



Hyperbaric oxygen therapy: Effectiveness of video assisted teaching program on knowledge regarding hyperbaric oxygen therapy among B.Sc. nursing students

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Abstract

Background: Strength is a lot like oxygen. We don't really pay much attention to it-unless it's missing. The aim of the study was to assess the effectiveness of video assisted teaching programme on knowledge regarding hyperbaric oxygen therapy (HBOT) among B.Sc. Nursing students at Shri. J.G.C.H.S. College of nursing, Ghataprabha, Belagavi.

Methods: Research design; a pre experimental one group pre-test post-test design was used to carry out the study. Setting: The study was conducted in Shri. J.G.C.H.S. College of Nursing, Ghataprabha, Belagavi. Students: simple random sampling technique of 2nd and 3rd year B. Sc. Nursing students (50).

Tool: Part-I structured questionnaire on demographic data. Part-II structured knowledge questionnaire to assess the level of knowledge regarding HBOT.

Results: The pre-test findings revealed that majority (60%) of the students were having average knowledge and 40% of the students were having the poor knowledge regarding HBOT, with the mean score of 14.50 ± 3.564 . The findings from post-test represents that majority (68%) were having good knowledge and 32% of the respondents were having the average knowledge regarding HBOT with the mean score of 34.40 ± 2.330 . The significant association was found between Gender and post-test knowledge scores ($\chi^2 = 3.687$ df=1 $p < 0.05$).

Conclusion: The investigator concluded that the video-assisted teaching programme can improve the knowledge regarding Hyper baric oxygen therapy among B.Sc. Nursing students.

Keywords: Assess, HBOT, knowledge, video assisted teaching programme (VATP) B.Sc. (N) Students

1. Introduction

Hyperbaric oxygen therapy is defined as administration of 100% oxygen to a patient placed inside a chamber pressurized to a greater than 1 atmosphere at sea level. Local application of pressurized oxygen to a part of the body without completely enclosing the patient is not hyperbaric oxygen therapy. In 1662, a British Clergyman Henshaw first built a sealed chamber where compressed oxygen was given as a cure to various ailments. He also used the term 'Domicilium' to describe the chamber [1].

Hyper baric oxygen therapy may be administered in two ways: multi-place chamber (used to treat multiple patients at the same time), and mono-place chamber (used to treat a single patient). In monoplace chamber a single patient is placed in a chamber which is then pressurized with 100% oxygen. Monoplace chambers are used to treat stable patients with chronic medical conditions. And Multiplace chambers are those where many patients can be treated at the same time with most commonly in sitting position [2].

The mechanism of action of hyperbaric oxygen therapy is twofold physical and physiological. The physical effect is exerted due to increased dissolution of oxygen in the plasma leading to improvement in the cellular oxygen supply by

raising the tissue-cellular diffusion gradient [3].

HBOT is a simple, non-invasive and painless treatment which most patients find comfortable and relaxing. Patients will be treated in a secure and comfortable purpose built chamber with a trained operator present to operate the barochamber. In certain circumstances the attendant will accompany clients into the chamber. On entering the chamber clients can use a chair or, alternatively, they may sit on the floor. It is recommended that clients can wear comfortable clothing and leave any jewelry or watches outside. No smoking materials, matches or lighters are allowed in the chamber [4].

The indications of administering hyperbaric oxygen therapy are arterial air or gas embolism, acute blood loss anemia, carbon monoxide poisoning, cyanide poisoning, smoke inhalation, compromised skin grafts and flaps, crush injury, decompression sickness, to facilitate enhanced wound healing, gas gangrene, necrotizing soft tissue infections (NSTI), radiation necrosis, refractory osteomyelitis, refractory mycosis, thermal burns etc. [1].

