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FROM THE EDITOR

Abdulrazak Abyad
MD, MPH, AGSF, AFCHS
(Chief Editor)
Editorial office:
Abyad Medical Center &
Middle East Longevity Institute
Azmi Street, Abdo Center
PO BOX 618
Tripoli, Lebanon
P + (961) 6 443684
F + (961) 6 443685
E aabyad@cyberia.net.lb

Publishing Office:
medi+WORLD International
Australia
W www.me-jn.com

This is the first issue this year and we would like to start by wishing all our authors and readers a happy new year. In addition we would to inform that MEJN is now indexed with Scopus.

Elbilgahy A.A et al; evaluate the effect of implementing an evidence-based educational program on nurses' knowledge, practice and attitude about CLABSI prevention in critically ill child. A quasi-experimental research design using one group (pre-test & post-test measures) was used. The study involved a convenient sample of 120 nurses working in the Pediatric Intensive Care Unit (PICU) affiliated to Mansoura University Children's Hospital, Egypt. The results of the current study showed improvement in nurses' knowledge, observed practice and attitude after completion of short term evidence-based educational program about CLABSI. Our study provide a well-rounded picture of prevention of CLABSI in Egypt suggested that PICU nurses' knowledge, practice & attitude were improved significantly after the implementation of evidence based educational program. Therefore, the nurses' knowledge and practice should periodically updated and evaluated regarding guidelines for CLABSI. Therefore, the nurses' knowledge and practice should periodically updated and evaluated regarding guidelines for CLABSI.

Jonson J et al ; looked at the growing landscape of elder care in Qatar and the necessity of a skilled nursing work force. The authors stressed that though Qatar has one of the youngest populations in the region, life expectancy in Qatar is increasing and the local population is aging. An increase in the population over the age of 65, particularly for those having pre-existing chronic health conditions, poses challenges in providing high quality healthcare. One of these challenges is in securing a nursing workforce knowledgeable about the special health needs of the aged, and skilled in providing their care within the cultural context of an Arab Muslim country. One strategy to address this challenge is to make a conscious shift in nursing education that highlights the need to equip student nurses with adequate knowledge and developed skills to care for the aging population of Qatar. Nurses who teach in this context must be prepared to deliver a curriculum that is evidence based and culturally sensitive to the norms and practices that are prevalent in the country. This article discusses the current population trends in Qatar, culture specific challenges to providing high quality aged care, and the subsequent necessity of educating a nursing workforce that is knowledgeable and skilled in geriatric care.

Helvaci M.R et al; looked at the possibility that smoking may end up with irritable bowel syndrome. The authors stressed that smoking induced chronic vascular endothelial inflammation may be found among several underlying causes of irritable bowel syndrome (IBS). IBS is diagnosed according to Rome II criteria in the absence of red flag symptoms.

The study included 331 patients with the IBS and 334 control cases. The mean age of the IBS patients was 41.8 years. Interestingly, 65.2% of the IBS patients were female. Prevalence of smoking was significantly higher in patients with the IBS (37.7% versus 20.6%, $p<0.001$). Similarly, prevalence of antidepressants use was also higher in the IBS cases (51.3% versus 15.8%, $p<0.001$). As an important component of the metabolic syndrome, prevalence of white coat hypertension (WCH) was significantly lower among the IBS patients (26.5% versus 31.7%, $p<0.05$). Similarly, mean values of triglycerides ($p= 0.011$) and low density lipoproteins (LDL) ($p<0.05$) were significantly lower and mean value of high density lipoproteins (HDL) was significantly higher in the IBS patients ($p<0.05$).

The authors concluded that IBS may be a low-grade inflammatory process being initiated with infections, inflammations, psychological disturbances - like stresses and eventually terminated with dysfunctions of the gastrointestinal and genitourinary tracts, and many other systems of the body. Although there may be several underlying causes of IBS, smoking induced chronic vascular endothelial inflammation all over the body may even terminate with IBS. The lower prevalence of WCH, lower values of triglycerides and LDL, and higher value of HDL in the IBS patients may be caused by smoking induced loss of weight gain secondary to chronic endothelial inflammation in whole body.

Sheykhi, M.T investigates how food accessibility is currently observed in developing world where majority of the world population live. People in those parts of the world while facing numerous shortcomings need to be nursed as far as their food provision is concerned. The necessary institutions must be prioritized and provided to be able to supply enough food for the increasing population with changing values, new patterns of food demand and changing lifestyles. While increasing migration in developing world is underway followed by decreasing agricultural products, food supply is emerging as problematic with ever increasing prices. The issue needs more inputs, more technologies and high supervision from the government side. UN also has positively recommended that the food issue in developing world could be solved only if improved technologies are used. Increasing urban people are in need of more varieties of food in a competitive manner much more than ever before. People in this part of the world demand more food in quantity and quality. Under the present circumstances, efforts must be made to obtain more yields to feed the increasing people. However, their food nursing is felt today more than ever before. The paper points to the hungry people in many parts of Asia, Africa and other corners of the developing world—facing malnutrition and emerging challenges. They urgently need solutions and remedies.

EVIDENCE-BASED EDUCATIONAL INTERVENTION FOR NURSES' ABOUT PREVENTION OF CENTRAL LINE ASSOCIATED BLOOD STREAM INFECTION

Amal Ahmed Elbilgahy (1)
Patricia M Davidson (2)
Phyllis W Sharps (2)

(1) Mansoura University, Faculty of Nursing, Pediatric Nursing Department
(2) Johns Hopkins University School of Nursing

Correspondence:
Amal Ahmed Elbilgahy
Mansoura University, Faculty of Nursing
Email: amal_ahmed568@yahoo.com

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Abstract

Central line associated blood stream infection (CLABSI) is the most common hospital-acquired infection among pediatric patients resulting in excess mortality, increased hospitalization stay and increased health care costs. Prevention and control of CLABSI depends greatly on awareness and implementation of evidence based procedures. The purpose of this study was to evaluate the effect of implementing an evidence-based educational program on nurses' knowledge, practice and attitude about CLABSI prevention in critically ill children. A quasi-experimental research design using one group (pre-test & post-test measures) was used. The study involved a convenient sample of 120 nurses working in the Pediatric Intensive Care Unit (PICU) affiliated to Mansoura University Children's Hospital, Egypt. The results of the current study showed improvement in nurses' knowledge, observed practice and attitude after completion of a short term evidence-based educational program about CLABSI. Our study provides a well-rounded picture of prevention of CLABSI in Egypt and suggested that PICU nurses' knowledge, practice and attitude were improved significantly after the implementation of evidence based educational program. Therefore, the nurses' knowledge and practice should periodically be updated and evaluated regarding guidelines for CLABSI.

Key words: central line associated blood stream infection, central venous catheter, evidence-based guidelines.

Relevance to clinical practice: These findings provide valuable information about the importance of implementing evidence based guidelines in clinical practice.

What is already known?

- Bloodstream infections associated with central lines are associated with adverse health outcomes
- Nurses play a critical role in preventing CLABSI
- Although evidence based guidelines are recommended, implementation requires tailored and targeted approaches.

What does this study add?

- Feasibility and acceptability of the development and delivery of an educational program and demonstration that nurses' knowledge, practice and attitudes toward preventing CLABSI can be improved by the implementation of an evidence-based educational program.

Introduction

Central venous catheters (CVC) are commonly used in the pediatric intensive care unit for rehydration, blood sample withdrawal, administration of drug, parenteral nutrition, blood and blood product and monitoring of central venous pressure(1). There are many potential hazards associated with the use of CVC including central line associated blood stream infection (CLABSI) (2). CLABSI is defined as a blood stream infection in a patient with a CVC that was inserted before infection onset, not related to another infection site, and developing 48 hours or more after insertion of the central line (3). The CLABSI adversely affects patients' outcomes and results in increased risks for morbidity and mortality, prolonged hospital stay, and increasing associated medical costs (4).

The Centers for Disease Control and Prevention (CDC) and the Asia Pacific Society of Infection Control (APSIC) have recommended evidence-based care components of the central line insertion and maintenance bundles to decrease the incidence of CLABSI). The most important insertion recommendations are; the use of maximal sterile barrier precautions during insertion of CVC, hand hygiene before catheter insertion and maintenance care with proper aseptic technique, optimal selection of CVC insertion site and catheter type must be based upon the intended purpose, duration of use and risk of infection with higher rate in femoral catheter than internal jugular or subclavian catheter. In addition, alcohol-based chlorhexidine has become a standard antiseptic for skin preparation for the insertion of both central and peripheral venous catheters; tincture of iodine may be used if chlorhexidine is not available or contraindicated (5, 6, 7).

Central line maintenance care bundle includes proper dressing change technique and standardized change of the administration set as well as daily evaluation of the line necessity and replacement because the risk of CLABSI is increased with longer duration of CVC. Disinfection of the catheter hubs and catheter lumens change are one of the most important preventive measures for CLABSI as the CVC hub serves as the common source of bacterial colonization and the portal of entry of microorganisms to the internal surface of the catheter (8, 9, and 10).

Many researchers indicated that educational intervention and intensified training are associated with decreasing the risk of infection associated with CVC use (11, 12). Nurses' limited knowledge of evidence-based practice may be a barrier to adherence to the evidence based guidelines for preventing CLABSI as well as translating evidence based findings into consistent care delivered at the bedside (13). Many studies have shown that educational interventions greatly reduced CLABSI rates in pediatric patients with CVC (14, 15). Additionally, the latest CDC guidelines emphasize the importance of staff knowledge in preventing CLABSI and of educating and training healthcare personnel such as nurses who insert and maintain catheters (5). These findings suggest that higher levels of nurses' knowledge about EB guidelines and practice are strongly related to lower CLABSI rates.

Significance of the study

Nurses' knowledge of guidelines for the prevention of CLABSI has not been fully assessed, and little is known about the difference between their knowledge and impact on practices. There are only a few studies that have evaluated nurses' knowledge for the prevention of central venous catheter (CVC) related infections in an Egyptian governorate (16, 17). A study conducted by Elbilgahy et al., (18) reported that, there were variations in nursing practice and absence of a uniform protocol for CLABSI prevention among nurses across the studied ICUs. In addition, they reported the need for developing a protocol for CLABSI prevention based upon current evidence based guidelines. Hence this study was to evaluate the effect of implementing an evidence-based educational program on nurse knowledge, practice and attitude about prevention of central line associated blood stream infection in pediatric critically ill populations.

Subject and methods

Research design

A quasi-experimental using one group pre / post-test research design was used for this study.

Aim of the study

The aim of the study was to evaluate the effect of implementing an evidence-based educational program on nurse knowledge, practice and attitude about prevention of central line associated blood stream infection in pediatric critically ill children through achieving the following objectives:-

1. Assessment of the nurses' knowledge, practice and attitude about prevention of central line associated blood stream infection in PICU.

2. Designing and implementing evidence based educational program about prevention of central line associated blood stream infection in PICU.

3. Evaluation of the nurses' knowledge, practice and attitude about prevention of central line associated blood stream infection.

Research hypothesis

Nurses who attend the evidence based educational program have good knowledge, practice and attitude about prevention of CLABSI in PICU.

Setting and study participants

This study was carried out in four ICUs (Medical, Surgical, Neonatal and Cardiac Care Unit) affiliated to Mansoura University Children's Hospital (MUCHs), Egypt. A convenient sample included 120 nurses out of 160 with a response rate of 75%, were included in the study.

Study Measures and Questionnaires

Nurses Knowledge about Evidence-Based Guidelines for CLABSI Prevention

The questionnaire used was developed by the researchers after reviewing the related literature (19, 20, 21). Questions were in the form of multiple choice questions. The questionnaire was translated to Arabic language and was assessed for its content validity and reliability by nurse experts. The reliability of tool was assessed using Alpha Cronbach's test. The alpha reliability was 0.717. The survey had three parts, as follows:

Part I: Characteristics of participants including: age, sex, level of education, years of experience and previous attendance of training program about CLABSI prevention.

Part II: Thirteen questions assessing nurses' knowledge related to frequency of CVC change, replacement of CVC over guide wire, use of CVC coated with antiseptic, skin antisepsis, use of antibiotic ointment, type of dressing, frequency of dressing change, disinfection of catheter hub and administration set management. The framework of survey scoring was calculated as follows; the correct answer scoring 1 and the incorrect answer scored zero (0). Accordingly, nurses were considered to have good knowledge if they answered ≥80% questions correctly, average knowledge if ≥ 75 % and < 80% were answered correctly and poor knowledge if the score was ≤ 70%.

Part III: The scale for assessing nurses' attitude toward evidence-based guidelines for prevention of CLABSI was developed with the guidance of Bianco et al, (3). The questionnaire consisted of 8 statements and the responses to these statements were; agree, uncertain, or not agree. The alpha reliability of this part was α= 0.70. The scoring system was developed with the positive attitude scored (2) and (uncertain) scored (1) and negative attitude scored (0). Using this scoring system, nurses were judged to have an extremely positive attitude if score was 80%, positive attitude if score was >75 % and negative attitude if the score was less than 70%.

Central line insertion and daily care observational checklist:-

Observational checklist was developed by the researcher based upon review of evidence-based practice (5, 3, 22). The checklist was used to assess and evaluate the pediatric nurses' practice related to prevention of CLABSI for pediatric patients. This checklist was used to observe the actual nurses' practice during insertion of CVC and daily care of the catheter. The observation of nurses' practice was carried out during morning and afternoon shifts. The scoring system for the observation checklist was developed; each correct step of the procedure scored on the bases of "complete correct done" scored (2), & "Not done", scored (0). The level of practice was considered competent practice if the percent score was 80% or higher and incompetent practice if the percent score was less than 70%.

Evidence-based educational intervention

The researcher designed the evidence-based educational program after thorough reviewing of the related literature (5, 10). The program was combined theoretical content and practical skills aims to increase nurses' information and skills for the prevention of CLABSI in the pediatric patient. The program was introduced for nurses in four sessions; including two theoretical and two practical. Nurses were divided into small groups of 8 participants; each session was lasts for 45-60 minutes and it was conducted inside the unit over a period of 3 months. The theoretical part including knowledge about overview of CVC types, site of insertion, preparation of the pediatric patient, daily maintenance care, CLABSI definition and incidence, mechanism of infection, evidence-based guidelines for prevention of CLABSI. The practical sessions including preparation of patient for CVC insertion, disinfection of insertion site, checking patency, daily care, dressing change, checking patency and correct flushing technique.

