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Correlation of Malondialdehyde Status with Wrist Sprain in Nurses: A Case-control Study

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Mrinal Kanti Ray[1], Tapas Ghosh[2], Basabdatta Samanta[3]

Abstract

Context: Nurses handle heavy workloads and often sustain injuries, like wrist sprains. So, management of this requires a good understanding of the pathophysiology, which can be approached from many sides. It may be relevant to study the role of free radicals or their derivatives like malondialdehyde (MDA). *Aims:* Aim of the present study was to estimate the levels of MDA in healthy nurses and in nurses who sprained their wrists. *Settings and Design:* Sixty nurses from orthopedics ward were enlisted as subjects following predetermined inclusion and exclusion criteria and divided into two groups. Group I consisted of thirty subjects who had healthy wrists and they served as controls. Group II had thirty age and sex-matched nurses who had recent wrist sprains and they served as cases. *Methods and Materials:* Estimation of serum MDA levels were done in both groups. *Statistical analysis used:* The MDA levels of the two groups were compared. *Results:* In group II (cases with wrist sprains) levels of MDA were highly significantly increased in comparison to MDA levels in group I (control subjects). *Conclusion:* Oxidative stress in wrist sprains leads to decreased MDA levels.The findings of this research might be relevant in strengthening the association between oxidative stress (caused by free radicals and leading to lipid peroxidation) and sprains; further, the above mentioned data may be important for workers in this area of study.

Keywords: Serum; Malondialdehyde; Nurses; Wrist; Sprain.

Introduction

Nurses in different wards of hospitals handle heavy workloads and naturally, often sustain various kinds of problems. Wrist sprain is a common injury, which occurs more commonly in orthopedics wards. So, management of this requires a good understanding of the pathophysiology, which can be approached from many sides. A recent trend is to study the role of free radicals as they may cause various diseases.

In our body free radicals are produced in normal health. One- and two-electron reduction of O_2 generates superoxide and hydrogen peroxide, respectively, both of which are generated by numerous routes in vivo. In the presence of free transition metals, superoxide and hydrogen peroxide together generate the extremely reactive hydroxyl radical. Ultimately, hydroxyl radical is assumed to be the species responsible for initiating the oxidative destruction of biomolecules [1]. Though superoxide is much less reactive than hydroxyl radical, superoxide can attack various biological substances in our body. It is now well established that free radicals and other ROS are continuously being produced in vivo. In addition to the above mentioned species, singlet oxygen, hypochlorous acid, ozone, nitric oxide, etc are produced [2]. The most important reactants in free radical biochemistry in aerobic cells are oxygen and its radical derivatives. Reactive free radicals formed within cells can oxidise biomolecules and lead to cell death and tissue injury. But establishing the involvement of free radicals in the pathogenesis of a disease is extremely difficult due to the short lifetimes of these species [3]. In general, free radicals are reactive chemically, some being extremely reactive. Reactive free radicals are able to produce chemical modifications of, and damage to, proteins, lipids, carbohydrates and nucleotides. Therefore, if such reactive free radicals are produced in vivo in amounts sufficient to overcome

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the normally efficient protective mechanisms, we can expect metabolic and cellular disturbances to occur in various major ways [4]. Reactive oxygen species generated by mitochondria, or from other sites within or outside the cell, cause damage to mitochondrial components and initiate degradative processes [5]. free radicals can cause tissue damage by reacting with polyunsaturated fatty acids in cellular membranes [6]. various derivatives are produced during oxidation of PUFA by free radicals [7].

MDA may be generated during hydrolysis by the oxidation of polyunsaturated fatty acids (PUFA) in the sample and by degradation of preexisting oxidation products [8]. MDA is a three-carbon dialdehyde. MDA chemistry has been of interest for a long time and has received attention recently because of suggestions that it may play a role in degenerative biological transformations [9]. The plasma concentration of MDA is often used as a marker of lipid peroxidation [10]. MDA is one of the final products of polyunsaturated fatty acids peroxidation in the cells. An increase in free radicals causes overproduction of MDA [11]. Therefore MDA is a frequently measured biomarker of oxidative stress. The vast majority of analytical approaches for the determination of MDA make use of some kind of derivatization. Most strategies are based on the "aldehydic-reactivity" of MDA, hence employing hydrazine-based derivatization reagents [12]. The reaction of MDA with TBA is often used to assay levels of MDA in plasma. It is dependent on the development of a red pigment resulting from the reaction of TBA with oxidized lipids. The TBA test continues to be helpful when used judiciously in studies of lipid peroxidation [13]. This method is widely used and is a standard for estimating free radical induced damage [14]. The most likely reason for this wide application might be its convenient utilization in particular to large sample numbers, needing only a plate reader instrument [12]. Urinary MDA is also used as an indicator of lipid peroxidation in the diet and in the tissues [15]. Elevated plasma MDA levels have been found in various conditions, including ageing and cancers, probably due to increased lipid peroxidation [16,17]. MDA has also been associated with pain levels [18], but it is thought that it is a marker of free radical damage rather than a causative factor for pain [19].

Wrist injury including sprains are common and may significantly impair the overall function of upper extremity unless properly managed [20]. Work-related musculoskeletal disorders of hand and wrist are associated with the longest absences from work and are, therefore, associated with greater lost productivity and wages than those of other anatomical regions [21]. There is now much evidence both direct and indirect implicating reactive oxygen species in pathogenesis of inflammatory synovitis. Cells present in inflamed joint, such as endothelial cells have the ability when isolated and stimulated to produce reactive oxygen species [22]. Since free radicals play an important role in inflammation, the pathophysiology of wrist sprain is likely to be influenced by their levels [23]. Increased levels of superoxide and other free radicals are found in inflammation [24]. But, to our knowledge, even after extensive search, measurements of MDA in patients with wrist sprain have never been recorded.

Since free radicals might be an important agent in the process of sprains and tears, in an attempt to ascertain the relevance of MDA, this study was designed to assay the serum levels of MDA in healthy nurses as well as in nurses who sprained their wrists.

Subjects and Methods:

This was a case control study. Sixty nurses from orthopedics ward were enrolled as subjects. These subjects were grouped in the following manner: Group I consisted of thirty nurses who had healthy wrists and these subjects were the controls; Group II had thirty age and sex-matched nurses who had recent wrist sprains and they were the cases.

All subjects were explained properly about the study matter and duly signed consent form was collected from each individual. The study duration was one year and four months. Ethical clearance from institutional review board was obtained. Detailed health histories of all patients were recorded and physical examinations were performed. Smokers, patients with history of trauma or surgery within the last month were excluded from the study. The patients were advised not to use topical or systemic corticosteroid or other immunosuppressive treatment in the preceding 3 months of the study. Also it was ensured that participants did not have upper respiratory tract or other infectious diseases in the preceding 3 weeks before the selection of subjects.