In the study by Kalani *et al.* 76% of patients treated with hyperbaric oxygen therapy had intact skin at the 3-year follow-up, compared with 48% of control patients. In

addition, there was a 20% reduction of amputation in the treated group and stated that Hyperbaric Oxygen Therapy accelerates the rate of healing, reduce the need for amputation, and increase the number of wounds that are completely healed on long-term follow-up [15].

Fink D, Chetty N, Lehm J P, Marsden D E, Hacker N. F. in their study on Hyperbaric Oxygen Therapy for delayed radiation injuries in gynaecological cancers stated that of the 14 patients included in the study, 10 patients have healed or showed improvement of more than 50% resulting in a success rate of 71% [16].

Since Hyperbaric Oxygen Therapy is a recent innovative technology which is being practiced in the clinical setting but was not administered in the Nursing curriculum thereby, the investigator felt it would be mandatory to impart the knowledge regarding Hyperbaric Oxygen Therapy among student nurses.

1.1 Research Hypothesis

H1: The mean Post-test knowledge scores of the B.Sc. Nursing students will be significantly higher than the mean Pre-test knowledge scores.

H2: There will be significant association between the post-test knowledge scores and selected demographic variables.

2. Methods

2.1 Research design: Pre experimental; one group pre-test post-test design was used to carry out the study.

2.2 Study variables: The independent variable was video assisted teaching programme on hyperbaric oxygen therapy and dependent variable was knowledge on hyperbaric oxygen therapy.

2.3 Setting: The present study was conducted in Shri J.G.C.H.S. College of Nursing Ghataprabha, Belagavi.

2.4 Sample: The samples selected for the study were 50 Nursing students from 2nd and 3rd year B.Sc. studying of Shri J.G.C.H.S. College of Nursing, Ghataprabha, Belagavi.

2.5 Tools of data collection: The tool is divided into two parts,

2.5.1 Part I: Demographic data of students: It comprised of 5 items seeking information on demographic data of the such as Age, Gender, Area of Residence, Year of study and Previous information of HBOT.

2.5.2 Part II: Structured Knowledge questionnaire on Hyper Baric Oxygen Therapy

Structured knowledge questionnaire on Hyper Baric Oxygen Therapy consists of 40 items. They were closed multiple choice questions helped in assessing the students' knowledge about Hyper Baric Oxygen Therapy.

Table 1: The score of 1 was given for each correct response.

Sl. No.	Score	Percentage	Level of knowledge
1	0-13	00-33	Poor
2	14-26	34-65	Average
3	27-40	66-100	Good

2.6 Content validity and reliability

Content validity of tool was ascertained in consultation with ten experts of which only nine experts responded. Of the 10 experts, 09 experts were from the field of Medical-Surgical Nursing and 01 from Medical Profession (Doctor). The experts were requested to judge the items for accuracy, relevance, and appropriateness. The tool was modified accordingly.

The reliability coefficient of the tool was calculated by using the Pearson's formula.

The calculated value of "r" was 0.857. The developed tool was found to be reliable.

2.7 Administration and ethical considerations

Prior permission was obtained from the concerned authority, The Principal of Shri J.G.C.H.S. College of Nursing Ghataprabha, Belagavi. Keeping in mind the ethical aspect of the research, data were collected after obtaining informed consent by the respondents, and were assured of the anonymity and confidentiality of the information provided by them.

2.8 Pilot study

The pilot study was conducted at Shri J.G.C.H.S. College of Nursing in Ghataprabha, Belagavi on 08/03/2017. To find the feasibility of the study 05 students were selected by using purposive sampling technique.

2.9 Plan for data analysis

Both descriptive and inferential statistics were used to analyze the data collected.

- Descriptive statistics: Frequency and percentage distribution were used to analyze the demographic data of students. Mean, median and standard deviation were calculated.
- Inferential statistics: Chi-square test was used to find association of knowledge scores with selected demographic variables among B.Sc. nursing students.

The statistical significance of the effectiveness of the Video assisted teaching programme would be analyzed by using paired 't' test.