The researcher uses different methods of teaching and using different media such as , group discussion, brain storming, demonstration & return demonstration using PowerPoint, video, posters and educational booklet was distributed and available in the department for nurses. The researcher assesses the nurses' knowledge, practice & attitude (post test) after three (3) months of program implementation and observation of nurses' practice.

Data collection

Data collection of this study was carried out over six months in the period from the beginning of November 2015 to the end of April 2016. Two methods were used for data collection by the researchers, including observation of nurses' practice of daily care of CVC and nurses self-administered questionnaire.

Pilot study

A pilot study was carried out on twelve (12) nurses to determine the applicability and simplicity of the tool. The pilot study result indicates that the questionnaire is clear and easy to understand.

Data Analysis

Processing and analysis of data was done by using Statistical Package of Social Sciences (SPSS) version 16.0. Descriptive statistics (number, percentage, mean and SD) were used to describe the main variable. Association between categorical variables was tested using Chi-square test and Mc Nemar test. Paired t-test was used for comparison within groups. The significance level for all tests was at $p < 0.05$.

Ethical Considerations

Ethical agreement was obtained from the ''Research Ethics Committee at the Faculty of Nursing - Mansoura University". An executive endorsement was acquired by

an official letter to the director of the hospital to conduct the study after discussing and clarifying the aim of the study. Written consent was obtained from every nurse after explaining the aim of the study. Concealment of data and secrecy as well as nurses right to retract from the study was clarified.

Results

Table 1 describes the characteristics of the nurses participating in the study. Approximately half of the nurses (49.2%) were in the age group from 30 to less than 35 years. Among the nurses participating in this study 75.8% had bachelor degree in nursing, with more than one third of nurses (37.5%) having 5 to 10 years of experience. In addition, more than two thirds (67.5%) of the nurses had attended a training program about infection control, approximately three quarters (73.3%) of nurses have revised no training program about CLABSI prevention.

Table 1: Characteristics of studied nurses

Characteristics	(n=120)	%
Age in years		
20 < 25	11	9.2
25 < 30	33	27.5
30 < 35	59	49.2
35 ≥ 40	17	14.2
Educational level		
Diploma	15	12.5
Technical institute of nursing	14	11.7
Bachelor degree of nursing	91	75.8
Years of experience		
< 5	28	23.3
5 < 10	45	37.5
10 < 15	36	30
15 < 20	4	3.3
20 & more	7	5.8
Department		
Pediatric intensive care unit (PICU)	41	34.2
Neonatal intensive care unit (NICU)	40	33.3
Surgical intensive care unit (SICU)	19	15.8
Cardiac care unit (CCU)	20	16.7
Attending of training programs on infection control		
Yes	81	67.5
No	39	32.5
Attending of training programs on CLABSI prevention		
Yes	32	26.7
No	88	73.3

There was a highly statistical significant difference pre / post program implementation in relation to the nurses' knowledge about prevention of CLABSI as presented in Table 2. Twenty five percent of studied nurses (25%) gave the correct answer about the use of coated CVC before the program, while, replacement of transparent dressing was answered by 28.3% of nurses before the program compared to the majority of them (95% and 99.2% respectively) P (<0.001).

Concerning replacement of administration set for clear fluid, it was found that, a minority of the nurses (6.7%) reported that IV set must be changed every 96 hours before program and this percentage was improved after program to (98.3%) with the majority of nurses (81.7% & 98.3%) replying that replacement of administration set for lipid solution must be performed every 24 hours. Moreover, disinfection of catheter hub was correctly answered by fewer nurses (8.3%) before the program and the majority of them (91.7%) after program implementation.

Table 2: Nurses knowledge about prevention of CLABSI

Variable	Pre		Post		P - value
	No(120)	%	No (120)	%	
Replacement of central venous catheters (CVCs) routinely					
Every 7 days	26	21.6	46	38.3	X^2=34.26 p<0.001**
Every 3 weeks	13	10.8	0	0	
Only when indicated	69	57.5	73	60.8	
Do not know	12	10	1	0.8	
Recommendation for CVC replacement in the same insertion site					
Inserting a new catheter at a different site	85	70.8	117	97.5	X^2=32.71 p<0.001**
Guide-wire insertion has been the accepted technique	19	15.8	3	2.5	
The use of an existing CVC site is associated with an increased risk of CLABSI, as compared with the use of a new CVC site	9	7.5	0	0	
Do not know	7	5.8	0	0	
It is recommended to replace CVCs over a guide wire					
Yes, every 3 days	7	5.8	1	0.8	X^2=80.52 p<0.001**
Yes, every 7 days	23	19.2	0	0	
No, only when indicated	58	48.3	119	99.2	
Do not know	32	26.7	0	0	
Replacement of pressure transducers and tubing routinely					
Yes, every 4 days	10	8.3	92	76.7	X^2=128.2 p <0.001**
Yes, every 8 days	0	0	1	0.8	
No, only when indicated	58	48.3	26	21.7	
Do not know	52	43.3	1	0.8	
CVC coated with an antiseptic agent is recommended to prevent CLABSI					
Yes, in patients whose CVC is expected to remain for more than 5 days	30	25	114	95	X^2=134.1 p<0.001**
No, because the use of such catheters is not cost-effective	5	4.2	6	5	
No, because the use of such catheters does not result in a significant decrease in the rate of CLABSI	22	18.3	0	0	
Do not know	63	52.5	0	0	
Recommendation for transparent dressing change					
Daily	76	63.3	0	0	X^2=143.1 p<0.001**
Every 3 days	1	0.8	1	0.8	
When indicated (soiled, loosened) and at least weekly	34	28.3	119	99.2	
Do not know	9	7.5	0	0	
Recommendation for gauze dressing change					
Daily	87	72.5	4	3.3	X^2=132.2 p<0.001**
When indicated and at least every 2 days	22	18.3	109	90.8	
When indicated (soiled, loosened) and at least weekly	3	2.5	7	5.8	
Do not know	8	6.7	0	0	
Recommended type of CVC dressing					
Polyurethane dressing (transparent, semi-permeable)	14	11.7	2	1.7	X^2=95.45 p<0.001**
Gauze dressing	53	44.2	0	0	
Both are recommended because the type of dressing does not affect the risk for CLABSI	47	39.2	117	97.5	
Do not know	6	5	1	0.8	

Recommended antiseptic solution to disinfect the catheter insertion site					
2% aqueous chlorhexidine	14	11.7	116	96.7	X^2=178.2 p<0.001**
0.5% alcoholic chlorhexidine	2	1.7	2	1.7	
10% povidone-iodine	101	84.2	2	1.7	
Do not know	3	2.5	0	0	
It is recommended to apply antibiotic ointment at the insertion site					
Yes, because it decreases the risk of CLABSI	89	74.2	6	5	X^2=174.1 p<0.001**
No, because it causes antibiotic resistance	12	10	114	95	
No, because it does not decrease the risk of CLABSI	5	4.2	0	0	
Do not know	14	11.7	0	0	
Frequency of change of administration set for lipid emulsions					
Within 24 hours	98	81.7	118	98.3	X^2=25.85 p<0.001**
Every 72 hours	8	6.7	0	0	
Every 96 hours	0	0	2	1.7	
Do not know	14	11.7	0	0	
Frequency of change of administration set for clear fluid					
Every 24 hours	96	98.3	2	1.7	X^2=214.2 p<0.001**
Every 48 hours	0	0	0	0	
Every 96 hours	8	6.7	118	98.3	
Do not know	14	11.7	0	0	
It is recommended to use an antiseptic solution to clean the access hub					
Yes, by wiping with 70% alcohol solution or alcohol and chlorhexidine solution for no less than 15 seconds	98	81.7	110	91.7	X^2=24.22 p<0.001*
Yes, by spraying the access site with 70% alcohol solution or alcohol chlorhexidine solution	10	8.3	10	8.3	
It is not recommended because no evidence has been found	3	2.5	0	0	
Do not know	9	7.5	0	0	

(**) Highly statistically significant at p <0.001

Table 3: Nurses practice during insertion and daily maintenance care of central venous catheters (CVC)

Variable	Pre				Post				p value
	Done correctly		Not done		Done correctly		Not done		
	No	%	No	%	No	%	No	%	
Care of CVC during insertion									
1. Hand washing	69	57.5	51	42.5	120	100	0	0	<0.001**
2. Wearing mask	69	57.5	51	42.5	120	100	0	0	<0.001**
3. Wearing sterile gloves	120	100	0	0	120	100	0	0	-
4. Wear gown	30	25	90	75	80	66.7	40	33.3	<0.001**
5. Place patient in Trendelenburg position	46	38.3	74	61.7	95	79.2	25	20.8	<0.001**
6. Disinfect site of insertion with antiseptic and allow to dry	120	100	0	0	120	100	0	0	-
7. Open the catheter kit using a sterile technique	120	100	0	0	120	100	0	0	-
8. Flush the lumens with normal saline after catheter insertion	120	100	0	0	120	100	0	0	-
9. Label the dressing with the time and date	120	100	0	0	120	100	0	0	-
CVC maintenance care									
1. Hand washing prior to access the line for medication administration, blood sample withdrawal and change the device	30	25	90	75	80	66.7	40	33.3	<0.001**
2. Scrub the line and the hub for 10-15 times or from 10-15 seconds and allow to dry	33	27.5	87	72.5	75	62.5	45	37.5	<0.001**
3. Access catheters only with sterile devices	46	38.3	74	61.7	95	79.2	25	20.8	<0.001**
4. Change wet soiled dressing	120	100	0	0	120	100	0	0	-
5. Change dressing using aseptic technique with clean or sterile gloves	120	100	0	0	120	100	0	0	-

McNemar Test was used

(**) Highly statistically significant at p <0.001

Table 3 reports nurses' practice during insertion and maintenance of central venous catheter. It was noted from this table that fifty seven percent of the nurses (57.5%) were correctly performing hand washing and wearing gloves for catheter insertion before program implementation. Immediately after the program, all of nurses (100%) perform these steps correctly. In addition, 25% of the nurses were performing hand washing before accessing CVC and wearing gown before the program and this improved after program to 66.7%. Moreover, there was a statistically significant difference in relation to nurses' practice in the daily care of CVC pre and post program implementation ($P < 0.001$).

Nurses' attitude toward preventive measure for CLABSI as shown in Table 4 was very positive. All nurses agreed that maintaining aseptic technique and hand washing can reduce the risk of CLABSI pre and post program. In addition, the majority of nurses (86.7% & 99.2%) had a positive attitude regarding removing dressing and examining the insertion site when the pediatric patient was feverish pre and post program implementation, respectively.

When the nurses were asked about antibiotic ointment application at the insertion site, sixty eight percent (68.3%) of them reported the benefit of applying antibiotic ointment on the insertion site and this practice is not recommended by guidelines. But the attitude was changed positively after program implementation to 87.5%. Furthermore, the majority of nurses (80%) had a negative attitude regarding routine CVCs replacement without any signs and symptoms of infection pre program and declined to 25.8% after the program.

Table 5 demonstrates the benefit of the program with an increase in the mean score of nurses' knowledge, practice and attitude following the program implementation. Attitude score was improved from10.87 ± 1.88 to 14.35 ± 1.89 and the difference was highly significant ($p < 0.001$).

Level of nurses' knowledge about prevention of CLABSI is presented in Figure 1 and shows that the majority of nurses (88.3%) had poor knowledge before EB program implementation compared to 97.5% of nurses who had good knowledge after program implementation and the difference was statistically significant.

Table 4: Nurses' attitude about evidence-based guidelines for prevention of CLABSI

Variable	Pre			Post			p-value
	Agree	Uncertain	Not agree	Agree	Uncertain	Not agree	
	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	
1. Following aseptic technique during insertion and care of CVC reduces the risk of CLABSI.	120 (100)	0	0	120 (100)	0	0	-
2. Performing hand hygiene before and after inserting, replacing, accessing, or dressing CVC reduces CLABSI risk	118 (98.3)	2 (1.7)	0	120 (100)	0	0	0.50
3. CVC dressing should be removed and insertion site should be examined when pediatric patient has fever without obvious source.	104 (86.7)	16 (13.3)	0	119 (99.2)	1 (0.8)	0	<0.001**
4. Inspect catheter insertion site visually or by palpation through an intact dressing on a regular basis reduces the risk of CLABSI.	108 (90)	10 (8.3)	2 (1.7)	118 (98.3)	0	2 (1.7)	0.005*
5. Application of topical antibiotic ointment or creams on CVC insertion sites reduces the risk of CLABS.	82 (68.3)	28 (23.3)	10 (8.3)	8 (6.7)	7 (5.8)	105 (87.5)	<0.001**
6. Antiseptic should be allowed to dry before catheter insertion	98 (81.7)	17 (14.2)	5 (4.2)	116 (96.7)	1 (0.8)	3 (2.5)	<0.001**
7. Routine CVCs replacement is effective to prevent CLABSI	96 (80)	13 (10.8)	11 (9.2)	31 (25.8)	5 (4.2)	84 (70)	<0.001**
8. Using a CVC with the minimum number of lumens is an effective practice to reduce CLABSI risk	83 (69.2)	25 (20.8)	12 (10)	79 (65.8)	0	41 (34.2)	<0.001**

Mc Nemar and chi square tests were used
(*) statistically significant at p <0.05
(**) highly statistically significant at p <0.001

