleeding and damage to the brain. TBI can cause several effects on the patient such as physical, psychological, social and functional disabilities, there for nurses education is an essential part to improving functional abilities for TBISnelson, et al, (2019)

Finding of the current study refer to, regarding to demographic characteristics of the study sample, most of them aged group between 29 years to <39 years, this finding in accordance with Anna, et al, (2018)they are stated that the nurses age group included in their study The average age of examined nurses was 38.13. Also they are stated that the most of sample included in the study were female as the finding of the current study about of two third included in the study were female. More over this result in constant with Vahid & Mohammad, (2014), who reported that most of sample included in their study were female as we found in this study, in another perspective the current study illustrated that, related to level of education the two third of the study sample have technical institute of nursing education, this result contradict with Vahid & Mohammad, (2014), who illustrate that their findings according to level of education have a bachelor nursing (92.80%).

Based on the result of this study, we found that the most of nurses included in the study with experience between 5 years to 10years. A working years experience can empower the nurses in their knowledge and practice to provide excellent patient care. This result is in consistent with Shin, et al, (2016)they are founded that about (70 %) had working experience less than 10 years. Regarding to previous training most of nurses with no previous training, nurses training consider is an essential aspect of patient care, so all of us should design training courses to help nurses to work efficiently and provide quality patient care in all hospitals across the country worldwide. Therefore ongoing training, education and professional development for nurses can help to ensure competency and quality patient care throughout the lecture, training courses and workshop (Price, & Reichert, 2017).

Regarding to nurses knowledge, finding of this study explain that the nurse's knowledge was improved post using mobile assisted education than pre education, so the nursing education is very important to increase nursing profession and improve quality of care provided to the patient. This finding in accordance with Seliman, et al, (2014)they are stated that an obvious improvement in nurses knowledge scores were documented post education as compared to their pre education with highly significant statistically differences. The nurses knowledge improvement might be related to well designed educational training and availability of mobile using which can facilitate education process and educational outcome.

More over in another study the nurse's knowledge was statistically significant improved post education, as the result based on the current study, this result supported by Sabry, Mohamed & Abd-Elkader (2018) they are founded that significant improvement regarding nurses' knowledge about specific care of traumatic brain

injury patient's throughout the program intervention, in the same point this result supported by **Hanafi, et al, (2014)** reported that, their study finding positive changes in knowledge among nurses and improved after performing nursing education. Similar trend was shown in our previous study in assessing nurses' knowledge

The result of the current study refer to, highly statistically significant improvement in nurses practice post using mobile assisted education than pre education, this result in congruent with **Abd El-Hay, Abed-Allah & Tag- El Din, (2018)** who clarified that regarding nurses' practice about management of patients, the study results revealed that there were highly statistically significant improvements among nurses' practice about throughout all intervention periods and throughout education. Improvement in nursing practice enhance patient care, increase satisfaction for both care provider, patients and their family as well as continuous nurse's education increase profession of nursing care delivered in the hospitals and health care setting.

Regarding to using mobile assisted nurse's education, finding of the current study explain that, the nurse's was strongly agree to use mobile in education to save their time and effort, mobile technology become a habits in our life, so we can use it in right way as education, mobile devices have been proposed to enhance nurses learning outcome and can improve nurses practice. Mobile learning has been playing an increasingly crucial role in education, allowing learning to take place beyond geographical barriers and time constraints. It supports learners who are studying "on the move" to access learning materials in various contexts, with different cultural and environmental cues necessary for understanding the learning contents **Kam Cheong, et al, (2017)**.

XI: Conclusion & Recommendation

The findings of this study concluded that, there are lacking of nurses knowledge and practice toward improving functional ability of patient with TBI, so using of mobile for nurses consider is an important aspect in improving nurse's knowledge and practice.

Recommendation:

Based on the results of the current study the following recommendations are suggested:-

1. Designing an educational guidelines for nurses about nursing care of TBI patients
2. Continuous feed nurses with essential updated information to improve their knowledge, practice and professionalism
3. Integrate technology with education for keeping up update

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