Blood was drawn from all subjects and serum MDA estimation was done [25].

Each result was expressed as mean±standard deviation. Statistical significance of the data was determined by student's t-test.

Results

There was increase in MDA levels (in micromole/ litre) in Group II (1.9+0.7) compared to those in Group I (1.3 + 0.6), as shown in Table 1.

The two-tailed p value equals 0.0007.

By conventional criteria, this difference is considered to be statistically extremely significant.

The difference of the means of the two groups was 1.6.

95% confidence interval of this difference: from -0.937 to -0.263

Table 1: MDA levels in serum in cases and controls (N = No. of subjects)

	Group I	Group II
N	30	30
Mean (+ SD)	1.3 (+ 0.6)	1.9 (+ 0.7)
SEM	0.110	0.128

Discussion

Free radical mechanisms have been associated with a large number of disease states including inflammation. The site of free radical generation, that is whether the generation of radical species is predominantly extracellular or intracellular, may determine to a degree, the types of macromolecular and cellular damage which result [26]. Nitric oxide, superoxide and reactive oxygen species exert multiple modulating effects on inflammation and play a key role in the regulation of immune responses. They affect virtually every step of the development of inflammation. Superoxide anion produced by NAD(P)H oxidases present in all cell types participating in inflammation (leukocytes, endothelial and other vascular cells, etc) may lead to toxic effects, when produced at high levels during oxidative burst. The effects of both nitric oxide and superoxide in immune regulation are exerted through multiple mechanisms [27]. Superoxide radical depolymerizes hyaluronic acid and bovine synovial fluid; McCord et al. suggested this as the mechanism of synovial fluid degradation in an inflamed joint [28]. Free radicals are largely released into surrounding tissues of RA patients, eventually leading to tissue damage [29]. A short course of nonsteroidal, anti-inflammatory medication and perhaps repeated applications of cold may also reduce free-radical-induced secondary tissue injury [30].

MDA is a frequently measured index of lipid peroxidation [31]. MDA is determined as the thiobarbiturate chromogen formed by reaction of the plasma with 2-thiobarbituric acid under acid and heating conditions [32]. Since MDA is a metabolite of free radicals, it is logical that MDA levels might be an indicator of oxidative stress. MDA has been labelled as a biomarker of oxidative stress in subjects with familial hypercholesterolemia [33]. Eisenberg et al. found elevated levels of MDA and anti-oxidants in serum and saliva of patients with complex regional pain syndrome, therewith establishing a possible involvement of oxidative stress in the disease mechanism of this condition [34].

In inflammation neutrophil-generated superoxide reacts with an extracellular precursor to generate a substance chemotactic for neutrophils [35]. Thus it is logical that the inflammatory process in wrist sprains is dependant on free radicals. In our study also we found that there was increase in MDA levels in cases with sprained wrists compared to those in controls having healthy wrists, as shown in Table I. This data supports the idea that sprains are linked with free radicals. But some aspects of this study may be considered. Further detailed studies involving other free radical derived products like 4-hydroxynonenal, hexanal, acrolein, etc [36] should be carried out to confirm our findings. We chose MDA as it is time tested, the most abundant, widely produced, frequently measured free radical derivative of lipid peroxidation [37,38,39]. The TBARS assay also is a convenient, simple and standard method to estimate free radical damage. Further evidence for the role of oxidative stress may be obtained by studying the activity of antioxidants. Since the present study was conducted in eastern India, a larger population with different demographic profiles may ascertain a better representation of the actual scenario and prove more beneficial. Oxidative stress could cause cell damage and in order to minimize the damages, antioxidants could help to protect the cells by enhancing the body's defence systems against oxidative stress [40]. Thus, our study may help in a better understanding of the interactions of free radicals with our system, and facilitate ways to keep our body healthy.

Conclusion

Oxidative stress in wrist sprains leads to decreased MDA levels. The findings of this research might be relevant in strengthening the association between oxidative stress (caused by free radicals and leading to lipid peroxidation) and

sprains; further, the above mentioned data may be important for workers in this area of study.

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Original Article

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Knowledge of Nurses on Care of Patients on Mechanical Ventilator with a View to Develop a Nursing Intervention Protocol

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Shobana K[1], V. Uma[2], R. Sumathy[3], S. Sridevy[4]

Abstract

Caring for a patient on Mechanical Ventilation requires team work, knowledge of care, goals and interventions based on best practices, patient needs and response to therapy. The health care providers and patients face many challenges, where new treatment modalities and technology interfere with the continuing effort to strive for quality care expected outcomes. The present study was conducted to assess the level of knowledge regarding care of patients on ventilator among intensive care unit nurses working in government general hospital in Puducherry. The researchers selected Indira Gandhi Government General Hospital and Post Graduate Institute (IGGGH & PGI), Indira Gandhi Medical College and Research Institute (IGMC & RI) and Rajiv Gandhi Government Women and Child Hospital (RGGW & CH) as their study area. The findings showed that out of 75 nursing officers the majority 44 (33%) of them had good knowledge, 14 (10.5%) of them had very good knowledge, 13 (9.75%) of them had average knowledge 4 (3%) of them had poor knowledge on care of patient on ventilator.

Keywords: knowledge; ICU nursing officers; ventilator; nursing intervention protocol.

Introduction

Mechanical ventilation is a process by which gases are moved in to and out of the lungs by means of a ventilator, a machine that delivers a flow of gas to a patient's airway. The indication for mechanical ventilation includes respiratory arrest, acute lung injury, critical illness and respiratory support. A critically ill patient presents a major challenge and consequent reward to nursing. The nurse coordinates efforts of the health care team, teachers and supports the client and the family, monitors the client's response to ventilation, intervenes to maintain oxygenation and ventilation ensures that the client's complex needs are met. In order to provide a better comprehensive care to the mechanically ventilated patient, the nurse should have good working knowledge regarding the mechanical ventilation and also have the practical skills to provide better care to those patients.

Statement of the Problem

A study to evaluate the knowledge of intensive care unit nurses on the care of patients on ventilator with a view to develop a nursing intervention protocol.

Objectives of the Study

- To assess the knowledge of nursing officers regarding care of patients on ventilator.
- To associate the knowledge of nursing officers regarding care of patients on ventilator with the selected demographic variable.
- To develop a nursing intervention protocol for care of patient on mechanical ventilator

Research Approach

Quantitative research approach.

Research Design

Descriptive research design.

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Research Study Setting

The present study was conducted among ICU nursing officers. The researchers selected Indra Gandhi Government General Hospital and Post Graduate Institute (IGGGH & PGI), Indra Gandhi Medical College and Research Institute (IGMC & RI) and Rajiv Gandhi Government Women and Child Hospital (RGGW & CH) as their study area.

Population

In this study, population comprises of the nursing officers those who were working in selected hospitals at Puducherry.