3. Results

3.1 Data has been organized into sections

- Section a: Assessment of demographic characteristics of B. Sc. Nursing students.
- Section b: Findings related to pre-test knowledge Scores.
- Section c: Findings related to post-test knowledge Scores.
- Section d: Findings related to effectiveness of video-Assisted Teaching Program.
- Section e: Findings related to association of post-test knowledge scores with selected demographic variables.

Part A: Description of Demographic Characteristics of B.Sc. Nursing Students.

Table 2: Frequency and Percentage Distribution of B. Sc. Nursing Students according to Demographic Characteristics (N=50).

Sl. No	Demographic data	No. of samples	Percentage (%)
1.	Age in years		
a.	a.18-19	12	24
b.	b. 20-21	34	68
c.	c. 22-23	04	08
d.	d. 24 & Above	00	00
2.	Gender		
a.	a. Male	21	42
b.	b. Female	29	58
3.	Area of Residence		
a.	a. With family	24	48
b.	b. In hostel	21	42
c.	c. Others	05	10
4.	Year of study		
a.	a. II Year	32	64
b.	b. III Year	18	36
5.	Previous information about HBOT		
a.	a. Yes	00	00
b.	b. No	50	100

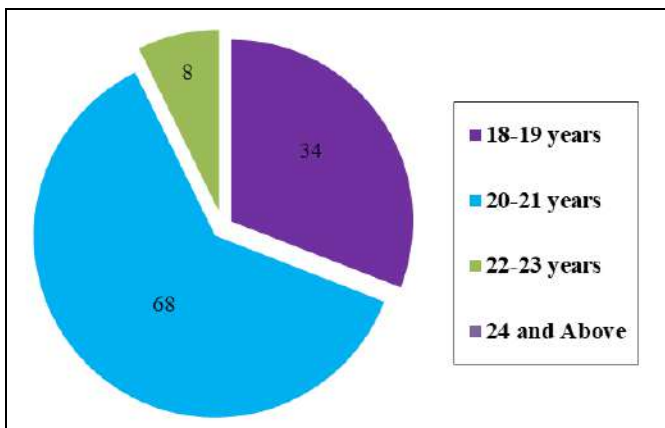


Fig 1: Percentage Distribution of Age of Students in Years

Regarding the Age of Students 12(24%) of samples belongs to 18-19 years, 34 (68%) belongs to 20- 21 years and 4(08%) were in the age group of 22-23 years (Fig.1).

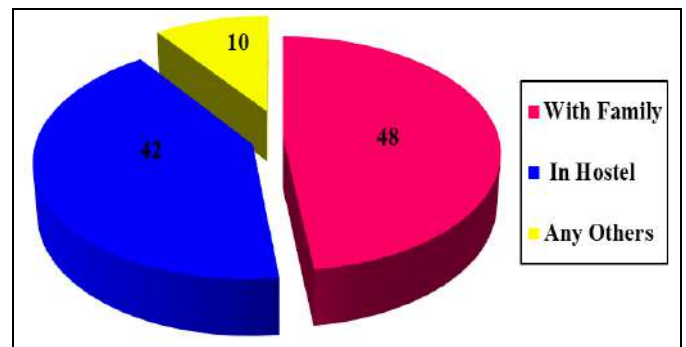


Fig 3: Percentage Distribution of Area of Residing of B. Sc. Nursing Students

While Area of residence: Majority 24(56.6%) of them are Staying with the Family, 21(43.3%) were from Hostelates and 05(8%) are Staying in others like Private rooms and PG’s (Fig.3).