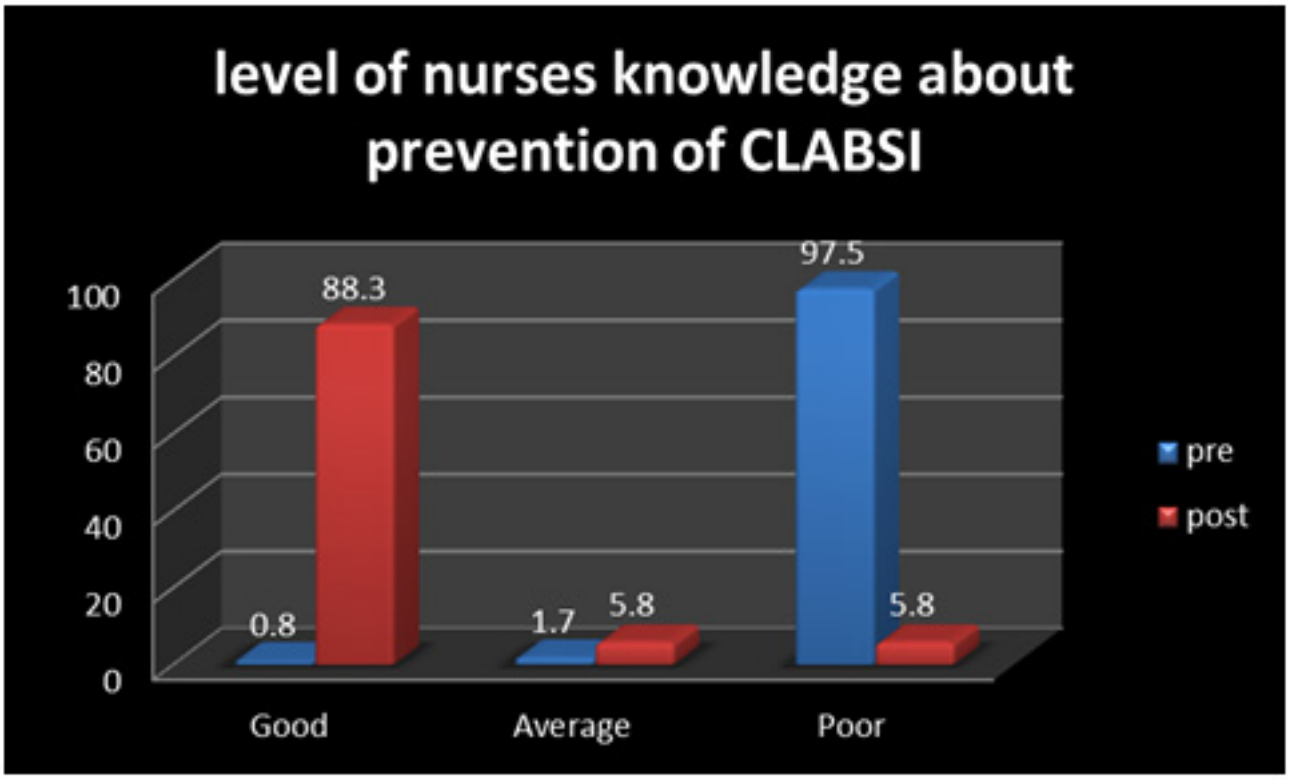
Table 5: Mean scores of nurses' knowledge, practice and attitude about prevention of CLABSI before and

	Pre	Post	Paired t-test
	Mean ±SD	Mean ±SD	
Knowledge score	4.19±1.95	10.98±1.2	t=37.46 p<0.001**
Practice score	23.2±1.05	38±0	t=154.4 p<0.001**
Attitude score	10.87±1.88	14.35±1.89	t=13.19 p<0.001**

Paired t test used

(**) highly statistically significant at p <0.001

Figure 1: Level of nurse's knowledge about prevention of CLABSI



Discussion

This study verified that nurses have an ample level of knowledge concerning evidence-based recommendations for preventing CLABSIs such as replacement of CVC (57.5%), replacement of administration set for blood and lipid solution (81.7%) and the use of antiseptic solution to disinfect the catheter hub (81.7%). Contrarily, there are wide areas where the knowledge was lower; particularly regarding recommended antiseptic solution to disinfect the catheter insertion site, since 11.7 % only gave the correct answer. To ensure the highest standards of nursing care, nursing practice must be based on a strong body of scientific knowledge. This can be achieved through adherence to the evidence based guidelines for prevention of CABSI which will contribute to improving patient outcomes. Approximately three quarters (73.3%) of the studied nurses did not receive a training program about CLABSI and its prevention (Table 1). Similarly Chen et al., (1) reported in their study that half of studied nurses had not received training about the guidelines for prevention of CLABSI. However, this result was in contrast with Humphrey, (23) who reported in a similar study that Seventy-eight percent (87%) of studied nurses had been receiving education program regarding maintenance of central line.

In the present study, more than half (57.5% and 60.8%) of nurses gave the correct answer regarding replacement of CVC before and after the educational program respectively. Previous studies also revealed the highest percentage of nurses' knowledge in this point with percentage ranging from 40-76% (16, 24, 25, 26). The reason for the nurses' correct answer can be interpreted as the CVC was changed only when indicated as a part of hospital policy without recognizing the relation between CVC replacement and the risk of CLABSI.

The present study revealed that, 48.3% of the studied nurses only knew that CVC replacement over guide wire should be done only when indicated. This result was in discrepancy with Labeau et al., (21, 26) who reported in a similar study that, approximately 70% of nurses in their study answered this question correctly. Best practice suggests selecting a new site for CVC insertion; this was obvious in this study as approximately three quarters of the nurses gave the correct answer. Furthermore, replacement of CVC over guide wire technique was not implemented in the hospital and the hospital policy recommends insertion of CVC in a new site. Furthermore, few of the nurses were aware that, pressure transducers and tubing should be replaced every 4 days before the program and improved after educational intervention; this result was consistent with Chen et al., and Cicolini et al, (1 & 27).

Regarding the use of coated catheter in the prevention of CLABSI, the present study indicated that, three quarters (75%) of studied nurses did not know the correct answer before program implementation. This result was congruent with Labeau et al., (26) who reported in their study that 36% of European nurses did not know what is recommended regarding the use of such catheter. Lack of knowledge in this point reflects infrequent application of this technique inside the hospital.

According to CDC guidelines for prevention of CLABSI, both sterile gauze and transparent, semi permeable dressing are recommended (5). However, more than one third (39.2%) of the nurses reported the correct answer regarding recommended type of dressing before program implementation. This could be attributed to the fact that the gauze dressing is more accessible and used to cover CVC insertion site compared to transparent, semi permeable dressing which is more expensive.

CVC dressing change is the main responsibility of nurses and our study indicated low level of nurses' knowledge about dressing change. The study showed that, few nurses 28.3% and 18.3 % knew the frequency of change transparent and gauze dressing respectively before conduction of the program. Study result was in concurrence with Alkubati et al., (16); but in contradiction with Guembe et al., (25) who reported higher percentage of nurses' knowledge regarding frequency of dressing change. The result could be interpreted in the light of fact that, gauze dressing is changed on a daily basis in our hospital in Egypt and this also reflects the gap between the guidelines and clinical practice. In addition, the nurses' reported that, frequent change of dressing decreases the risk of infection, whereas, it may be associated with increased medical cost and patient discomfort. During the study, chlorhexidine solution was not available for disinfection of the insertion site and tincture of iodine and alcohol were used instead. This probably accounts for the low knowledge score, because only 11.7% knew that chlorhexidine is recommended to disinfect the CVC insertion site.

Concerning the use of antibiotic ointment or cream on CVC insertion site, the result of the current study showed that, only 10% of studied nurses knew that application of such practice is not recommended by CDC guidelines because it can lead to antibiotic resistance. Similarly, Alkubati et al; Guembe et al and Labeau et al., (16, 25, 26) showed low level of nurses' knowledge about the use of antibiotic ointment. The lack of nurses' knowledge about this issue also reflected on nurses attitude as more than two thirds (68.3%) of studied nurses had negative attitudes and agree about application of antibiotic cream on CVC insertion site pre program. This result was in agreement with Bianco et al., (3) who reported in their study that approximately one third (31%) of respondents were also in agreement or were uncertain or equivocal about the utilization of topical antibiotic treatment at CVC insertion sites. This could be explained by nurses' belief that, application of topical antibiotic can provide extra protection from infection or may reflect the hospital policy.

Replacement of administration set for blood and lipid solution was correctly answered by the majority of nurses (81.7%) before educational intervention. On the other hand, few of the nurses (6.7%) replied that the administration set used for clear fluid must be changed every 96 hours. Also, Chen et al., (1) reported in their study that, only 3.5% of nurses knew that the administration sets should be replaced after 96 hours in patients not receiving blood, blood products or fat emulsions. In contrast, Cicolini et al., and Labeau et al., (27 & 26) reported that, 26.5% and 45.4% of nurses, respectively, knew this fact. The findings from the current study related to the hospital policy and unit protocol guidelines stated that the administration set for blood and lipid solution was changed immediately at the end of infusion and the administration set for clear fluid must be changed daily.

Knowledge is considered the backbone of the prevention of nosocomial infections especially CLABSI. The goal of continuous education in nursing is to enhance knowledge and to promote the quality of health care delivery to the pediatric patient. The present study findings revealed that, all pediatric nurses with different educational levels and years of experience had unexpectedly poor knowledge scores about CLABSI prevention before program implementation. The overall mean score of nurses' knowledge was 4.19 out of 13, which is congruent with Ullman et al., (24) who reported in their study that, the mean score was 5.5 out of 10 in pediatric ICU nurses. Similarly,

Vandijck et al., (20) also reported limited knowledge in the current guidelines. These results may be due to lack of training courses, or lack of equipment and work overload which in turn affects nurses' knowledge and practice.

Nurses' knowledge of care and maintenance of CVC and prevention of CLABSI were statistically significant (p = .0001) and the pre test mean score was improved from 4.19±1.95, to 10.98±1.2 after the educational intervention as presented in Table 5 and Figure 1. Similarly, Humphrey, (23) reported that, nurses mean score of knowledge revealed a statistically significant mean score from 4.6 to 8.4 after educational intervention. In addition, Comer et al., (14) found that electronic instructional classes and online courses increased physicians' information about prevention of central line associated blood stream infection. Furthermore, Yilmaz et al., (12) reported that a training program for healthcare workers who inserted and maintain CVC was associated with decrease in the incidence of catheter related blood stream infection.

The current study showed that, all nurses (100% & 98.3%) respectively had an extremely positive attitude toward maintaining aseptic technique and hand washing. Similarly, Bianco et al., (3) reported in their study that 96.7% and 95.8% agreed that maintaining aseptic technique and hand washing can reduce the risk of CLABSI. In addition, 86.7% of the nurses believe that dressing must be removed and the insertion site must be examined when the patient is feverish. Furthermore, negative attitude was obvious in routine replacement of CVC as the majority of nurses (80%) did not understand that routine replacement of CVC without signs or symptoms does not prevent CLABSI. In contrast, Bianco et al., (3) reported that, more than half of participant (57.8%) had positive attitude regarding routine CVC replacement.

Our study indicated that, fifty seven percent of studied nurses (57.5%) were washing their hands and wearing mask during insertion of CVC. Moreover, all nurses wore sterile gloves during insertion and only a quarter (25%) of them were wearing gowns, while application of sterile drape to cover patient body during insertion was not applied as the majority of CVC insertion was done inside the unit and the difficult cases were done in the operating room where sterile drape was done. Similarly, Alkubati et al; El-Nemr et al; Ider et al & Rosenthal et al., (16, 17 & 22) reported that less than half of nurses were compliant and adherent with wearing personal protective equipment (PPE) during the insertion of CVCs in developing countries. In addition, sterile towel did not cover the entire body of the patients during CVC insertion. The low percentage of nurses' compliance to maximal sterile barrier could be attributed to lack of supplies such as (gown, mask, cap and sterile drape), work overload, lack of knowledge about the importance of PPE and it may be due to nurses belief that the physicians must only be responsible with using maximal sterile barrier as they insert the catheter and the nurse assists in the procedure.

Flushing CVC with normal saline after insertion and as daily care routine was done by all nurses in the present study and all of them accurately demonstrated the insertion and application of dressing. This result was in contradiction with Mathers, (28) who reported a lower percentage of nurses' practice in this point. Finally, prevention of CLABSI necessitates a collaborative effort, and the nurses had critical responsibility since their frequent interactions with pediatric patients at the bedside. So, it is imperative to increase the nurses' knowledge about prevention of CLABSI through educational programs to enhance the implementation of EBGs of research into practice.

Conclusion and Recommendation

The study concluded that nurses' knowledge, practice and attitude about prevention of central line associated blood stream infection in pediatric patients were improved significantly after the implementation of the evidence-based educational program. Based on the findings of the current study the following recommendations must be considered: the nurses should provide nursing care to critically ill children based on evidence-based practice other than experience based practice and the hospitals should organize internal training courses for all health care team members as important to broaden the implementation strategy for CLABSI prevention and CVC infection. In addition, the hospital policy maker should offer supplies necessary to provide care for critically ill children with CVC. Establishing a system to ensure that CLABSI prevention protocol should be implemented consistently in all PICUs and the preventive measures for CLABSI applied at time of CVC insertion and at daily CVC care. Furthermore, the nurses must attend external training courses and conferences to upgrade their knowledge and practices in their field and the evidence based guidelines for CLABSI prevention should be incorporated in all nursing curricula.

Limitation of the study

The main limitation of our study was that, it was conducted in one hospital and on a small sample size; so, the results may not be generalized with those from other institutions with different populations and medical policies. Another important limitation was that, the educational intervention was implemented for nurses only where there are also doctors involved with CVC insertion and assessed by investigator developed instruments. In addition, the impact of educational intervention on clinical outcomes was not evaluated. Moreover, the study provides a lot of information about prevention of CLABSI in PICU in Egypt.

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PATIENT SAFETY CULTURE DIMENSIONS AS PERCEIVED BY NURSES

Zeid Alrowely (1)
Omar Ghazi Baker (2)

(1) Zeid Alrowely, MSN,BSN,RN, CPPS
Director, Health Investment Development Administration,Directorate of Health Affairs
Aljouf, Saudi Arabia
(2) Omar Ghazi Baker,PhD, MSN,BSN,RN(BC)
Associate Professor, College of Nursing King Saud University, Riyadh
Saudi Arabia

Correspondence:
Omar Ghazi Baker,
Associate Professor, College of Nursing
King Saud University, Riyadh
Saudi Arabia
Email: obaker@ksu.edu.sa

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Abstract

Patient safety is a global concept that every healthcare professional must hold at the very heart of what they do. Shared culture of patient safety should be of primary significance and there is resolute need for theory lead research approaches for safety culture in health care organizations. The main objective of this research was to investigate staff nurses' understanding of patient safety culture in governmental hospitals in the northern region of Saudi Arabia. The descriptive cross-sectional design was used in this research. 503 nurses from six hospitals were included. This study introduced credible findings owing to the whole high response rate (73%) and outcomes with specified results. The staff nurses rated patient safety as very good (Mean = 2.30; SD = 0.839) supposing that efforts of the organizations and nurses were executed to offer the safest patient care possible. The whole patient safety culture was rated neutral supposing that (63%) of the staff nurses who participated in the current study have merged ideas about the status of patient safety culture in their respective organizations. Another essential result that required further investigation was the extent of frequency of events reported wherein between 25% and 32% or the whole 21% never or rarely reported events that occurred. The results of this research reflect that patient safety should be taken into account as a priority when enhancing health care-related activities by staff nurses in the studied hospitals.