Sample size

The sample size is 75.

Sampling technique

Non-probability sampling technique (convenience sampling technique).

Table 1: Frequency Distribution & Percentage of the levels of Knowledge level of Nursing Officers

Nursing Officers	Knowledge Score			
	Very Good Knowledge	Good Knowledge	Average Knowledge	Poor Knowledge
75	14(10.5%)	44(33%)	13(9.75%)	4(3%)

- The findings showed that out of 75 nursing officers the majority 44 (33%) of them had good knowledge, 14 (10.5%) of them had very good knowledge, 13 (9.75%) of them had average knowledge 4 (3%) of them had poor knowledge on care of patient on ventilator.
- The findings showed that the level of knowledge on care of patient on ventilator is associated with place of working at p>0.001.
- This study found that the level of knowledge on ventilator care is higher in nursing officers those who were working in RGGW & CH than others.

Discussion

The first objective of this study to evaluate the knowledge of nursing officers regarding care of patients on ventilator. The findings showed that out of 75 nursing officers the majority 44 (33%) of them had good knowledge, 14 (10.5%) of them had very good knowledge, 13 (9.75%) of them had average knowledge 4 (3%) of them had poor knowledge on care of patient on ventilator.

The second objective of this study to associate the knowledge of nursing officers regarding care of patients on ventilator with the selected demographic variables. The findings showed that the level of knowledge on care of patient on ventilator is associated with place of working at p > 0.001. This study found that the level of knowledge on ventilator care is higher in nursing officers those who were working in RGGW & CH than others.

Conclusion

Critical care had more questions about life and survival. The nurses are the angels from the heaven. They have the miracle hand which gives rebirth to the patients and give them to their relatives. Practically they should have appropriate knowledge and skill to bring that miracle. This study clearly identified that there was a good level of knowledge among Nursing Officers.

Recommendation

On the basis of present study, the following recommendations are formed for future study.

1. Similar study can be conducted in other parts of the country with a large sample.
2. Similar study can be conducted in different settings.

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Original Article

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Effectiveness of Nurse Led Education on Self Care Management of Renal Failure among Haemodialysis Patients

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Settepalli Jasmin Debora

Abstract

Introduction: Self care management of renal failure is a positive effort to oversee and participate in their health care to optimize health, prevent complications, control symptoms, control medical symptoms and minimize the intrusion of the disease in to their preferred life. Self management comprised of 2 domain self management of health care and self management of everyday life; the nurse should provide ongoing education and reinforcement while monitoring the patient progress and compliance with treatment regimen. *Methods:* An Evaluatory approach with one group pre test post test pre experimental design was used for this study. The sample consist 60 haemodialysis patients who belong to 35-45 years of age attending nephrology ward at NRI general hospital. They were employed by a non probability purposive sampling technique. The study was conducted at NRI general hospital chinakakani. The data was collected prior to and after the Nurse led education by administration a structured interview schedule. *Results:* The data was analyzed by descriptive and inferential statistics. There was significant difference in the Mean scores of pre-test and post test of haemodialysis patients on self care management of renal failure after Nurse Led education. The educated haemodialysis patient's scores after intervention showed association. *Conclusion:* The Nurse led education was found to be an effective strategy for providing information and for improving the knowledge of haemodialysis patients on self care management of renal failure.

Keywords: chronic kidney disease; haemodialysis; Nurse led education; Renal failure; self care management.

Introduction

Chronic kidney disease (CKD) is a major public health problem worldwide; the current burden of disease might be due to change of an underlying pathogen city of chronic kidney disease [1]. Now a day's infection became a less evident and co morbid conditions such as hypertension, diabetes, cardiovascular disease and obesity are major risk factors in chronic kidney disease [2].

Self care management is a positive effort to oversee and participates in their health care to optimize health, prevent complications, control symptoms and minimize the intrusion of the disease in to their preferred life [5].

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The nurse should provide ongoing education and reinforcement while monitoring the patient progress and compliance with treatment regimen. From the available literature, it was found that chronic renal failure is debilitating condition responsible for high mortality and morbidity. Hence, Life style modification is effective to prevent and control the disease progression.

Objectives

- To Evaluate the effectiveness of Nurse led education programme on self care management of Renal failure among Haemodialysis patients by Pre-test and Post-test.
- To find the association between the post-test scores of Haemodialysis patients on self care management of Renal Failure with their selected variables.

Hypothesis

H_1: There will be significant difference between pre-test and post-test knowledge scores of haemodialysis patients after implementation of

Nurse led education on self care management of renal failure.

H_2: There will be significant relationship between selected variables and the post test knowledge scores of haemodialysis patients on self care management of renal failure.

Materials and Methods

Research Approach: Descriptive survey research approach was adopted

Research design: Pre experimental one group pre-test and post-test design was used for the study.

Setting of the study: The present study was conducted in nephrology wards at NRI General Hospital, Chinakakani, Guntur district, Andhra Pradesh.

Sample and sampling Technique

Sample size for the present study was 60 renal failure patients undergoing haemodialysis. Subjects were recruited by using non probability purposive sampling technique.

Inclusion criteria

The study included haemodialysis patients who are

- With the age 35 years and above
- Admitted in Nephrology ward at NRI General hospital, chinakakani, Guntur, Andhrapradesh
- Able to understand and speak Telugu
- Available at the time of data collection
- Willing to participate in the study

Exclusion criteria

The study excluded haemodialysis patients who are

- Less than 35 years
- Not admitted in nephrology ward at NRI General Hospital
- Undergoing peritoneal dialysis
- Receiving haemodialysis treatment for the first time
- Not able to understand and speak Telugu
- Not available at the time of data collection

Description of the tool

The Structured interview schedule was developed and used for collecting the data. The interview schedule consists of 2 sections, namely section A and B.

Section A consists of 8 questions selecting the demographic data and general information of the subjects, Age, Sex, Religion, Marital status, Education. Occupation, Monthly income in rupees, Diet pattern.

Section B consists of 33 multiple choice questions on knowledge regarding self care management of renal failure with 4 options each correct answer was assigned 4 of one. The total score of section B was 33. Subjects who got scores above 76% were considered as having the adequate knowledge; the score between 51-75% were considered moderately adequate and the scores below 50% were considered as having inadequate knowledge.

Development of Nurse led education: Nurse led education was conducted by the researcher using Power point projection, Flash cards, charts on self care management of renal failure for 35 min.

Validity of the Tool

The content is validated by 7 experts, of which 5 were nursing experts and 2 were doctors. The validates had suggested some modifications in the questions the modifications and suggestions were incorporated in the final preparation of the interview schedule by the investigator.

Reliability of the tool

The reliability was assessed by applying split half method (6 subjects); Karl Pearson's correlation formula used to test the reliability of the prepared tool. The reliability was r= 0.86 indicating high reliability.