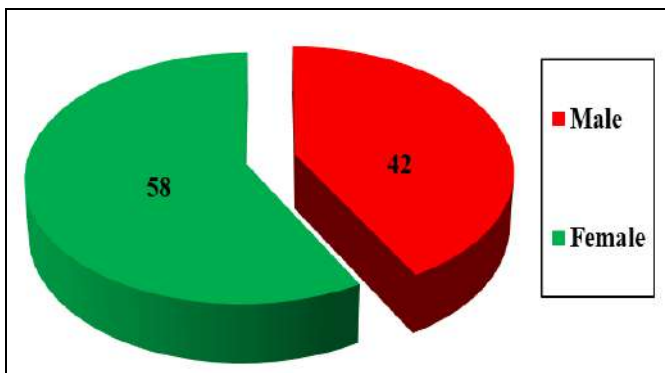


Fig 2: Percentage Distribution of Gender of B.Sc. Nursing Students

Regarding the Sex of the study samples, 21(42%) were Male and 29(58%) were Female (Fig.2).

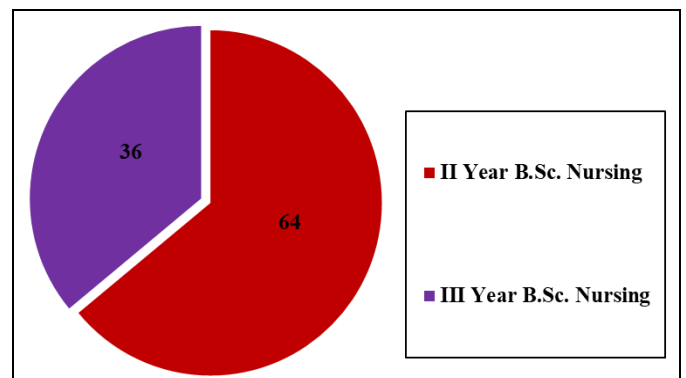


Fig 4: Percentage Distribution of Year of Study of B.Sc. Nursing Students

Majority 32 (64%) of Students are from 2nd year where as 18 (36%) of Students belongs to 3rd year B.Sc. Nursing (Fig.4).

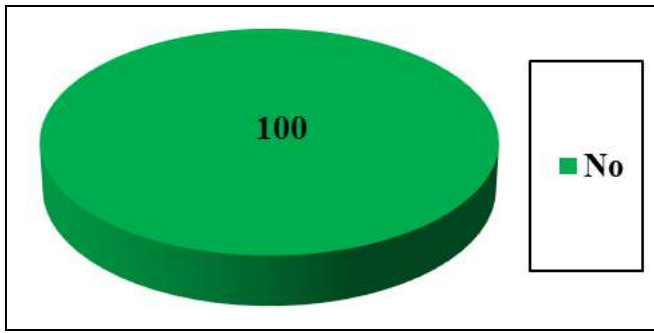


Fig 5: Percentage Distribution of Previous Information regarding Hyperbaric Oxygen Therapy

50 (100%) samples were not having the any Information regarding HBOT (Fig.5).

Section B: Findings Related to Pre-Test Knowledge Scores

Table 3: Mean, Standard deviation and Mean Percentage of Pre-test Knowledge

No.	Knowledge Aspects	Statements	Max.	Min	Mean	SD	Mean (%)
1	Pretest knowledge	40	21	08	14.50	3.564	29%

The above table shows the mean (14.50), SD (3.564) and Mean percentage (29%) of pre-test knowledge scores of respondents.

Table 4: Classification of Respondents based on Pre-test Knowledge Scores

Sl. No.	Pretest Level of Knowledge	Frequency	Percentage
1	Poor (0-33)	20	40
2	Average (34-65)	30	60
3	Good (65-100)	00	00
Total		50	100

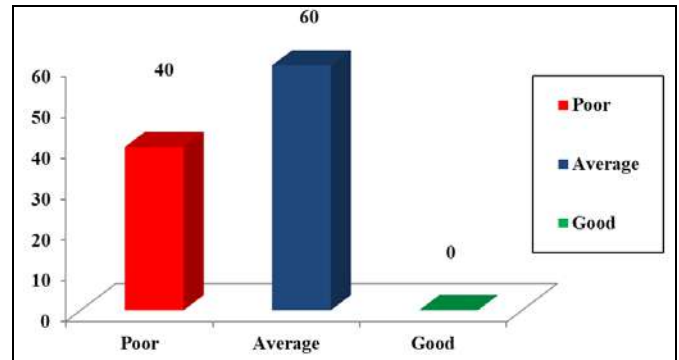


Fig 6: Percentage distribution of pre-test knowledge scores

The above figure shows that, majority (60%) of the students were having average knowledge and 40% of the students were having the poor knowledge regarding HBOT.