Key words: patient safety culture, nurses, Saudi Arabia

Introduction

1. Definition of Safety Culture

The safety philosophy of a hospital is the product of an interaction between individuals and group beliefs, behaviors, insights, and aptitudes that stipulate the pledge to, and the style and adeptness of, an organization's management of safety culture. Organizations with a positive safety culture are described by communications founded on mutual confidence, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures (Westat, Rockville & Sorra, 2016).

The concept of safety culture originated outside of health care especially in studies of high trusted organizations, organizations that minimize adverse events in spite of executing intrinsically complicated and dangerous work. High trusted organizations have a commitment to safety at all levels from frontline providers to managers and executives. This commitment creates a "culture of safety" that encompasses the following properties: acknowledgment of the high-risk nature of an organization's activities and the specification to obtain safe operations; a blame free environment where people are able to report problems or near misses without fear of punishment; support of collaboration through ranks and disciplines to target solutions to patient safety obstacles, and organizational commitment of resources to address safety perspectives (Simon, Muller & Hasselhorn, 2010).

Patient safety is the first and most important step to enhance the quality of medical and health services and is an inseparable component of these services. This method became highly scrutinized by health scholars and professionals (Elmi, Babaie & Elmi, 2018).

Patient safety culture is a part of the organizational culture within health care. A dynamic and conscious definition of patient safety culture was introduced by the European Society for Quality in Health Care in 2006 and reveals safety culture as where actions are taken to decrease risk or harm to patients in the trajectory of care. It is considered as "An integrated pattern of individual and organizational behavior, dependent on shared beliefs and values that continuously try to minimize patient harm, which may result from the processes of care delivery (Westat, Rockville & Sorra, 2016).

Characteristic properties of patient safety culture have been defined as leadership acknowledging the health care environment as highly risky and specified transferring resources to the frontline staff, a collaborative spirit among staff, where relations are open, respectful and flexible, where the environment permits all health care staff to speak up on the patient's behalf, and where all staff value learning from mistakes as a method to enhance their performance. In addition, practice is dependent on evidence, errors are known as system failures rather than individual failures and simultaneously individuals are held responsible for their actions, and care is centered on the patient (Nordin, 2015).

2. Nursing practice obstacles in the work environment:

Nursing practice meets a lot of obstacles associated with problems in the work environment and integration of a culture of safety found that shortage of clear communication; shortage of evidence of work group co-operation; inadequate management of patient care problems, shortage of confidence among health care employers and conflict, culminate in nurses' job dissatisfaction and feelings of being overstressed. They supposed that the results influence nurses' capability to introduce quality, safe, and humane care. The lack of nursing staff is no secret to stakeholders and has become a great focus in the past decade leading to hospital administrators and nurse managers to become more conscious of the safety and quality of the staff work environment and its effects on the workforce (Fujita et al., 2013).

Patient safety should be recognized in the perspective of general highest quality. Since there are various factors acting in the health system, it should be examined through the adoption of clinical practices. Concentration is required to make obvious the responsibilities and roles of all experts working in health care. There is a need to strengthen the qualifications of professionals. Training is defined as an indispensable tool to ensure that safety and effective care is delivered at all times. In recent years, a lot of educational initiatives have been adapted, although in different ways. These experiences reflect on the need to establish a level of skills and knowledge that will enhance the development of strategies for introducing and ensuring safety for all patients (David et al., 2013).

Alahmadi's study (2010) presents an overall evaluation of safety perceptions among hospital staff in private and public institutions in Saudi Arabia. Results confirmed increased attention to patient safety and continuous improvement efforts. Although results also show that safety culture is yet to be developed, as there are several areas for improvement involving error reporting, communication, teamwork and leadership across hospital units and in response to errors. Efforts for developing and implementing effective strategies to enhance patient safety culture in Saudi Arabian hospitals are limited by leadership capacity to set up open communication and organizational learning.

Alswat (2017) discussed the findings of repeating the assessment of patient safety culture in a multisided Medical City in Riyadh, in KSA. Findings were compared with a previous assessment conducted in 2012. The research study established that the Medical City has attained important improvement in the patient safety culture aggregates although having features needful of further enhancement. Findings similarly revealed that ongoing periodical assessment can help hospitals to better envision and recognize changes needed to enhance their performance.

3 The six factors of creating a patient safety culture:

The Joint Commission's Center for Transforming Healthcare (2015) discussed the six aspects of maintaining a patient safety culture:

1. The culture of patient safety starts from the top management. It would be difficult to produce and maintain a patient safety culture if it was not inaugurated at the top managerial level of a healthcare organization. Leading boards, executives and supervisory management should inspire a safety culture and make their standards obvious to the rest of the organization. Healthcare administration has to encourage everyone to nurture patients' well-being as healthcare quality is the utmost priority in an organization's goal (Donabedian, 2012).

It is an attitude made by management, not a temporal matter, that patient safety is the top priority. Top management should reinforce the practice of patient safety culture in their healthcare organizations. Governing board members and managers must interact openly with healthcare teams including physicians, nurses and patients, making it obvious to the staff and patients that the top management's commitment to patient safety is an ongoing monitored process.

2. Healthcare management must create a vision that will guide the organization's practice and reinforcement of patient safety culture. Doing so necessitates administrators to conduct a gap exploration to distinguish where the organization stands in the continuum of safety and where it needs improvement.

3. Patient safety culture should entail all levels in the healthcare organization. When analyzing the gap is executed, administration of the organization can make efforts to boost and advance a patient safety culture.

4. Patient safety culture requires some evolution and some changes. Patient safety culture depends on many various conditions and environments. Healthcare organizations are multifaceted organizations, made up of many diverse parts with different requirements, diverse staff members and different patients.

5. Commitment to patient safety culture is consistent. One of the evident common liabilities that weakens the development of a patient safety culture is in the commitment of top managerial level. Additional common mistakes can be apparent in how management deals with malpractice issues. It is imperative that the top managerial level recognize that malpractice issues and medical errors are constantly the result of defects in the system, more than individual ineffectiveness. When medical errors occur, the management should look at ways to improve systematic processes to deter future adverse events from occurring, more than punishing the individual who created the problem. These discrepancies can make staff members more exhausted and less interested and concerned with patient safety efforts.

6. Patient safety culture ultimately transcends the leadership Patient safety culture exceeds management considerations; effective improvement of a patient safety culture must create a complete sphere. The significant gauge of whether an organization has attained this; is to understand how properly the organization's patient safety culture succeeds once there is a change in management. (Sorra et al., 2016)

4. The Self System in Reciprocal Determinism Model:

Human behaviors have preferred underlying models emphasizing environmental or inner fundamentals of behavior. In social learning theory, causal actions are categorized in terms of mutual determinism. In regard to this attitude, psychological standing includes constant mutual actions between cognitive, behavioral, and environmental influences. The basic argument between unidirectional and reciprocal models of human behavior focus on the issue of self-influences (De Wet and Johnson, 2014)

According to Bandura (1978) self-system in the structure of social learning theory involves cognitive structures and sub-functions for appreciating, assessing, and modifying behavior, not a psychic factor that regulates actions. The effective role of the self-system in mutual determinism is established by a mutual examination of self-regulatory operations. Mutual determinism is hypothesized as a chief principle for examining psychological events at the level of interpersonal development, interpersonal relations, and shared standing of social and organizational systems (Cooper, 2000, and Wood and Bandura, 1989).

5. A Model of Safety Culture

Safety culture is a part of organizational culture that affects members' behaviors concerning an organization's continuing health and safety transactions. Though the complex of descriptions of organizational 'culture' and 'safety culture' that proliferate in both the management and safety literature, presumes that the term of business-specific cultures is not straightforward. Placing such 'culture' concepts into a goal-setting model seems to lead to better transparency than has previously been the case. A mutual model of safety culture derived from Bandura's (1986) model of reciprocal determinism is the Reciprocal Safety Culture Model by Cooper (2000). This model is adopted in order to deliver both a theoretic and practical structure with which to ration, measure, analyze, and evaluate safety culture (Bandura, 1986, and Wood and Bandura, 1989). This Reciprocal Safety Culture Model promotes self-regulatory processes consistent to the definition of safety culture hitherto recognized as 'The result of joint values, beliefs, attitudes, and patterns of behavior established on a top down approach practices that are concerned with reducing the exposure to conditions considered risky or detrimental to the whole group members on a self-regulatory basis' (Faridah et al., 2011).

Study questions:

1. What are the main benefits of patient safety culture?

2. What are the major variables affecting patient safety culture in investigated hospitals?

3. Is patient safety culture familiar as a concept to nurses in these hospitals?

4. What are the main impacts of applying patient safety culture in the studied hospitals?

Methodology

The descriptive cross-sectional design was used in this research.

1. Participants

A participant in a study presents the entire group of interests. The aimed groups of interest were the staff nurses working in public hospitals in Saudi Arabia. The accessible population involved all nurses working in hospitals located in three cities in the northern region of Saudi Arabia with at least 100 beds capacity. The inclusion criteria included: those in active full time employment at the time data was gathered and willingness to voluntarily participate in the study. The only exclusion criterion was the non-willingness or refusal to voluntarily participate in the study

2. Sample size

In order to obtain a medium effect size of 0.15, statistical power of 0.95, and probability of error at 5% (α = 0.05), a priori sample size was computed using G*Power version 3.1.9.2 software was 226.

3. Measures

The study method utilized in this study is the Hospital Survey on Patient Safety Culture by AHRQ publication (Sorra et al., 2016). This survey concentrated on patient safety and error and event reporting. There are 42 items grouped into 12 composite measures, or composites. Furthermore, the survey included two questions that asked participants to give a whole score on patient safety for their work area / unit and to specify the number of events they reported over the previous 12 months. In addition, participants were also asked to give background demographic information about themselves that involved hospital settings, number of years working in current hospital, number of years working in current assigned unit, staff position, number of hours worked per week in current hospital, whether they had direct contact or interaction with patients, number of years working as a registered nurse and assigned nursing units.

In this study, results were introduced depending on the calculation of the frequency of response for every survey item. The two lowest response categories were integrated (Strongly disagree / Disagree and Never / Rarely) and the two highest response categories were also combined (Strongly agree / Agree and Most of the time / Always). The midpoints of the scales were reported as a separate category (Neither or Sometimes). About 17 missing responses were excluded when percentages of response to the survey items were displayed. In the calculation of hospital's score on a special safety culture composite, the average score of the percent positive responses on all items involved in the composite was calculated. In the calculation of percent positive scores, the responses were reversed in the negatively worded items. Disagreeing or responding Never to a negatively worded item referred was a positive response. Validity and reliability data have been reported on the subscales of the Hospital Survey on Patient Safety Culture by Ulrich & Kear (2014) from AHRQ (2004). The 12 components refer to the following Cronbach's alpha: group within units (0.83), supervisor/ manager expectations and actions supporting patient safety (0.75), organizational learning continuous enhancement (0.76), management support for patient safety (0.83), whole perceptions of patient safety (0.74), teamwork across units (0.80), staffing (0.63), handoffs and transitions (0.80), non-punitive response to error (0.79), communication openness (0.72), feedback and communication about error (0.78), and frequency of events reported (0.84).

4. Procedure and ethical considerations

Approval from the Institutional Review Board from the Office of the Ministry of Health General Directorate of Health Affairs in the Northern Border Region was achieved. Permission to conduct the study in the 6 hospital settings was achieved and granted. Permission to use the instrument was achieved through electronic mail from the instrument's author. The instruments were distributed to the hospitals according to the corresponding target sample size across all nursing departments. A cover letter requesting voluntary participation from the staff nurses, confirming anonymity of identities, confidentiality of responses, and possible publication of the study was attached to the instrument. The participants were not provided with any form of compensation for their participation in the study.

5. Data analysis

520 questionnaires were retrieved. Only 503 questionnaires were involved for further processing thereby obtaining a response rate of 73%. Components needing reverse-scoring were reverse coded before encoding in IBM SPSS version 21 software for further processing and analysis. Descriptive statistics was used and Pearson correlation coefficient was utilized in introducing and interpreting findings on which of the number of years working in hospital; staff position; number of hours worked per week, number of years working in current position, patient contact or interaction, patient safety grade, frequency of event reporting, number of events reported, teamwork within units; supervisor/manager expectations and actions promoting safety, management support for patient safety, organizational learning continuous enhancement, the whole perceptions of patient safety, communication openness, feedback and communication

about error, staffing; teamwork across units; hospital handoffs and transitions; and no punitive response to error, are associated with nurses' overall perceptions of patient safety in these six hospitals. Important findings were inferred for p-values < 0.05.

Results

Profile of Participants

The majority of the participants have been working in their current hospital for five years or less (73%) and have been working in their current assigned unit for five years or less (80%). Most of the participants worked between 40-59 hours per week (64%). The majority (93%) are registered nurses and have direct patient contact or interaction (91%). Most were assigned to the emergency department (15%), intensive care unit (14%) and presumably rotated in different units (13%).

Results of Overall Patient Safety Culture

The strongly disagree/disagree responses and the agree/strongly agree responses were aggregated as suggested in the scoring guide. The scores of all items in each of the 12 dimensions were further averaged to come up with the dimension's average rating. The average ratings of the 12 dimensions were aggregated to come up with the overall patient safety culture.