Pilot study

Pilot study was conducted in nephrology ward (43A) at NRI General Hospital with purpose to find the feasibility and practicability of the study design. A group of 10 renal failure patients undergoing haemodialysis with age 35 and above were randomly selected from nephrology wards, interviewed to assess the knowledge regarding self care management of renal failure then Nurse led education was given on self care management of renal failure among haemodialysis patients using flash cards, natural food stuffs, charts and pamphlet

and post test was conducted after a fifteen days and It was found to be feasible it covered 35 to 40 mints on average for interview for one subject.

Collection of Data

Researcher obtaining prior permission from authorities, consent was taken from subjects. The subjects were recruited by employing purposive sampling technique and sixty subjects were selected based on inclusion and exclusion criteria; the data were collected in two phases; in first phase pre test was given to renal failure patients undergoing haemodialysis in nephrology ward (43) at NRI General Hospital. A Nurse led education was administered on the same day of the pre test with the help of visual aids, in second phase a post test was given with gap of 15 days from pre test and data were collected by using structured interview schedule.

Results

Section I: Frequency and percentage distribution of Haemodialysis patients,

Table 1 describes socio-demographic

Table 1: N=60

S. No	Sample characteristics	Frequency (f)	Percentage (%)
1.	*Age in Years*		
	a) 35 – 45 years	41	68.3
	b) 46 – 55 years	12	20
	c) 56 – 65 years	3	5
	d) 66 years and above	4	6.7
2.	*Educational qualification*		
	a) Illiterate	12	20
	b) 1 – 5th class	5	8.3
	c) 6 – 10th class	15	25.2
	d) Intermediate	14	23.2
	e) Undergraduate	12	20
	f) Post-graduate and above	2	3.3
3.	*Monthly income in Rupees? [ ]*		
	a) Rs. 5,000/- and below	38	63.4
	b) Rs. 5001/- to Rs.10,000/-	17	28.3
	c) Rs. 10,001/- to Rs. 20,000/	4	6.6
	d) Above Rs.20,000/-	1	1.7
4.	*Diet pattern?*		
	a) Vegetarian	29	48.4
	b) Non-vegetarian	31	51.6

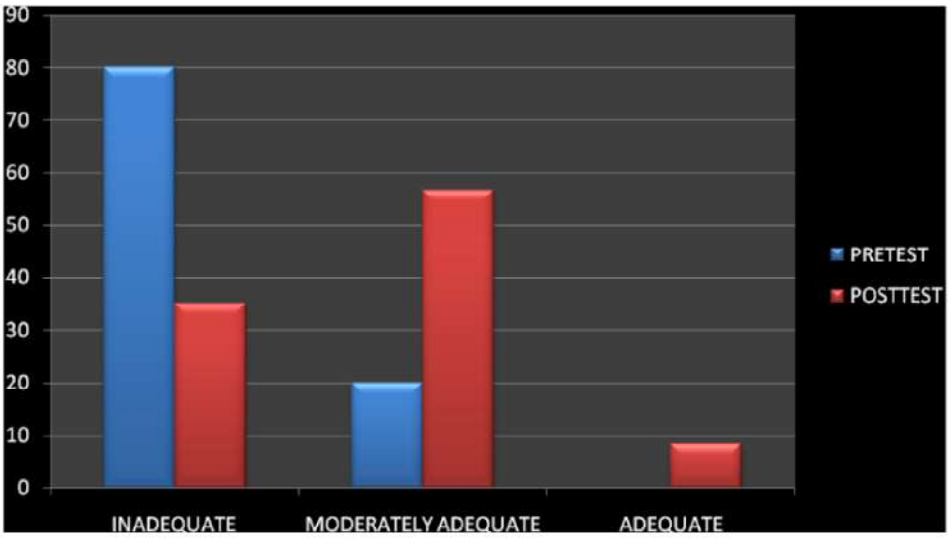

Fig. 1:

characteristics of sample 68.3% (41) subjects belong to age group of 35-45 years, 25.5% (15) had 6th to 10th class education, 63.4% (38) had income 5000 and below, 51.6% (31) were non vegetarians (Table 1)..

Section II: Frequency and percentage distribution of knowledge scores of haemo dialysis patients on self care management of renal failure in pretest and post test. (Fig.1)

Section III: Mean and Standard deviation and Paired -'t' value of knowledge scores of renal failure patients undergoing haemodialysis regarding self care management of renal failure in both Pre test and post test (Table 2).

Table 2: N =60

Knowledge scores	Mean ($\bar{x}$)	Standard deviation (SD)	Paired-'t' Value
Pre test	25.6	5.9	33.3 (P<0.001)
Post test	30.3	8.3	
Improvement	4.63	2.4	

Table: 2 conclude that there was significant difference between post test and pre test knowledge scores regarding self care management of renal failure among haemodialysis patients indicating that the Nurse led education was effective.

Section IV: Association between Selected variables and post test scores obtained by renal failure patients undergoing haemodialysis

There was significant association between the knowledge levels of renal failure patients undergoing haemodialysis and selected variable, education ($\chi 2$ =20.3). There was no significant association between the knowledge levels of renal failure patients undergoing haemodialysis and selected variables like age ($\chi 2$ =2.05), monthly income ($\chi 2$=6.06), diet pattern ($\chi 2$=2.7).

Discussion

The findings of present study revealed that majority of the respondents 80% (48) had In adequate knowledge, few respondents 20% (12) had moderately adequate knowledge and none of them have adequate knowledge in pre-test. The overall pre test mean knowledge scores of haemodialysis patients was $\bar{x}$-25.6 with SD-5.9, these findings were consistent with the study conducted by Curtin, Roberta Braun; which state that mean post test knowledge score of the subjects was 78.8%; higher than the mean pre test score 31.0% and was found to be significant with a calculated t -value of 32.8, p<0.05 [2]. Sota. Marisela stated that noncompliance dialysis patients require major changes in lifestyle including dialysis, strict diet, fluid restriction and medication through proper teaching programme [7] in accord with the study.

The findings of present study after Nurse led education, showed majority, 56.6% (34) had gained moderately adequate knowledge, 35% (20) had In adequate knowledge and 8.3% (5) had adequate knowledge. This is concurrent with the study by Issac R. Which showed that an information booklet is an effective method in improving the knowledge of hemodialysis patients [11].

The overall post test mean knowledge scores of haemodialysis patients was $\bar{x}$ 30.3 with SD-8.3 which is homogenous with the study by Lingerfelt KL. Thornton K, et al. stating a significant improvement in ESRD knowledge post-intervention (p<0.000), which could lead to improved self management and better outcomes [10]. Tsay S.L., Hunglo, et al., concluded that, there is greater significant improvement in the empowerment group than the control group [6]. The present study findings yield that an significant improvement in the post test scores after nurse led education will enhance quality of life haemodialysis patients which is supported by Bayoumi M, El-Fouly Y, et al. The results show significant improvements that revealed in the scores of many domains of quality of life, p<0.001 [9].