Section C: Findings Related to Post-test knowledge scores

Table 5: Mean, Standard deviation and mean percentage of Post-test knowledge

No.	Knowledge Aspects	Statements	Max	Min	Mean	SD	Mean (%)
1.	Post-test knowledge	40	39	29	34.40	2.330	86

The above table showed that the Mean (34.40), SD (2.330) and Mean Percentage (86) of Post-Test Knowledge scores.

Table 6: Classification of respondents based on Post-test Knowledge scores

Sl. No	Post-test level of knowledge	Frequency	Percentage
1	Poor (0-33)	00	00
2	Average (34-65)	16	32
3	Good (65-100)	34	68
Total		50	100

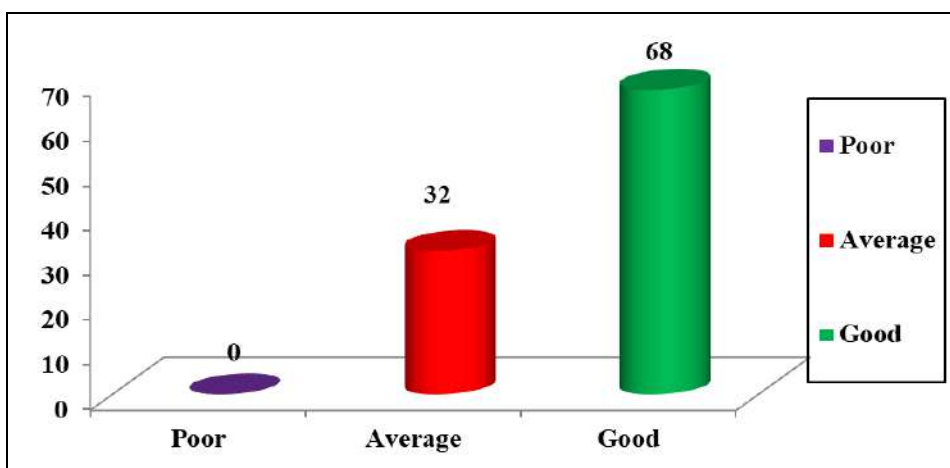


Fig 7: Percentage distribution of post-test knowledge scores

The above graph shows that the majority of (68%) students have gained the knowledge regarding HBOT after the video assisted teaching programme.

Section D: Findings related to effectiveness of video-assisted teaching program.

Table 7: Association between pre-test and post-test knowledge scores

Aspects	Max. Score	Respondents Knowledge Scores			SE of Mean Diff	Paired 't' Test	Df	P value	Inference
		Mean	SE of Mean	Mean %					
Pre test	40	14.50	0.504	29%	0.539	36.901	49	<0.05	Highly Significant
Post test	40	34.40	0.330	86%					

Table 8: Comparison of samples based the pre-test and post-test knowledge scores

Knowledge Level	Classification of Respondents			
	Pre test		Post test	
	Number	Percentage	Number	Percentage
Poor (0-33)	20	40	00	00
Average (34-65)	30	60	16	32
Good (65-100)	00	00	34	68
Total	50	100	50	100