About 77.5% (n= 390) of the participants rated the overall teamwork within units positively with an aggregated mean score of 3.80+0.73 suggesting an overall response of agreement. Supervisor/manager expectations and actions promoting patient safety were rated neutrally (n = 283; 56%) with an aggregated mean score of 3.17+0.50 suggesting an overall neutral response. Organizational learning - continuous improvement was rated positively (n = 406; 81%) with an aggregated mean score of 3.93+0.61 suggesting an overall response of agreement. Management Support for Patient Safety was rated neutrally as a whole (n = 213; 42%) with an aggregate rating of 3.33+0.68 suggesting neutral response. The overall perceptions of patient safety was rated neutrally (n = 287; 57%) with an aggregate mean rating of 3.32+0.56 also suggesting neutral response. Feedback and communication about error was positively rated (n = 334; 66%) with an aggregated mean rating of 3.71+0.80 suggesting agreement. Communication openness was rated neutrally (n = 229; 45%) with an aggregated mean rating of 3.38+0.78 suggesting that the participants neither disagree nor agree. Half of the participants rated teamwork across units positively (n = 256; 51%). Overall, teamwork across units was rated neutrally with an aggregate mean rating of 3.39+0.61. Staffing had an overall negative rating (n = 281; 56%) with an aggregated mean rating of 2.60+0.55 suggesting disagreement. The rating however is considered positive since the item was worded negatively. Handoffs and transitions had an overall positive rating (n = 201; 40%) with an aggregated mean rating of 3.09+0.75 suggesting a neutral rating. Non-punitive response to errors had a negative rating (n = 285; 57%) with an aggregated mean rating of 2.48+0.72 suggesting disagreement. When taken as a whole, patient safety culture was rated neutrally (n = 317; %) with an aggregated mean rating of 3.29+0.32. Overall, the participants neither disagree nor agree on the level of patient safety culture that they have in their hospital of employment or assigned unit.

The Association between Nurses' Entire Perception and the 12 Dimensions of Patient Safety Culture

Pearson correlation coefficient was used to test the association between nurses' entire perception of patient safety culture and the 12 dimensions of patient safety culture. Results are presented in Table 1 (next page).

There were 16 independent variables that were statistically and significantly associated with the overall patient safety culture ranging between r = .034 and r = .715. The following variables were statistically and significantly associated (with p-values <0.001) and have large effect size (r > .5) with the overall patient safety culture: Teamwork within Units (r = 0.613); Organizational Learning—Continuous improvement (r = .512); Management Support for Patient Safety (r = .549); Feedback and Communication about Error (r = .715); Communication Openness (r = .571); and Teamwork across units (r = .613). These variables will likely explain a large part of the variances in the overall patient safety culture.

Discussion

The results of this study revealed collective increase in ratings in the overall patient safety culture as perceived by the staff nurses. Contrary to the findings of a large study in 2014, managers perceived patient safety culture more positively than other staff positions or frontline workers (Sorra et al., 2014; Hickner et al., 2014). Having many of the participants working in the emergency department (ED) and intensive care unit (ICU) suggested a result of increase in patient safety culture rating with similar findings in another study of a patient-centered transfer process stating increase in patient satisfaction ratings and weighty decrease in transfer event errors reported improved patient safety in an emergency department (Cronin-Waelde & Sbardella, 2013).

In this study, the patient safety grade is rated as very good by the participants when taken on a whole. The result is similar to the study also conducted in the kingdom, although high in rating, it still suggested a need to improve and maintain a culture of safety (Alahmadi, 2010).

In this study, the areas of strength identified are teamwork within units, organizational learning-continuous improvement, feedback and communication about error, staffing, and non-punitive response to errors. Several studies have similar results as documented in the literature (Onge & Parnell, 2015; and Vifladt et al., 2016). The results suggest a sense of agreement among staff nurses that people support one another and treat each other with respect to their nursing unit in the hospital organization. Contrary to the study of Fujita et al. (2013), lack of evidence of teamwork and collaboration, lack of mutual trust among

Table 1: Results of testing the association between nurses' entire perception of patient safety culture and the 12 dimensions of patient safety culture

Patient Safety Culture Dimensions	*r*	*p*- Value
Overall Patient Safety Culture	1.000	
Number of years working in hospital	-.059	0.092
Number of years working in assigned unit	-.207	<0.001
Number of hours worked per week	.116	0.005
Staff position	-.165	<0.001
Number of years working in current profession	-.112	0.006
Patient contact or interaction	-.034	0.225
Patient safety grade	-.332	<0.001
Number of events reported	-.054	0.111
Frequency of Event Reporting	.441	<0.001
Teamwork Within Units	.613	<0.001
Supervisor/manager expectations & actions promoting safety	.497	<0.001
Organizational Learning Continuous improvement	.512	<0.001
Management Support for Patient Safety	.549	<0.001
Overall perceptions of patient safety	.384	<0.001
Feedback and Communication About Error	.715	<0.001
Communication Openness	.571	<0.001
Teamwork Across Units	.613	<0.001
Staffing	.094	0.018
Handoffs & Transitions	.430	<0.001
No punitive Response To Error	-.020	0.330

health care workers, and conflict contributed to nurses' job dissatisfaction and feelings of being overstressed at work that could affect negatively on patient safety culture at the workplace which plays a role in underdeveloped healthcare safety culture (AHRQ, 2017). Participants also reported to be actively doing things to improve patient safety. In this manner, facilitating a just and trusting culture contributes to organizational learning and improvement in patient safety (Aboshaiqah & Baker, 2013; and Kirwan et al., 2013). It has been suggested, based on the findings of the study that ensuring appropriate nurse staffing and working hours are considered as important factors in enhancing the quality and safety of care and to decrease the care left undone in hospitals. Such findings are congruent with similar studies that have been conducted in Western countries (Cho et al., 2016). The areas for improvement identified in this study included supervisor/manager expectations and actions promoting patient safety, management support for patient safety, overall perceptions of patient safety, communication openness, teamwork across units, handoffs and transitions, and the overall patient safety culture that were rated neither disagree or agree on the level of patient safety culture in their hospital of employment. Contrary results from many studies have been acknowledged in the literature, such as that manager support and actions, shared perception/expectation of the importance of safety, established reporting system of adverse events, and open communication among nurses resulted in a more positive patient safety culture (Hickner et al., 2015; Hessels & Larson, 2016; Wang et al., 2016; Hamaideh, 2016; Gunes et al., 2016). The concern on hospital handoffs and transitions in the current study is similar to the findings of AHRQ (2016). Thus, there is a need to study handoffs and

transitions practices in order to formulate strategies that will improve the procedure and thereby improve patient safety.

As for the association of independent variables with overall patient safety culture in this research study, there are 16 independent variables that were statistically and significantly associated with the overall patient safety culture with a collective large effect size (r > 0.5) on the overall patient safety culture namely: teamwork within units; organizational learning- -continuous improvement; management support for patient safety; feedback and communication about error; communication openness; and teamwork across units. The association of these variables explained the large part of the variances in the overall patient safety culture. Hospital management support for patient safety and organizational learning has been identified as areas of strength with positive response rates. Furthermore, the latter has been identified to significantly improve patient safety culture that is consistent with the findings of other studies (Aboshaiqah & Baker, 2013). Patient safety culture rating is significantly improved by about 20 percent when there is communication openness and management support for patient safety, more so than other components (Hickner et al., 2015). It has been positively pointed out that presence of teamwork among staff within and across units fosters development of a strong safety culture in an organization (AHRQ, 2016; Hessels & Larson et al., 2016).

Conclusion

Enhancing patient safety culture depends on the organizational learning-continuous improvement, work group in units, feedback and communication, staffing, and non-punitive reply to mistakes which are vital assets. Though manager expectations and activities supporting patient safety, management apt for patient safety, communication candidness, work group through units, and handoffs and shifts need to be given significance for improving culture of patient safety. When taken as a whole, the results of this research reveal that patient safety should be emphasized as a priority when improving health care-related actions. Results of this study actually show that there is a need to substitute traditional culture of shame and blame to non-punitive culture. The findings of the current study will work as a starting point to better understand patient safety. Upcoming research in patient safety culture and nursing may produce new thoughts to the body of literature.

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SMOKING MAY EVEN TERMINATE WITH IRRITABLE BOWEL SYNDROME

Mehmet Rami Helvaci (1)
Mustafa Cem Algin (2)
Abdulrazak Abyad (3)
Lesley Pocock (4)

(1) Specialist of Internal Medicine, MD
(2) Specialist of General Surgery, MD
(3) Middle-East Academy for Medicine of Aging, MD
(4) medi+WORLD International

Corresponding author:
Mehmet Rami Helvaci, MD
07400, ALANYA, Turkey
Phone: 00-90-506-4708759
Email: mramihelvaci@hotmail.com

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Abstract

Background: Smoking induced chronic vascular endothelial inflammation may be found among several underlying causes of irritable bowel syndrome (IBS).

Method: IBS is diagnosed according to Rome II criteria in the absence of red flag symptoms.

Results: The study included 331 patients with the IBS and 334 control cases. The mean age of the IBS patients was 41.8 years. Interestingly, 65.2% of the IBS patients were female. Prevalence of smoking was significantly higher in patients with the IBS (37.7% versus 20.6%, $p<0.001$). Similarly, prevalence of antidepressants use was also higher in the IBS cases (51.3% versus 15.8%, $p<0.001$). As an important component of the metabolic syndrome, prevalence of white coat hypertension (WCH) was significantly lower among the IBS patients (26.5% versus 31.7%, $p<0.05$). Similarly, mean values of triglycerides ($p= 0.011$) and low density lipoproteins (LDL) ($p<0.05$) were significantly lower and mean value of high density lipoproteins (HDL) was significantly higher in the IBS patients ($p<0.05$).

Conclusion: IBS may be a low-grade inflammatory process being initiated with infections, inflammations, psychological disturbances-like stresses, and eventually terminated with dysfunctions of the gastrointestinal and genitourinary tracts, and many other systems of the body. Although there may be several underlying causes of IBS, smoking induced chronic vascular endothelial inflammation all over the body may even terminate with IBS. The lower prevalence of WCH, lower values of triglycerides and LDL, and higher value of HDL in the IBS patients may be caused by smoking induced loss of weight gain secondary to chronic endothelial inflammation in the whole body.

Key words: Irritable bowel syndrome, smoking, metabolic syndrome, weight gain, white coat hypertension, hyperlipoproteinemias

Introduction

One of most frequent applications to Internal Medicine Polyclinics is due to recurrent upper abdominal discomfort (1). Although gastroesophageal reflux disease, esophagitis, duodenal or gastric ulcers, erosive gastritis or duodenitis, celiac disease, chronic pancreatitis, and malignancies are found among several causes, irritable bowel syndrome (IBS) may be one of the most frequently diagnosed diseases, clinically. Flatulence, periods of diarrhea or constipation, repeated toilet visits due to urgent evacuation or early filling sensation, excessive straining, feeling of incomplete evacuation, frequency, urgency, reduced feeling of well-being, and eventually disturbed social life are often reported by the IBS patients. Although many patients relate onset of symptoms to intake of food, and often incriminate specific food items, a meaningful dietary role is doubtful in the IBS. According to literature, 10-20% of the general population have IBS, and it is more common among females with unknown causes, yet (2). Psychological factors seem to precede onset or exacerbation of gut symptoms, and many potentially psychiatric disorders including anxiety, depression, or sleep disorders frequently coexist with the IBS (3). For example, thresholds for sensations of initial filling, evacuation, urgent evacuation, and utmost tolerance recorded via a rectal balloon significantly decreased by focusing the examiners' attention on gastrointestinal stimuli by reading pictures of gastrointestinal malignancies in the IBS cases (4). So although IBS is described as a physical instead of a psychological disorder according to Rome II guidelines, psychological factors may be crucial for triggering of the physical changes in the body. IBS is actually defined as a brain-gut dysfunction according to the Rome II criteria, and it may have more complex mechanisms affecting various systems of the body with a low-grade inflammatory state (5). For example, IBS may even terminate with chronic gastritis, urolithiasis, or hemorrhoid in a significant proportion of patients (6-8). Similarly, some authors have studied the role of inflammation via colonic biopsies in 77 patients with the IBS (9). Although 38 patients had normal histology, 31 patients demonstrated microscopic inflammation and eight patients fulfilled criteria for lymphocytic colitis. However, immunohistology revealed increased intraepithelial lymphocytes as well as increased CD3 and CD25 positive cells in lamina propria of the group with "normal" histology. These features were more evident in the microscopic inflammation group who additionally revealed increased neutrophils, mast cells, and natural killer cells. All of these immunopathological abnormalities were the most evident in the lymphocytic colitis group who also demonstrated HLA-DR staining in the crypts and increased CD8 positive cells in the lamina propria (9). A direct link between the immunologic activation and IBS symptoms was provided by work of some other authors (10). They demonstrated not only an increased incidence of mast cell degranulation in the colon but also a direct correlation between proximity of mast cells to neuronal elements and pain severity in the IBS (10). In addition to these findings, there is some evidence for extension of the inflammatory process beyond mucosa. Some authors addressed this issue in 10 patients with severe IBS by examining full-thickness jejunal biopsies obtained via laparoscopy (11). They detected a low-grade infiltration of lymphocytes in myenteric plexus of nine patients, four of whom had an associated increase in intraepithelial lymphocytes and six demonstrated evidence of neuronal degeneration. Nine patients had hypertrophy of longitudinal muscles and seven had abnormalities in number and size of interstitial cells of Cajal. The finding of intraepithelial lymphocytosis was consistent with some other reports in the colon (9) and duodenum (12). On the other hand, smoking is a well-known cause of chronic vascular endothelial inflammation all over the body. We tried to understand whether or not smoking induced chronic vascular endothelial inflammation in the whole body is found among several underlying causes of the IBS.