On Comparison of pre test and post test knowledge scores obtained paired 't' test value is greater than the table value t-33.3 (p<0.01) both at 0.01 and 0.05 level of significance. Therefore the research hypothesis H1 was accepted and Null hypothesis H01 was rejected at 0.05 level of significance. It is inferred that there is a significant difference in the knowledge levels of the renal failure patients undergoing haemodialysis on self care management of renal failure due to the implementation of Nurse led programme.

There was significant association between the knowledge level of the renal failure patients undergoing haemodialysis with selected variable Education ($\chi 2$=20.3). Hence, the research hypothesis H_2 was accepted both at 0.01 and 0.05 level of significance and Null hypothesis H02 was rejected.

There was no significant association between the knowledge level of the renal failure patients undergoing haemodialysis with selected variables like Age ($\chi 2$=2.05), Monthly income ($\chi 2$=6.06), Diet pattern ($\chi 2$=2.7). Hence, the Research hypothesis H01 was rejected both at 0.01 and 0.05 level of

significance and Null hypothesis was accepted. Which is persistent with the study by Curtin, Roberta Braun there is no association between the Post test mean knowledge score and selected variables like age religion occupation, residence [2].

Conclusion

The study concluded that there is significant improvement in knowledge score before and after nurse led education on self care management on renal failure among haemodialysis patients; and the knowledge scores had association with the variable education indicating educated patients learn faster in comparison to illiterates. The nurse led programme will enhance the quality of life among haemodialysis patients.

Acknowledgement

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Conflict of Interest:

No conflict of interest

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Original Article

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Effectiveness of Ice Cube Application or Prior to Intra Muscular Injection on Pain Intensity among Adult in Selected Hospital, Tamilnadu

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Abstract

Nurses as advocates for adults, are committed to minimize the emotional and physical impacts of painful procedures. Providing pain relief is considered a most basic human right and it is the obligation of the nurse to utilize best way to deal with various pain control measures such as applying pressure, taping the skin, applying heat and cold. This study was done to assess the effectiveness of ice cube application for prior to intra muscular injection on pain. The study findings shows post test level of pain intensity in experimental group revealed that 19 (63.33%) subjects had mild pain and 11 (36.67%) subjects had moderate pain level and post test level of pain intensity in control group revealed that 13 (43.33%) subjects had moderate pain and 17 (56.67%) subjects had severe pain level. The calculated unpaired 't' value of t=8.76 was found to be statistically significant at p<0.001 level.

Keywords: Pain; Ice Cube Application and Intramuscular Injection.

Introduction

Pain is a multidimensional phenomenon, it is difficult to define, it is an individual and subjective experience, and no two individuals experience pain is the very same way. Pain is standout amongst the most widely recognized reasons for human sufferings, which is considered as a major health problem among adults. There are 16 billion Intramuscular injections (IMI) administered annually throughout the world (WHO, 2013).

Pain resulting from IM injection should not be underrated, in light of the fact that a painful injection might affect serious apprehension of injection, which may lead a patient to postpone looking medical help. Decreasing patients' pain is critical for all nurses in light of numerous reasons. Unnecessary pain can harm the nurse-patient relationship. Intramuscular injections (IMI) are regular complex procedure used to deliver medication profound into the vast muscle of the body. There are various pharmacological and non-pharmacological measures to lessen pain. Research evidences demonstrated that non-pharmacological measures complimentary or alternative nursing interventions, which were advocated to minimize pain in patients.

Cryotherapy is most well-known techniques for cold application incorporate cold packs, cold immersion, and ice massage. Spray and stretch is an application of cryotherapy with a vapocolant spray, which then is followed by stretching of the included muscles. Contingent on the application technique and length of time, the essential physiologic impact incorporates, diminish local metabolism, vasoconstriction, reactive hyperaemia, lessened oedema, decreased haemorrhage and reduced muscle effectiveness. In this manner, the present study will be conducted to evaluate the effect of cryotherapy on pain intensity among adult patients receiving intramuscular injections.

Objective

- Assess the pain intensity among adult receiving IM injection in experimental and control group
- Compare the pain intensity among adult receiving IM injection between experimental and control group
- Associate between pain intensity and selected demographic variable in experimental and control group

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Materials and Methods

Research Design

The research design selected for the study is quasi experimental design (post test control group method)

Research Variables

In this study dependent variable is level of pain and the independent variable is ice application. The demographic variable consists of baseline characteristics of adult such as age in yrs, sex, religion, educational status of caretaker, family income in month, and type of intramuscular injection, to be received and site of intramuscular injection.

Independent variable: Ice cube application

Dependent variable: Pain during intramuscular injection

Demographic variable: Age, sex, religion, site of IM injection, type of medication

Setting of the Study

This study was conducted in selected hospital in thiruvannamalai, Tamilnadu. The setting for the study was the medical and surgical wards, which is situated in the 2nd and 3rd floor of selected hospital. It consists of 200 beds.

Population

Both male and female who were admitted to medical surgical wards.

Sample and sample Size

A total of 60 patients (experimental group 30 and control group 30) both male and female who were admitted to medical surgical wards and who fulfilled the sampling criteria were the samples.

Sampling Technique

Patients who fulfilled inclusion criteria were included in the study. Samples were selected by using convenient sampling technique.

Criteria for Selction of Sampls

Sampling criteria is a list of characteristics essential for the membership in the target population sampling criteria inclusion and exclusion criteria.

Inclusion Criteria

- The adult age group between 20 to 35 years
- Both male and female patients.
- Who are receiving medication such as paracetamol, Diclofenac Sodium and Dicyclomine.
- Among adults who are available during the study period.
- Patients who could understand and speak Tamil and/or English.

Exclusion Criteria

- Patients with chronic pain associated with other disease condition.
- Sedated and unconscious patients.
- Adult patients who are receiving intramuscular injection for the first time.
- Patients have impaired circulation, peripheral vascular disease.
- Local infection.

Development and Description of Tool

The data will be collected using the tool consisted of

Section A: consisted of socio-demographic data

Section B: Visual analogue scale (VAS)

Subjective perception of pain during IM injection assessed by using a visual analogue scale. The scale comprised of a horizontal line with 0 -10 numbers. The score 0 indicates no pain and score 10 indicates worst possible pain. The pain scale was shown to the patient after ice cube application and asked the patient to mark the pain level.