Material and methods

The study was performed in the Internal Medicine Polyclinic of the Dumlupinar University between August 2005 and March 2007. Consecutive patients with upper abdominal discomfort were included into the study. Their medical histories including smoking habit, hypertension (HT), diabetes mellitus (DM), and used medications including antidepressants at least for a period of six-months were learned. A routine check up procedure including fasting plasma glucose (FPG), triglycerides, low density lipoproteins (LDL), high density lipoproteins (HDL), erythrocyte sedimentation rate, C-reactive protein, albumin, thyroid function tests, creatinine, hepatic function tests, markers of hepatitis A virus, hepatitis B virus, hepatitis C virus, and human immunodeficiency virus, a posterior-anterior chest x-ray film, an electrocardiogram, a Doppler echocardiogram in case of requirement, an abdominal ultrasonography, and a questionnaire for IBS was performed. IBS is diagnosed according to Rome II criteria in the absence of red flag symptoms including pain and diarrhea that awakens/interferes with sleep, weight loss, fever, and abnormal physical examination findings. Patients with a history of eating disorders including anorexia nervosa, bulimia nervosa, compulsive overeating, or binge eating disorder, insulin using diabetics, and patients with devastating illnesses including malignancies, acute or chronic renal failure, cirrhosis, hyper- or hypothyroidism, and heart failure were excluded to avoid their possible effects on weight. Current daily smokers at least for six-months and cases with a history of five pack-years were accepted as smokers. Body mass index (BMI) of each case was calculated by the measurements of the same physician instead of verbal expressions. Weight in kilograms is divided by height in meters squared (13). Cases with an overnight FPG level of 126 mg/dL or higher on two occasions or already using antidiabetic medications were defined as diabetics. An oral glucose tolerance test with 75-gram glucose was performed in cases with FPG levels between 100 and 126 mg/dL, and diagnosis of cases with 2-hour plasma glucose levels of 200 mg/dL or higher is DM (13). Office blood pressure (OBP) was checked after a 5-minute rest in seated position with mercury sphygmomanometer on

three visits, and no smoking was permitted during the previous 2 hours. Ten-day twice daily measurements of blood pressure at home (HBP) were obtained in all cases, even in normotensives in the office due to the risk of masked HT after a 10 minute education session about proper blood pressure (BP) measurement techniques (14). The education included recommendation of upper arm while discouraging wrist and finger devices, using a standard adult cuff with bladder sizes of 12 x 26 cm for arm circumferences up to 33 cm in length and a large adult cuff with bladder sizes of 12 x 40 cm for arm circumferences up to 50 cm in length, and taking a rest at least for a period of 5-minute in the seated position before measurements. An additional 24-hour ambulatory blood pressure monitoring (ABP) was not required due to an equal efficacy of the method with HBP measurement to diagnose HT (15). Eventually, HT is defined as a mean BP of 140/90 mmHg or higher on HBP measurements and white coat hypertension (WCH) is defined as an OBP of 140/90 mmHg or higher, but a mean HBP value of lower than 140/90 mmHg (14). Eventually, all patients with the IBS were collected into the first and age and sex-matched controls were collected into the second groups. Mean BMI, FPG, total cholesterol (TC), triglycerides, LDL, and HDL values and prevalence of smoking, antidepressants use, WCH, HT, and DM were detected in each group and compared in between. Mann-Whitney U test, Independent-Samples T test, and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 331 patients with the IBS and 334 control cases, totally. The mean age of the IBS patients was 41.8 ± 14.8 (17-86) years. Interestingly, 65.2% (216) of the IBS patients were female. Prevalence of smoking was significantly higher in cases with the IBS (37.7% versus 20.6%, p<0.001). Similarly, prevalence of antidepressants use was also higher in cases with the IBS (51.3% versus 15.8%, p<0.001). Mean BMI values were similar both in the IBS and control groups (27.6 versus 27.7 kg/m2, p>0.05, respectively). Interestingly, prevalence of WCH was significantly lower in the IBS group (26.5% versus 31.7%, p<0.05). Although prevalence of HT and DM and mean values of FPG and TC were all similar in both groups (p>0.05 for all), mean values of triglycerides (113.3 versus 147.7 mg/dL, p= 0.011) and LDL (118.4 versus 125.0 mg/dL, p<0.05) were significantly lower and mean value of HDL was significantly higher in the IBS group (50.6 versus 46.1 mg/dL, p<0.05) (Table 1).

Table 1: Comparison of patients with irritable bowel syndrome and control cases

Variables	Patients with IBS*	*p*-value	Control cases
Number	331		334
Mean age (year)	41.8 ± 14.8 (17-86)	Ns†	41.8 ± 14.4 (15-82)
Female ratio	***65.2% (216)***	Ns	65.2% (218)
Prevalence of smoking	***37.7% (125)***	***<0.001***	***20.6% (69)***
Prevalence of antidepressants use	***51.3% (170)***	***<0.001***	***15.8% (53)***
Mean BMI‡ (kg/m2)	27.6 ± 5.8 (15.0-50.5)	Ns	27.7 ± 5.9 (16.5-49.0)
Prevalence of WCH§	***26.5% (88)***	***<0.05***	***31.7% (106)***
Prevalence of HT‖	15.7% (52)	Ns	14.3% (48)
Mean FPG** (mg/dL)	108.3 ± 35.1 (66-321)	Ns	105.7 ± 33.3 (70-323)
Prevalence of DM***	9.9% (33)	Ns	10.1% (34)
Mean TC**** (mg/dL)	200.9 ± 39.7 (105-337)	Ns	198.3 ± 42.5 (110-296)
Mean triglycerides (mg/dL)	***113.3 ± 42.9 (38-198)***	***0.011***	***147.7 ± 104.0 (27-857)***
Mean LDL** (mg/dL)***	***118.4 ± 28.7 (10-269)***	***<0.05***	***125.0 ± 32.4 (54-231)***
Mean HDL*** (mg/dL)***	***50.6 ± 9.7 (40-80)***	***<0.05***	***46.1 ± 10.2 (26-72)***

*Irritable bowel syndrome †Nonsignificant (p>0.05) ‡Body mass index §White coat hypertension ‖Hypertension **Fasting plasma glucose ***Diabetes mellitus ****Total cholesterol *****Low density lipoproteins ******High density lipoproteins

Discussion

Smoking may be found among one of the most common causes of vasculitis all over the world. It is a major risk factor for the development of atherosclerotic endpoints including coronary heart disease (CHD), peripheric artery disease (PAD), chronic obstructive pulmonary disease (COPD), cirrhosis, chronic renal disease (CRD), and stroke (16, 17). Its atherosclerotic effects are the most obvious in Buerger's disease. It is an obliterative disease characterized by inflammatory changes in small and medium-sized arteries and veins, and it has never been reported in the absence of smoking in the literature. Although there are well-known strong atherosclerotic effects of smoking, some studies reported that smoking in humans and nicotine administration in animals are associated with a decreased BMI (18). Evidence revealed an increased energy expenditure during smoking both on rest and light physical activity (19), and nicotine supplied by patch after smoking cessation decreased caloric intake in a dose-related manner (20). According to an animal study, nicotine may lengthen intermeal time and simultaneously decreases amount of meal eaten (21). Additionally, BMI seems to be the highest in former, the lowest in current and medium in never smokers (22). Smoking may be associated with postcessation weight gain but evidence suggests that risk of weight gaining is the highest during the first year after quitting and declines over the years (23). Similarly, although CHD was detected with similar prevalence in both genders in a previous study (24), prevalence of smoking and COPD were higher in male patients with CHD against the higher prevalence of BMI, WCH, LDL, triglycerides, HT, and DM in female patients with CHD as the other atherosclerotic risk factors. This result may indicate both the strong atherosclerotic and weight decreasing roles of smoking (25). Similarly, the incidence of a myocardial infarction is increased sixfold in women and threefold in men who smoke at least 20 cigarettes per day compared to the never smoked cases (26). In other words, smoking is more dangerous for women regarding the atherosclerotic endpoints probably due to the higher BMI and its consequences in them. Parallel to the above results, the proportion of smokers is consistently higher in men in the literature (17). So smoking is probably a powerful athersclerotic risk factor with some suppressor effects on appetite. Smoking induced loss of weight gain may be related with the smoking induced chronic vascular endothelial inflammation all over the body, since loss of appetite is one of the major symptoms of inflammation in the body. Physicians can even understand healing of their patients from their returning appetite. Several toxic substances found in cigarette smoke get into the circulation by means of the respiratory tract, and cause a vascular endothelial inflammation until their clearance from the circulation. But due to the repeated smoking habit of the individuals, the clearance process never terminates. So the patients become ill with loss of appetite, permanently. In another explanation, smoking induced weight loss is an indicator of being ill instead of being healthy (20-22). After smoking cessation, normal appetite comes back with a prominent weight gain in the patients but the returned weight is their physiological or 'normal' weight, actually.

There may be several underlying mechanisms terminating with the symptoms of IBS in smokers. First of all, smoking induced chronic vascular endothelial inflammation all over the body may even disturb epithelial functions both for absorption and excretion in the gastrointestinal and genitourinary tracts. These functional problems may terminate with the symptoms and signs of IBS including loose stool, diarrhea, constipation, or urolithiasis. Additionally, diarrheal losses induced urinary changes may even terminate with the urolithiasis (6, 7). On the other hand, smoking induced sympathetic nervous system activation may cause motility disorders in the gastrointestinal and genitourinary tracts. Thirdly, immunosuppression secondary to the smoking induced chronic vascular endothelial inflammation all over the body may even cause gastrointestinal and genitourinary tract infections causing loose stool, diarrhea, and urolithiasis since some types of bacteria can provoke urinary supersaturation and modify the environment to form crystal deposits in the urine. In fact, 10% of urinary stones are struvite stones which are built by magnesium ammonium phosphate produced during infection with bacteria that possess the enzyme, urease.

Chronic endothelial damage may be the leading cause of aging and associated morbidity and mortalities by causing disseminated tissue hypoxia all over the body. Probably whole afferent vasculature including capillaries are mainly involved in the process since much higher BP of the afferent vasculature may be the major underlying cause by inducing recurrent endothelial injuries. Therefore the term of venosclerosis is not as famous as atherosclerosis in the literature. Secondary to the chronic endothelial damage, inflammation, edema, and fibrosis, vascular walls become thickened, their lumens are narrowed, and they lose their elastic nature which reduces blood flow and increases BP further. Some of the well-known accelerators of the disseminated atherosclerotic process are physical inactivity, excess weight, smoking, alcohol, and chronic inflammatory or infectious processes including sickle cell diseases, rheumatologic disorders, tuberculosis, and cancers for the development of terminal endpoints including obesity, HT, DM, PAD, COPD, pulmonary hypertension (PHT), CRD, CHD, cirrhosis, mesenteric ischemia, osteoporosis, and stroke, all of which terminate with early aging and premature death. They were researched under the title of metabolic syndrome in the literature, extensively (27, 28). Although early withdrawal of the causative factors may delay development of the terminal endpoints, the endothelial changes cannot be reversed after the development of obesity, HT, DM, PAD, COPD, PHT, CRD, CHD, or stroke due to their fibrotic nature (29, 30).

Obesity is probably found among one of the irreversible endpoints of the metabolic syndrome, since after development of obesity, nonpharmaceutical approaches provide limited benefit either to heal obesity or to prevent its complications. Overweight and obesity may lead to a chronic low-grade inflammatory process on vascular endothelium, and risk of death from all causes including

cardiovascular diseases and cancers increases parallel to the range of excess weight in all age groups (31). The low-grade chronic inflammatory process may cause genetic changes on the epithelial cells, and the systemic atherosclerotic process may decrease clearance of malignant cells by the immune system, effectively (16). The effects of excess weight on BP were shown by several studies (32); that the prevalence of sustained normotension (NT) was significantly higher in the underweight (80.3%) than the normal weight (64.0%, $p<0.05$) and overweight groups (31.5%, $p<0.05$), and 52.8% of cases with HT had obesity against 14.5% of cases with the NT ($p<0.001$) in another study (33). So the dominant underlying cause of the metabolic syndrome appears as weight gaining, which is probably the major cause of insulin resistance, hyperlipoproteinemias, impaired fasting glucose, impaired glucose tolerance, and WCH via a chronic low-grade inflammatory process on vascular endothelium (34). Even prevention of the accelerated trend of weight gaining with diet or exercise, even in the absence of a prominent weight loss, will probably result with resolution of many parameters of the metabolic syndrome (35-37). But according to our opinion, limitation of excess weight as an excessive fat tissue around abdomen under the heading of abdominal obesity is meaningless, instead it should be defined as overweight or obesity by means of BMI since adipocytes function as an endocrine organ, and they produce a variety of cytokines and hormones anywhere in the body (34). The eventual hyperactivities of sympathetic nervous system and renin-angiotensin-aldosterone system are probably associated with chronic endothelial inflammation, insulin resistance, and elevated BP. Similarly, the Adult Treatment Panel III reported that although some people classified as overweight have a large muscular mass, most of them have excessive fat tissue predisposing to hyperlipoproteinemias, HT, DM, CHD, and stroke (13).

As a conclusion, IBS may be a low-grade inflammatory process being initiated with infections, inflammations, psychological disturbances-like stresses, and eventually terminated with dysfunctions of the gastrointestinal and genitourinary tracts, and many other systems of the body. Although there may be several underlying causes of IBS, smoking induced chronic vascular endothelial inflammation all over the body may even terminate with IBS. The lower prevalence of WCH, lower values of triglycerides and LDL, and higher value of HDL in the IBS patients may be caused by smoking induced loss of weight gain secondary to chronic endothelial inflammation in the whole body.

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The growing landscape of elder care in Qatar and the necessity of a skilled nursing work force

Jessie Johnson (1)
Zohra Hasnani-Samnani (2)
Arlene Acallar Masaba (3)
Lois Thornton (4)

(1) RN, PhD, Graduate Program Coordinator, Faculty of Nursing University of Calgary in Qatar
(2) RN, MN, Instructor, Faculty of Nursing University of Calgary in Qatar
(3) RN, MSN, Instructor, University of Calgary in Qatar
(4) BN MEd RN, Instructor, Faculty of Nursing, University of Calgary in Qatar

Correspondence:
Jessie Johnson, RN, PhD,
Graduate Program Coordinator,
Faculty of Nursing University of Calgary in Qatar
Email: jessie.johnson1@ucalgary.ca

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Abstract

The oil rich Arab Gulf country of Qatar is experiencing rapid growth and development both in infrastructure and over-all health of its residents. Though it has one of the youngest populations in the region, life expectancy in Qatar is increasing and the local population is aging. An increase in the population over the age of 65, particularly for those having pre-existing chronic health conditions, poses challenges in providing high quality healthcare. One of these challenges is in securing a nursing workforce knowledgeable about the special health needs of the aged, and skilled in providing their care within the cultural context of an Arab Muslim country. One strategy to address this challenge is to make a conscious shift in nursing education that highlights the need to equip student nurses with adequate knowledge and developed skills to care for the aging population of Qatar. Nurses who teach in this context must be prepared to deliver a curriculum that is evidence based and culturally sensitive to the norms and practices that are prevalent in the country. This article discusses the current population trends in Qatar, culture specific challenges to providing high quality aged care, and the subsequent necessity of educating a nursing workforce that is knowledgeable and skilled in geriatric care.