Results and Discussion:

Finding revels that demographic variables in experimental group, with regard to age 12 (40%) were above the age of 32 years, 5 (16%) respondents to age group (20-24 years) and (29-32 years). with regard to Sex 16 (53.33%) respondents well male and 14 (46.66%) respondents were female, with regard to religion 20 (66.66%) belonged to the religion for Hindu 3 (10%) respondents to the religion for Muslim with regard to educational status 13

(43.33%) had no formal education and 8(26.66%) had secondary level and 6 (20%) had primary level and 3 (10%) respondents had graduate level of education. with regard to family monthly income 17 (56.66%) of the family income of below 5000, 11 (36.66%) of the respondents income of (5001-10000), to 2 (6.66%) of the respondents is the above 10000 of family income. with regard to type of IM injection 17 (56.66%) were given Diclofenac sodium 9 (30.0) were given paracentamol and 4 (13.3) Dicyclomine injection were given with regard to site of IM injection 30 (100.00%) injection were administered Gluteal muscles site. No injection was administered in Deltoid muscle site.

In control group, with regard to Age 14 (46.66%) belonged to the age group of above 32 years, 5 (16%) respondents to age group (20-24 years) and (25-28 years). with regard to sex 18 (60%) respondents well female and 12 (40%) respondents were male. with regard to religion 27 (90%) belonged to the religion for Hindu 1 (3.33%) respondents to the religion for Muslim. with regard to educational status 16 (53.33%) had primary level and 6 (20%) had no formal education and 5 (16.66%) had secondary level and 3 (10%) respondents had graduate level of education. with regard to family monthly income 20 (66.66%) of the family income of below 5000, 6 (20%) of the respondents income of (5001-10000), to 4 (13.33%) of the respondents is the above 10000 of family income. with regard to type of IM injection 14 (46.66%) were given Diclofenac sodium 9 (30.0) were given paracentamol and 7 (23.33) Dicyclomine injection were given with regard to site of IM injection 30 (100.00%) injection were administered Gluteal muscles site. No injection was administered in Deltoid muscle site.

The first objective was to assess the pain intensity among adult receiving IM injection in experimental and control group. A result shows that the analysis on post test level of pain intensity in experimental group revealed that 19 (63.33%) subjects had mild pain and 11 (36.67%) subjects had moderate pain level. The analysis on post test level of pain intensity in control group revealed that 13 (43.33%) subjects had moderate pain and 17 (56.67%) subjects had severe pain level.

The second objectives was to compare the pain intensity among adult receiving IM injection between experimental and control group. A result shows that the post test means score of Pain intensity in the experimental group was 11.01 with standard deviation 0.95 and the post test mean score of Pain intensity in the control group was 9.25 with the standard deviation was 0.56. The calculated unpaired 't' value of t=8.76 was found to be statistically significant at $p<0.001$ which indicates that there was difference in the post test level of Pain intensity between the groups, this clearly shows that the ice cube application prior to intra muscular injection reduces the level of Pain intensity in the experimental group.

Third objective was to associate between pain intensity and selected demographic variable in experimental and control group. The result shows that there is significant association between the

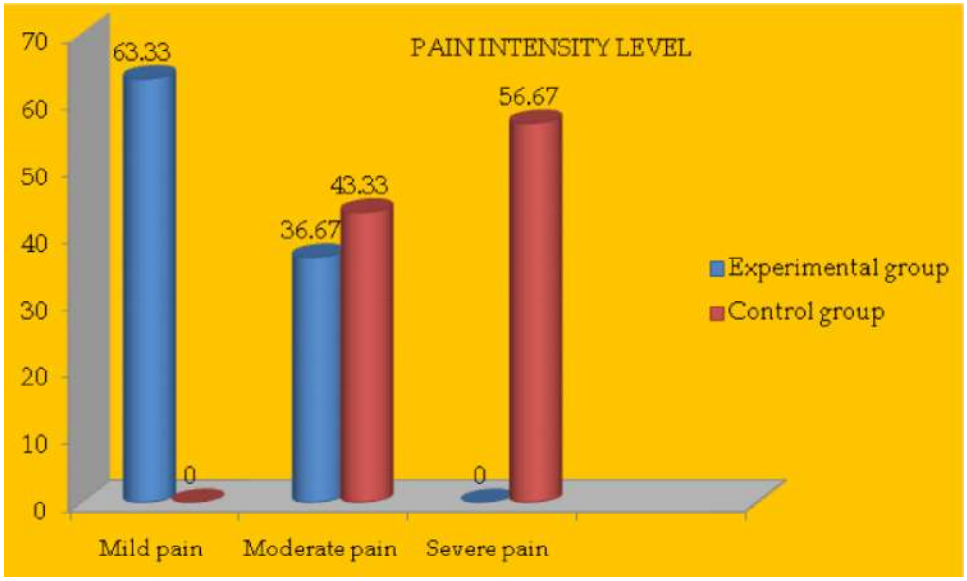

Fig. 1: Percentage distributions of adult according to the level of pain after receiving IM injection in both the experimental and group.

control group pain level and demographic variable like age, gender, religion, educational status, family income, types of IM injection. There was age significant between pain intensity and IM injection prior to ice cube application in experimental group. There is relation between gender, religion, educational status of the respondents and control group pain level on ice application prior to intra muscular injection on the intensity of pain among adult people experimental and control group.

Conclusion

Ice cube Application prior to IM injection on pain intensity in experimental group had significant improvement in their post test degree of pain intensity than the clients in the control group who had received routine hospital treatment. Hence, ice cube application can be used as a safe and effective alternative therapy for prior to IM injection to reducing pain intensity level.

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Review Article

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Interprofessional Education: An Approach to Improve Health Outcomes

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Abstract

As the complexity of knowledge and skills required for quality patient care continue to progress and number of individuals involved in the management of a single patient accordingly increases, effective team functioning becomes consecutively more important. Interprofessional education (IPE) and practice deliver team based care that fortifies health systems and improves health care outcomes. There is consensus that health care professionals must have the competency to work in teams to provide safer, quality care to multiple populations in varied health care settings. Interprofessional education and collaborative (IPEC) has published four competencies to exercise into practice. They are values and ethics; roles and responsibility; interprofessional communication and; team and team work. The framework for action on IPE is discussed as i) IPE, ii) collaborative practice and iii) health education and system. IPE is shaped by the mechanism of a) educator and b) curriculum. Collaborative practice level mechanisms are a) institutional support, b) working culture and c) environment. Health and education system deals with the ways services are provided in a) health care delivery and b) patient safety. This paper further encompasses benefits of IPE, and factors affecting the implementation of IPE. It also augments the results of research evidences in highlighting numerous activities that ultimately improves health outcomes.

Keywords: Interprofessional Education; Collaborative Practice; Team Work; Health Outcomes.

Introduction

The National League for Nursing (NLN) believes that contemporary educational approaches must encompass opportunities for students to engross in interprofessional education (IPE) and interprofessional practice (IPP). IPE and IPP convey team based care that amplifies health systems and ameliorates health outcomes. There is a unanimity that health care professionals should have the competency to work in teams to render safer, quality care to multiple populations in different health care settings [1]. Acknowledging that nurse is fundamental and essential in the delivery of team based, patient-centered care, the NLN confronts nurse educators to amalgamate with other health professions to ensue meaningful IPE and IPP openings for students.