Key words: Elderly, Geriatric, Nursing

Introduction

Qatar has long been recognized as one of the world's youngest and most vibrant nations; however, its population is aging. With significant growth since 1970, Qatar's population is now estimated at 2,717,866 (Ministry of Development Planning and Statistics (MPDS), 2018). Population trends show an expansion of the working age group with an increase of those aged between 15-64 years (70.3% in 1986 and 83.9% in 2015). Although the percent of population over the age of 65 years changed minimally from 1.9% in 1986 to 2.2% in 2015 (MPDS, 2018), and less than 2% as of July 2017 (Qatar National Health Strategy, 2018-2022), these ratios reflect an aging local population set against a rapidly expanding population of transient and young expat workers recruited to fulfill the needs of the ongoing infrastructure development and construction industries. The overall number of Qataris and non-Qataris above the age of 60 is estimated to be 10,757 and 18,030 respectively (Qatar Health Report 2012 retrieved Oct 4, 2017). Life expectancy in Qatar has also increased, "at 65 years, women are expected to live a further 20.3 years, 14.3 of which are healthy. At 65 years, men are expected to live a further 18.7 years, of which 13.5 are healthy" (Qatar Health Report 2012). This increase brings with it challenges of caring for the elderly population at home, and in acute and long-term care facilities.

Qatar's National Health Strategy (2018) has identified 'elderly' as one of the seven priority population groups that will be a focus through to the year 2022. It aims to improve the health of the aged by creating opportunities for older people to stay well and live at home as much as possible. It also seeks to integrate and coordinate home care services and enhance support for family caregivers to improve the healthy life-years for those over 65 years (Qatar National Health Strategy 2018-2022). However, in order to keep up with the demands of an aging society it is imperative to ensure its nurses are adequately trained within that realm. Among all health professionals, nurses have most contact with the elderly, in acute as well as community and residential long term care settings. It is therefore extremely important to prepare future nurses with specialized knowledge to enable them to identify and mitigate problems as they arise within this age group (Mastel-Smith, Nash & Caruso, 2016).

This narrative review provides a snapshot of the context of elder care in the state of Qatar and the need for the preparation of nurses to adequately care for the elderly in acute, long term, and community settings. This narrative review will use a constructionist approach as its conceptual framework. A constructionist approach involves creating a mental picture which is built on the knowledge and structure one creates as they peruse the literature (Papert and Harel 1991).

Cultural Context in Qatar

In traditional Arab culture, families are extended to include grandparents, aunts, uncles and cousins. In this milieu, elder family members are more likely to be cared for at home by family members (Musaider, D'Souza and Al-Roomi, 2013). However, due to a changing work and social landscape, Arab families are challenged to continue with this extended family tradition. Women family members, who are typically seen as caregivers, are now more likely to be actively employed outside of the home, so caring for the older members may be waning (Musaider, D'Souza and Al-Roomi, 2013). Other factors, including modernization, migration of youth, and urbanization, have impacted on the family's ability to provide traditional forms of informal caregiving for the elderly. (Hussein & Ismail (2017).

Until most recently, nursing homes were unheard of in Qatar, but a move towards their utility may be rapidly on the horizon for this region. Though people are living longer they are not necessarily healthy in aging. Indeed, the high rates of diabetes and cardiovascular disease in the country contribute significantly to disease and disability in the elder population, and to their need for supportive health care.

In the face of a significant aged population and changing societal norms, Qatar must invest resources to meet the demand for specialized services for the elderly (Musaiger 2013). This may include meeting an increased demand for nursing homes and nursing home beds, as well as investing resources in homecare. All of these equate to a necessity for increased training in the care of the elderly.

Priorities of Elder care in the Middle East

According to Qatar's new National Health Strategy (2018-2022, p 19) "aging is precious" and "we recognize the dignity of the older population and the need to support their independence and harness their contribution to society". Healthcare needs of the elderly are unique and require specialized care to address the many normal physiological, social and emotional changes of aging, as well as the multitude of acute and chronic manifestations of illness encountered in this age group (Esterson et al., 2013). In order to care for this unique population, health care professionals, as well as other public sector workers who are involved in planning for improving the quality of life of the elderly, need specialized education.

Qatar has invested in improving the quality of life of the elder population who reside in its communities. Qatar Foundation for Elderly People Care (IHSAN) is one program providing social care services to address the challenges of an elderly population of both locals and expats (hukoomi.qa retrieved May 28, 2018). It offers various social programs and activities through the use of the volunteers and is supported in this endeavor by the Center for Empowerment and Elder Care (Ehsan).

Through national health policy and support for local organizations and initiatives, Qatar has strived to support community dwelling elders; however, further action is needed to compliment this with high quality health care for those elders who reside in both the hospital and long-term care facilities. Development of a nursing workforce skilled in geriatric care is required for positive movement in this direction.

Fortunately, Qatar is one country in the region that recognizes the need for nursing education with a strong geriatric focus (Abyad, 2016). The University of Calgary in Qatar is the only provider of an undergraduate nursing program in Qatar. With instruction in English provided by Canadian trained and credentialed nurses, cultural understanding can be the deciding factor in fortifying the uptake of a curriculum shift to integrating geriatric concepts. Recognition of the unique culture of the country is a prodigious approach for nurses trained in the West but teaching in an Arab Islamic culture. "HCPs who are unaware of cultural and religious practices, beliefs and expectations may encounter difficulties" while caring for elderly persons (Johnson & MacDonald, 2016, p 25). It is this tenet that undergraduate baccalaureate nursing programs must keep in mind when delivering and developing specialized geriatric content.

The issue of cultural understanding is complicated by the fact that the existing nursing workforce in Qatar is dominated by nurses from outside of the Arab Gulf region. This is reflective of the cultural and linguistic diversity of Qatar's population as a whole; however, the aged portion of the population is in large part Arab.

Why Teach Geriatric Nursing as a Specialty

A registered nurse workforce that can address the specialized needs of the elderly in a culturally competent way is imperative to a successful trajectory of care for an aging population. This specialized care must imbue "maintaining the health, independence, and quality of life" of the aging population of Qatar (Lunsford & Posey, 2018, p185). According to Qatar's National Health Strategy (2018-2022, p 19) "the increased demand for primary and long-term care requires a larger and better trained workforce". With this in mind, undergraduate baccalaureate nursing programs should position themselves with regards to specialized training in the elder care sector. Nursing curricula must allow dedicated time for sufficient knowledge transfer of this content along with specialized hands on and simulated learning (Esterson, Bazile, Mezey, Cortes & Huba, 2013).

Ways to Improve Preparation of Nurses to Care for the Elderly

Strategies to improve nurses' knowledge and skill to effectively care for the elderly should be directed at both the education sector and the practice sector. Inadequate curriculum (Xiao, Paterson, Henderson & Kelton, 2008; Farrell, Luptak, Supiano, Pacala, Lisser 2018); lack of engagement between education sector and practice setting (Farrell et al., 2018); and lack of experienced faculty (Koehler, Davies, Smith, Hooks, Schanke, Loeffler 2016) are identified as barriers to preparing registered nurses to effectively care for the elderly.

The University of Calgary in Qatar is the only provider of an undergraduate nursing program in Qatar. It offers only one elective theory course in gerontological nursing which does not contain a practical component. Efforts have been made to include simulation and other active learning strategies in this course to enhance students' learning, and students report that they value receiving this instruction.

Anecdotal feedback from the students suggests that they find this course extremely beneficial. By virtue of culture and religious teachings, most students have elderly family members either residing, or in close contact with them. The students indicate that learning from this course enables them to understand the needs and behaviors of their elders which positively impacts on their relationships with them. Respect and care for the elderly have always been part of their cultural value and belief system; being able to take the course in gerontology enables them to better understand the physical, emotional and social needs of the elderly. On the other hand, when it comes to career choices, many students are more inclined to work in fast paced, acute care settings.

There is no research on the preference of career choices for nursing students in the Middle East; however, research conducted by Xiao et al. (2008) in the Australian context suggests that students are less motivated to work in elder care facilities or nursing homes due to the perception that elder care requires knowledge of basic nursing care and is linked with a social stigma positing that those who work in elder care facilities do not require specialized knowledge. One of the respondents from Xiao et al. (2008) stated that,

When RN's from aged care want to work in acute care, they have to complete a refresher course. However, when RNs come from acute care to aged care, they are assumed competent enough without the requirement of extra preparation. We feel uncomfortable to say we work in a nursing home publicly (NAFG 1 as quoted in Xiao et al., 2008, p. 775).

Prestige and honour in a career comes with maintaining high standards and placing added value to it. If geriatric nursing is recognized and valued at all levels including educational institutions and practice settings at regional and national levels then it will be considered a specialty for which many will compete. Passionate and dedicated professionals working in geriatrics will agree that taking care of elderly and learning about eldercare should be a specialty in nursing education and should be viewed as an advanced skill.

At the educational institutional level, geriatric nursing should be given equal importance as other nursing courses. Suggestions to prepare students to effectively care for the elderly include integration of gerontological and geriatric content with existing curriculum (Koehler et al., 2016) in addition to providing stand-alone courses in gerontology and geriatrics (Mastel-Smith, Nash, & Caruso, 2016). Undergraduate nursing programs have psychiatric and pediatric nursing as stand-alone courses; geriatric nursing should also be given the same attention, ultimately improving patient outcomes (Mastel-Smith et al., 2016). There is a need to recruit specialty geriatric nursing instructors to teach geriatric nursing. In Qatar, these instructors should also possess knowledge of the culture and be able merge together cultural and specialty knowledge to make meaningful application for students.

Fostering effective partnerships among education and practice settings is also very important to help students observe and practice geriatric nursing. Developing effective relationships between teaching and practice sectors will help improve the quality of care as well as strengthen the curriculum by addressing practice and curriculum gaps related to the care of the elderly (Baumbusch, Dahlke & Phinney, 2014). This is important because in Qatar, specialized geriatric units are few, and aged patients are usually treated on general hospital units. In this context it becomes challenging to build expertise in one particular aspect.

In addition, to improving the quality of care provided to elderly in any setting, emphasis should be given to recruiting professionals who possess the required expertise and are genuinely interested in serving this population. Upgrading and maintaining the standard of education and expertise of professionals already working with the elderly are also needed to maintain competency and ensure incorporation of evidence based practice to improve patient care outcomes. Regional initiatives such as a gerontological nursing certification program, provision of a web-based comprehensive geriatric nursing resource center, and fostering regional collaboration (Abyad, 2016) would help nurses to become competent in providing high quality care to the elderly.

Summary of Recommendations

(1) Integrate geriatric nursing as a specialty within undergraduate baccalaureate nursing programs.

(2) Include healthy aging as part of core courses.

(3) Embed care of the elderly into discussions regarding various chronic diseases and conditions.

(4) Encourage cultural relevance within care components of geriatric nursing in all undergraduate baccalaureate nursing programs.

(5) Include interprofessional collaboration when teaching courses that discuss geriatric content.

Conclusion

With the population of Qatar set to shift toward an increase in those persons 65 and older, it is more important now than ever to work toward alleviating problems associated with increased aging. As seen in both the Qatar National Health Strategies of 2011 and 2018, Qatar is moving toward abating these issues as they arise. Tantamount to this success is having a nursing workforce that is well skilled to work with an aging population in both a preventative and responsive way. This workforce should also be culturally responsive to the care needs of Qatar's diverse population. This growing demand for specialized elder care gives rise to the need to ensure baccalaureate nursing programs include as a specialty area, that of geriatric care, not only for the aging population of Qatar but worldwide. The authors make some recommendations for developing and delivering specialized geriatric content within an undergraduate baccalaureate nursing program.

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LIVING WITH FOOD POVERTY IN THE DEVELOPING WORLD: A SOCIOLOGICAL APPRAISAL

Mohammad Taghi Sheykhi

Correspondence:
Dr. Mohammad Taghi Sheykhi,
Professor of Sociology, Department of Social Science,
Alzahra University, Tehran,
Tel: 009821-22859416,
Emails: mtshykhi@alzahra.ac.ir; mtshykhi@yahoo.com

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Abstract

The paper investigates how food accessibility is currently observed in the developing world where the majority of the world population live. People in those parts of the world while facing numerous shortages need to be nursed as far as their food provision is concerned. The necessary institutions must be prioritized and provided to be able to supply enough food for the increasing population with changing values, new patterns of food demand and changing lifestyles. While increasing migration in the developing world is underway, followed by decreasing agricultural products, food supply is emerging as problematic with ever increasing prices. The issue needs more input, more technologies and high supervision from the government side. It also needs global recognition of climate change which will bring, droughts, floods, famines and extinctions. Ongoing pollution of the sea and land environment will jeopardise further food sources. The UN Warns climate change is driving global hunger (17). Pointing to extreme weather events, land degradation and desertification, water scarcity and rising sea levels, the authors show how climate change already undermines global efforts to eradicate hunger. Accordingly the UN has also positively recommended that the food issue in the developing world can only be solved if improved technologies are used along with efforts to stem climate change. Increasingly urbanised people are in need of more varieties of food in a competitive manner much more than ever before. People in this part of the world demand more food in quantity and quality. Under the present circumstances, efforts must be made to obtain more yields to feed the increasing number of people. However, their food nursing is felt today more than ever before. The paper points to the hungry people in many parts of Asia, Africa and other corners of the developing world, facing malnutrition and emerging challenges. They urgently need solutions and remedies.

Key words: Food shortage. Malnutrition. Improving agriculture. Third World hunger. Climate change, Advanced technologies.