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IPE is a noteworthy pedagogical approach for conceiving health professions' students to render patient care in an integrated team environment. The charming premise of the IPE is that once health care professionals start to work together in a combined manner, patient care will escalate. Interprofessional team strengthens the quality of patient care, lower costs, brings down patients' length of stay and keeps medical errors on the decline. There are few international organizations that have communicated support to IPE such as World Health Organization (WHO), National Academics of Practice, and American Public Health Association and so on [2]. Most significantly, the Institute of Medicine (IOM) proclaimed that health professionals should be educated to render patient-centered care as participants of an interdisciplinary team [3].

As the entanglement of knowledge and skills involved for good patient care persist to get bigger and the number of individuals required in the management of a single patient proportionately grows higher, effective team functioning becomes progressively more significant. Physicians and nurses are the most dynamic members in this team. In a hospital setting, however, it is evident

that their endeavors in patient care are not always harmonious and recognition of this fact has led to fattening national concern [4].

Background of interprofessional education

In the early 1970s, IOM recognized the necessity for and the impact of team based patient care on patient safety and amalgamated interprofessional communication (IOM1972; 2001; 2003) [3]. In 2009, IOM and Institute of Health care Improvement (IHI) demands team based care. Six National associations of health professions schools built Interprofessional Education Collaborative (IPEC) to advance and heighten interprofessional learning experiences to produce future health professionals to render team based care [5].

Need for interprofessional education

It is presumed that if members of varied professions learn with, from and about one another, they will associate and work better together to headway in their professional field as well as they will render upgraded services to the patients ensuing in enhanced clinical outcomes and quality of care being given to the patients [6]. The fragmented way in which health care is being provided to the patients and detachment between different professions occupied in patient care are often cited as obstacles in providing best health care to the patient [7]. Accreditation standards and guidelines from health care professions have also communicated that collaborative approach in education is inevitable [8].

Interprofessional communication and collaboration for revamping patient health outcomes focuses on IPE as a central competency for patient centered care. Part of document states that 'IPE enables the baccalaureate graduate to enter the workplace with baseline competencies and confidence for interactions and communication skills that will improve practice, thus yielding better patient outcomes'. IPE optimizes opportunities for the development of respect and trust for other members of the health care team [9].

IPEC published four core competencies as a framework for IPEC practice (2011)

1. *Values and ethics*: Work with individuals of other professions to sustain a climate of mutual respect and shared values.
2. *Roles and responsibility*: Use the knowledge of one's own role and those of other professions to assess and communicate the health care needs of the patients and populations served.
3. *Interprofessional communication*: Communicate with patients, families, communities and other health professionals in a responsive and responsible manner that supports a team approach to health maintenance and the treatment of disease.
4. *Team and teamwork*: Apply relationship-building values and the principles of team dynamics to discharge effectively in different team roles to plan and render patient-centered care that is safe, timely, efficient, effective and equitable.

Framework for action on IPE and collaborative practice

The framework for IPE and collaborative practice [11] as designed by World Health Organization is shown in Fig. 1:

A) IPE is shaped by mechanisms that are classified into:

- Staff responsible for developing, delivering, funding and managing IPE – educator mechanism
- Interprofessional curricula – curricular mechanism

i) Educator mechanism:

Developing IPE curricula is a complex process and may require staff from different faculties, work settings and locations

Retaining IPE can be equally complex and involves:

- Support institutional policies and managerial commitment
- Good communication among participants
- Enthusiasm for the work being done
- A shared vision and understanding of the benefits of introducing a new curriculum
- A champion who is responsible for coordinating education activities and recognizing impediments to progress

For most educators, teaching students how to learn about, from and with each other is a new and challenging experience.

ii) Curricular mechanisms:

Varied types of educators and health workers add a remarkable layer of coordination for

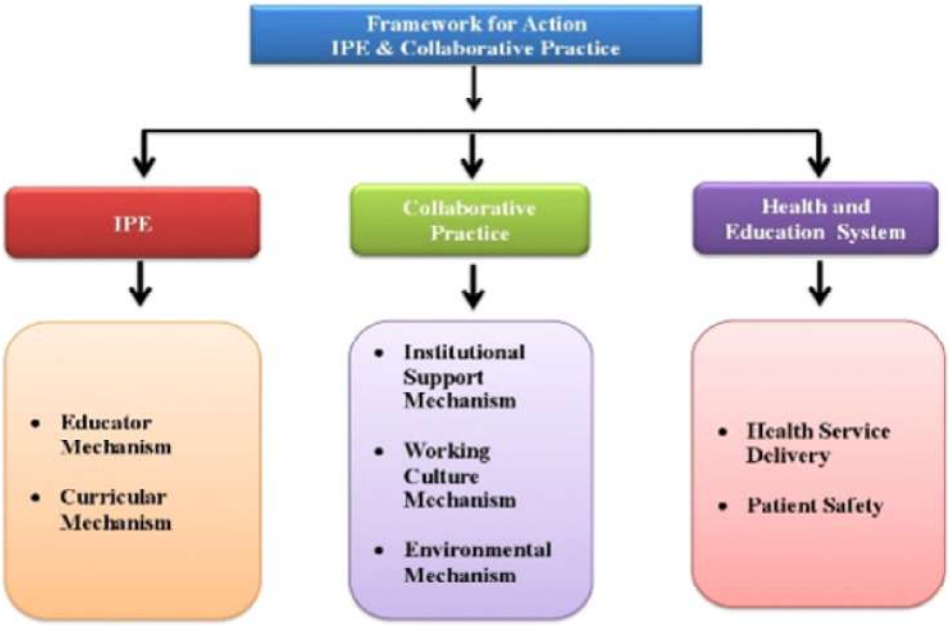

Fig. 1: Framework of interprofessional education and collaborative practice

interprofessional educators and curriculum developers.

Research designates that IPE is more effective when:

- Principles of adult learning are used
- Learning methods reflect that real world experiences of students
- Interaction occurs between students

Effective IPE pivots on curricula that associate learning activities, expected outcomes in terms of knowledge, skills and attitude, and assessment of what has been learned.

B) Collaborative practice: achieving optimal health services

Practice level mechanisms are:

i) Institutional support:

Institutional mechanism can configure the way a team of people work with unity, creating synergy instead of fragmentation.

Staff partaking in collaborative practice needs governance models, structured protocols and shared operating procedures. They require gaining insight of management supported teamwork and believes in sharing the responsibility for health care service delivery among team members. Adequate time and space is entailed for such collaboration and implementation of care. Simultaneously, personnel policies need to recognize collaborative practice and offer fair and equitable remuneration.

ii) Working culture:

Collaborative practice is effective when there are openings for shared decision making and routine team meetings. Structured information system, effective communication strategies, strong conflict resolution policies and shared decision making processes plays a dominant role in constructing a good working culture.

iii) Environment:

Effective collaborative practice can be raised by built environment, facilities, and space design. Physical space should not contemplate a hierarchy of positions. Added to it, considerations include expanding a shared space for healthier communication.

C) Health and education systems: achieving improved health outcomes

i) Health services delivery: The way in which health and education services are financed, funded, commissioned, capital planning and remuneration models have an effect on the success of IPE and collaborative practice.

ii) Patient safety: By lodging IPE and collaborative practice in legislation, accreditation requirements, registration criteria, policy makers and government

leaders can be the torch-bearer of interpersonal collaboration.

Benefits of IPE

Educational benefits:

- Students will function in practical conditions and will encounter real world experiences
- Teaching faculty from varied professions will propose contributions for program development and implementation bringing in comprehensive range of experiences
- Will reinforce mutual respect and trust among the professionals involved
- Will provide opportunities to develop competencies to work as team and expand leadership qualities
- Understanding of professional roles
- Enhanced communication and negotiation skills and professionalism
- Students will learn about the modalities and skills of other professional streams too

Health policy benefits:

- There will be better workplace based practices
- Improved patient centered care and quality enhancement
- Clinical and patient outcomes will be upgraded
- Staff confidence, self esteem and morale will be boosted
- With collaborative and team based work culture, patient safety will be refined
- Health care will be more cost effective
- Emergency patient care and disaster management will be enhanced

IPE and collaborative practice for improved health outcomes

Research evidence has shown a number of results. Collaborative practice can improve [12] can decrease [13] and bring changes in community settings [14] as shown in Fig. 2.

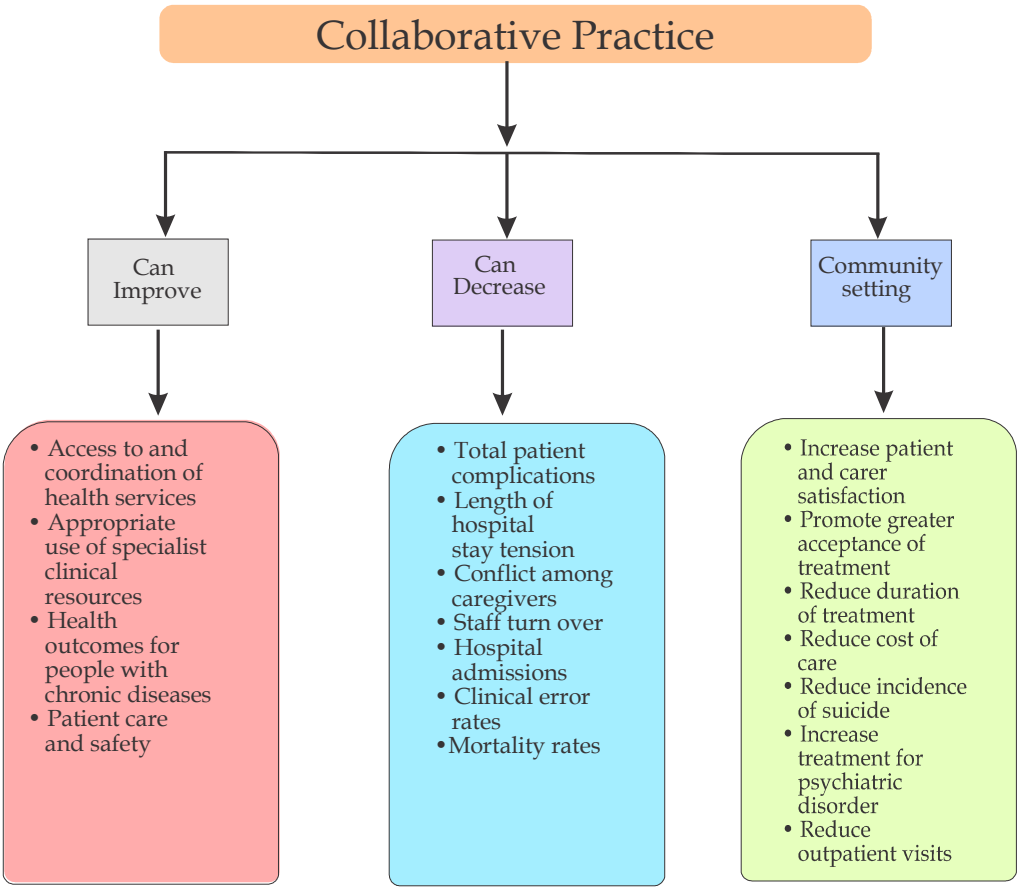

Fig. 2: Effects of collaborative practice based of research evidence

Factors affecting the implementation of IPEC [15]

- Teaching differently for a team-based health care system such as different schedules, calendars, lack of meeting space, incongruent curricular plans and so on
- Faculty workload such as developing newer educational models
- Providing opportunities for all level of students
- New roles and new focus on health eg: Nurse practitioners, Physician assistants, clinical pharmacists, informatics specialist have moved focus of health care reform
- Assessment issues: There is urgent need to develop suitable instruments to assess interprofessional competencies so as to enhance the notion of competency - based IPE.
- Lack of regulatory support- accreditation of IPE is not heard of. Bringing the regulatory bodies on board and having common regulations across all health professions involved in IPE is a big challenge.

Recommendations for faculty

- Pursue interprofessional development opportunities
- Use the IPE core competencies as a framework to develop systematic plans to help students meet the IPEC competency domains in varied educational settings
- Examine curricula content and traditional approaches to determine bias and messaging that impede IPP approaches and subsequent health care delivery
- Inspire nursing students to seek out teamwork training and collaborative practice opportunities
- Implement courses and learning opportunities that prepare graduates to focus on patient- family centered care in interprofessional teams
- Provide opportunity for students to work on interprofessional research teams and service-learning activities
- Develop clinical new models of IPE that strengthen the links between education, practice, and research and draw upon nursing expertise in knowledge generation and translation of research

Conclusion

IPE is an opportunity to not only change the way that we think about educating future health workers, but it is an opening to step back and reconsider the traditional means of health care delivery. IPE ideally would promote specific competencies in the learner, including teamwork, leadership, consensus building, and ability to identify and accomplish common patient care goals.

At the University of Minnesota the Academic health center mission statement includes the goal: 'Educate the next generation of doctors, nurses, pharmacists, dentists, public health professionals and veterinarians'. How exciting it would be to see something eventually like 'create expert teams of health care providers who will transform health and health care together'. IPE is not about bringing a change in educational practice but a change in the culture of medicine and health care.

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[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006; 35: 540-7.

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Article in supplement or special issue

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Corporate (collective) author

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Reference from electronic media

[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

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