Introduction

Struggle for survival has ever been the lot of human beings since their appearance. Occupations of early humans have been hunting, collecting seeds, fishing and the like, and such a process has ever been evolving. It was possible for man to struggle by any means to consume any element to fight hunger. But, it was not possible for him to fight malnutrition. It was because the early man could not recognize what was the cause of malnutrition. Since then , the effect of food diets/regimes on illnesses and well-being have been gradually recognized and prevented. However, the industrial world came to know the cause and effect of foods earlier, while the less developed world came to recognize it later (Sheykhi,2014).

It is now a problem of all countries as the 1% rich are growing richer at the expense of all ordinary people. It is now also a POLITICAL problem born of international Corruption and dictatorships whereby equity is not being tackled by, or capable of being tackled by the politicians.

Currently, nutrition is one of the most important dimensions of public health, its main objective is to create physical and mental conditions to contribute to mobility and efficiency of human beings in social life. Human nutrition is on the one hand associated with the natural conditions, technological development, socio-economic characteristics and cultural factors of nations, and on the other hand, it is associated with the biological structure of humans (age, sex and well-being).Therefore, the social and hygienic aspects of nutrition at local, national and international levels must depend on interactions of the above factors(ibid).

Currently there are about one billion people suffering from chronic hunger mainly in the developing world. Based on the information received from WHO and FAO, today, about one seventh of the world population is suffering from a shortage of food items. Under the present circumstances the number of hungry people in Africa is increasing day by day. While Asia has been able to improve its food products due to more access to improved technologies, Africa with 56 countries is mainly in an unfavorable situation so far as their food productivity is concerned. Therefore, the less developed world needs more capital investment in agriculture and food products. While the world farmers produce enough food products, their products are not well distributed, and many people do not have the purchasing power to buy them. That is because prices are always inflating in those countries just as much due to lack of political will and corruption. In those countries the people do not have the purchasing power to get the food items that they need. Such a scenario leaves many in under-nutrition, malnutrition and even hunger. The above situation is observed in many African countries and other parts of the developing world. The consequences of such a state is the unwanted and uncontrolled migration followed by increasing urbanization; which is creating socio-economic insecurity for those countries.

"Over nutrition" (obesity) is nowadays just as big a concern for human health as malnutrition and is not a straightforward issue of people over-eating. Sugars and fats, like Palm Oil, are added to processed foods to deliberately addict people to encourage them to eat/buy more. In fact those with 'under nutrition' are often healthier than the obese as they do not have life threatening diseases like diabetes and cardiovascular disease.

By the year 2050, two to three billion more people will be added to the world's population, and at that stage, demand for food materials will be doubled. Therefore, from the economic sociology point of view, because of the increasing world population, climate change and ecological degradation, checks and balances and more advanced technologies must be applied to produce more food. Therefore, sociologists and agricultural experts must always project the future population and food needs for the year 2030(17). If not, the future generations will face a food crisis. As per projections, people in the future will have higher incomes, and because of that, they will demand more food and services. Such a movement will lead to more economic dynamics. Food wastage is also causing economic disaster in the wealthier countries.

Roughly one third of the food produced in the world for human consumption every year, approximately 1.3 billion tonnes, is lost or wasted. Food losses and waste amounts to roughly US$ 680 billion in industrialized countries and US$ 310 billion in developing countries (19).

Therefore, countries need to prepare the grounds to sustainably produce, distribute and consume. In this way, and through suitable interactions between production and consumption, backgrounds of economic and welfare of societies are set.

Improving and modernizing agriculture is known as one of the ways to solve/combat hunger. It is worth noting that agriculture must be of priority in planning projects by the governments of the developing countries. It is in this way that even the industrial sector could be improved and promoted. Unfortunately, in today's world a sum of one seventh of the world population is suffering from food shortage.

Method of Research

The methodology used in the present article is of qualitative type, in that, various paradigms for finding facts have been used. Qualitative research usually studies the people in their natural settings. In finding facts for the research, the researcher engaged in careful data collection and thoughtful analysis of what was relevant. In the documentary research applied in the present article, printed and written materials were widely regarded. The research was performed as a qualitative library type in which the researcher referred to relevant and related sources. In the present research, various books on food were thoroughly investigated, and the needful inferences

were thoroughly investigated, and the needful inferences were made. The data fed by the investigator in the present research is dependable and reliable.

Global Hungry People

According to the 2018 report, about 815 million people of the 7.6 billion people in the world, or 10.7%, were suffering from chronic undernourishment in 2016. (20). They are in countries with limited agricultural capacities; such countries do not have the necessary technologies for agriculture. The existing conditions contribute to increasing migration from such countries (Maharatna, 2014). Therefore, the less developed societies, because of their poor economic conditions, are usually deprived of food variety. When countries become richer, they spend more on food items. In poor countries such as Zimbabwe in Africa with GNP per capita of less than $ 1000 a year, per capita spending on food items is only $ 400 a year (Kingwell, 2017). It is worth noting however that before political change in Zimbabwe, it was once called 'the breadbasket of Africa"

Because of cultural change of human populations, consumption patterns as compared with other species/ animals have to a large extent changed. Food culture is reflected in terms of religions, beliefs, attitudes and expectations (Niyinzigama, 2014).

Paralleled with such conditions, food prices are constantly increasing. Such increasing prices are impoverishing the poor and the hungry more than others, i.e. a situation that makes the poor of the world poorer and poorer, losing their purchasing power every day. The above scenario is on the agenda of many world organizations including FAO. If the situation is not changed, a dark and insecure future is waiting for such people. If pessimism continues based on the fact that earth does not have the capability to feed its people, that would be a tragedy. The world currently produces enough to feed everyone, but due to lack of arable land in some countries and due to politics, corruption, wastage and economic factors this food is not equally distributed. (21) Social, economic and geopolitical changes in the world in the past few decades in many stances have caused shortage of food, increasing prices and hunger, and that motivates some of the economic pessimists to declare that earth is not able to easily feed the hungry. But, in the meantime, some world organizations such as the UN have positively interfered, saying that through effective policies and more advanced technologies, shortage of food materials could be responded to, and in that way poverty and hunger are minimized. The food and agricultural sector of the UN offers solutions, and has a central role to eliminate hunger and poverty (UN,2017).

As projected, while the world population will reach 9.5 billion by the year 2050, more migration from rural to urban areas is under way, pushing the countries towards shortage of food stuff and consequently rising prices. While shortage of food is prevalent food consumption is increasing in other parts of the world due to food promotion. Hence, economic sociologists need to pay special attention to the upcoming crisis.

Under such a scenario, new proposals and plans must be implemented to create more food security within the developing world. While due to socio-demographic change, lifestyle and life expectancy are also changing, planners and researchers need to operationalize balanced programs to be able to respond to the needs of citizens. Nowadays, those developing countries that have proceeded regardless of projections, are facing increasing economic and social challenges. They are at the same time facing food shortages.

Challenges caused by environmental limitations, shortage of farming lands, shortage of water resources, climate change etc. have all made food supply problematic. FAO in 2006 defined food security as when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (22) and sufficient water for human consumption and for agriculture.

Currently, African countries are facing such challenges which will increase shortage of food, and increase hunger in those countries.

Increasing Demand

As projected, demand for food will double by the year 2050, which is the result of population increase by that year. In fact food materials will not increase in that scale and that will create shortages and challenges. Change in consumption patterns, increasing literacy, urbanization and optimistically increasing income all will motivate people to more food demand. Therefore, economic sociologists are ever seeking policies, methods and strategies to use to decrease the crisis. It is only the developed countries under their economic, social and cultural conditions that could be excluded from the food crisis by the year 2050. Similarly, social networks are highly affecting food demand in the years to come. Social networks joining the people together, will motivate them to consume more food items (Higgs, 2016).

Past Food Production

Increase in food products occurred in the past due to agricultural (green) revolution which followed the industrial revolution. That somehow or other ended starvation and food shortage. The above situation also led to economic growth for many; such a process contributed to economic growth of up to five times more for many countries. Such a supply of food products led to better health and eugenics for some in many countries. The agricultural revolution followed by industrial revolution contributed to the availability of more food in the market; increasing the quality of food items, and leading to healthier generations (Gibbons,2012).

Studies associated with food and longevity in Japan indicate a balanced consumption of grains, vegetables, fruits, meat, fish, eggs, dairy products, soybeans and the like within the population of age groups 45-75. That is, the materials that decrease the risks of death within the people (Gander, 2016).

During the recent past years as more advanced technologies have been exploited in agriculture, the economies of many developing countries have transformed; they have been able to have better yields from their lands, and thereby they have been able to have more benefits and surpluses. Due to more international trade and sale of agricultural products, many developing countries have earned more GNP per capita, and in this way they have more purchasing power. Such a transition has positively affected the citizens and placed them in a higher quality of life. Therefore, to obtain higher income, countries need to sustain their agricultural revolution, and thereby keep a considerable number of their citizens active in the agricultural sector. Such a process provides many nations with more guarantees such as food security, higher purchasing power etc. It must be noted that the industrial countries while giving the first priority to their industries, also keep active and sustainable their agricultural sector.

Despite the above facts, yields are not satisfactory in many parts of Africa and South Asia. In those areas people generally cannot exploit advanced technologies in the agricultural sector. However, many people in Africa and South Asia are facing insecurity of food needs (Pretty et al., 2000). However, the world must prepare and promote its food products by 2050 as with a world of over 9 billion people there will be shortage of water and land as well (Beddington, 2010).

Multiple Agricultural Revolutions

This concept indicates efforts and focuses on increasing yields. Though the agricultural revolution occurred centuries back, since then because of population increase and change in lifestyle, countries have always been following increase of agricultural products; so that it would be possible to respond to the nutrition needs of their people. In recent decades, through the application of modern technologies the agricultural revolution has ever been strengthened and even reached many traditional societies. While during the 20th century world population quadrupled from 1.5 billion to 6 billion, countries would inevitably adopt more advanced policies to respond to the newly-emerged nutrition needs of the people. Under the conditions of the agricultural revolution periodical famines declined, or were even eliminated within some nations. The agricultural revolution continued in this manner, and nations improved their production styles in scientific and specialized manners. Similarly, during the second agricultural revolution countries became more resistant against the environmental challenges, climate change, market fluctuations etc.

Therefore, during the past one hundred years the second agricultural revolution happened, and many countries could access more relevant advanced technologies, fertilizers, green house products and refrigeration to improve their mechanical productivity. The second agricultural revolution that made use of more facilities, improved and upgraded yields with special reference to the advanced countries (Retrieved, 2018). In this way, the quality and quantity of many agricultural products improved. Such a change, improved the per capita food access; that is an indicator improving the quality of life of many communities. Such a change improved life expectancy of many nations for thirty years or more. Though the second agricultural revolution increased the global volume of food, yet there is still more than one billion hungry people in need of food in the world. Therefore, societies in general, and the Third World societies in particular must apply more supervision on their population, their incomes, and their food expenditure. Access to food is among the pivotal issues to reach welfare, security and well-being (Zezza, 2017).

As mentioned before, countries in Africa can escape hunger and poverty through exploiting more advanced technologies, education and mechanization of agriculture. In the meantime, international support by WHO, UNESCO and FAO, can bring about considerable changes in the economic and social sectors of the African countries. Similarly, exploitation of land and water resources must happen in a way that next generations could use them too. Over-exploitation of forests, underground resources etc. will endanger the life of the next generations. Therefore, exploitation of resources must take place in a balanced manner. It is worth noting that industrial countries use their resources based on prediction, and in a precautionary manner, which is very different from Africa; they always forecast their needs for the their next generations as well.

Food Security

Transition in food security is possible when investments can take place via public and private sectors. Privatization of many economic and agricultural sectors is currently taking place. Therefore, financial institutions such as banks must find the opportunity to invest in food industries. In this way, African countries will be able to experience some more growth in their food sectors. Not only the African continent, but many other developing countries are currently facing a food crisis. The Private sector plays a determining role to provide food materials with special reference to the developing urban areas. Increasing patterns of urban consumption is generally responded to by the private sector in various countries (Dubbeling, 2016).

Similarly, access to sufficient food will be achieved only when the political, scientific, industrial, communications and educational infrastructures are provided. So, those countries that do not have sufficient infrastructure, are suffering from a shortage of food and poor agriculture; a

process sometimes leading to famine for some people. Elimination of poverty and hunger also needs markets free of corruption and deviance. One of the difficulties of the developing countries is the commercial markets with corrupted agents and middlemen, and under such circumstances farmers do not earn the right benefits; they gradually leave farming and join the urban economy as laborers the economies that do not welcome such workers. In the meantime, to reach their objectives of food security and prevent hunger, the relevant countries must be able to face climate change. They should be able to obtain suitable strategies, technologies and other necessary means to face and remedy the new natural conditions. That is, the process which affects the economy of the countries in various forms.

Governments need to plan and improve strategies to develop their food production. Such a priority can create healthier generations that will positively affect next generations too. However, all the countries of the world, somehow or other are under the impact of malnutrition, and need to face it. Therefore, it seems to be the largest challenge of the world safety (WHO,2018).

Conclusion

The paper enunciates how food production affects access to nutritional needs. Currently, the world is housing 7.5 billion people, and within three decades ahead it will reach 9.5 billion by the year 2050. While about 80 per cent of the world population will belong to the developing world, effective planning needs to be applied to produce the necessary food materials for those people in the course of upcoming decades. If not, the next generations will be badly affected too.

As far as the developing countries are concerned, many of the food producers, and those producing agricultural products and food items, are not equipped with sufficient economic and natural resources for producing agricultural products, the preservation of products and the like. Such a scenario contributes to food shortage in those countries. Therefore, dissipation of up to date information in the developing world needs to increase within the farmers and food producers as much as possible. Based on the real facts, hunger still includes one billion people of the world. After the passage of six decades since 1960, or the discoveries towards the green revolution, suffering from malnutrition, shortage of food and poverty are observed within a large number of people. Many people of the less developed world and Africa are suffering from daily food rations, i.e. what brings about food calories. This situation affects not only the present generations, but the next generations as well. Therefore, governments must prioritize strengthening and developing their plans of food production. In this manner, countries can have healthier generations. However, during the present century the world will experience plus 4 degree of heat rise, shortage of water and consequently food shortages will follow. The entire circumstances mentioned, will lead to a food crisis.

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