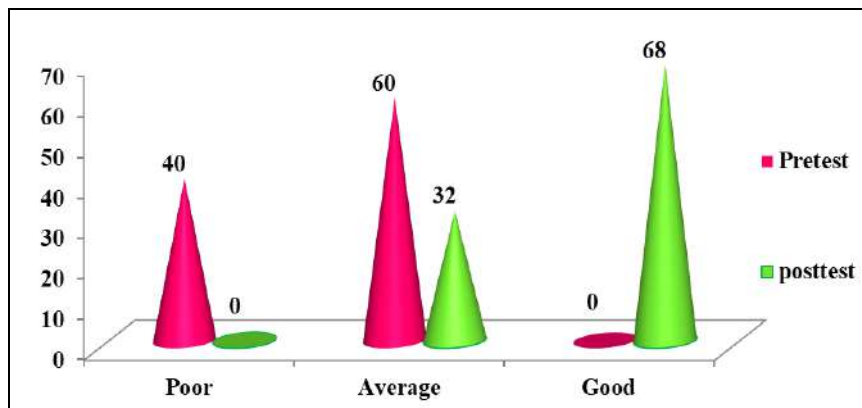


Fig 8: Percentage distribution of comparison between pretest and posttest knowledge scores

The above comparison graph represents the knowledge of the respondents during pretest (60% & 40% Average & Poor respectively) and posttest (32% & 68% Average & Good respectively) conducted by the investigator. Hence this shows the significant gain in the knowledge regarding

HBOT through VATP conducted by the researcher.

Section E: Findings related to association of post-test knowledge scores with selected demographic variables

Table 9: association between post-test knowledge and selected demographic variables (n= 50)

Sl. No	Demographic Variables	Median and Below	Above Median	Total	Chi Square Value	Df	P Value	Inference	
1	Age in years	18-19	03	09	12	4.177	2	>0.05	Not Significant
		20-21	19	15	34				
		22-23	01	03	04				
		24 & Above	00	00	00				
2	Gender	Male	13	08	21	3.687	1	<0.05	Significant
		Female	10	19	29				
3	Place of Residing	With Family	13	11	24	2.395	2	>0.05	Not Significant
		In Hostel	07	14	21				
		Other	03	02	05				
4	Year of study	II year B.Sc. Nursing	15	17	32	0.027	1	>0.05	Not Significant
		III year B.Sc. Nursing	08	10	18				
5	Previous information regarding HBOT	Yeas	00	00	00	Not Applicable			Not Significant
		No	23	27	50				

Significant association was found between Gender and post-test knowledge scores ($\chi^2 = 3.687$ df = 1 $p < 0.05$).

4. Discussion

The study was conducted to assess the effectiveness of VATP regarding Hyper baric oxygen therapy among 2nd and 3rd year B.Sc. Nursing students studying at Shri J.G.C.H.S. College of Nursing Ghataprabha, Belagavi. In order to achieve the objectives, pre experimental design was

selected; the samples were selected by purposive sampling technique.

The study was conducted for about four weeks. The data was collected from 50 respondents through a structured questionnaire. The data was organized, analyzed and presented as below.

Section I: Description of the demographic characteristics of Students.

- Majority 34 (68%) of the Age of students were ranged between 20-21 years.
- Regarding the Gender of study samples 29(58%) were female respondents.
- Majority 24(48%) of study samples were residing with the family.
- Considering the year of the study 32(64 %) of them were from 2nd year B.Sc. Nursing students.
- The majority 50(100%) students doesn't have any previous information regarding hyper baric oxygen therapy.

Section II: Analysis of pre-test knowledge scores of B.Sc. Nursing Students on Hyper baric oxygen therapy.

The mean percentage value of knowledge in the pre-test was 29% with total mean±SD of 14.50±3.564.

The pre-test findings showed that the (40%) of B.Sc. Nursing students had poor knowledge, 60% of had average knowledge on Hyper baric oxygen therapy.

Study finding coincides with the findings of Wayne A *et al.* (2006) a descriptive study which concluded that less than 10% of physicians had good knowledge, so primary care physicians were having under knowledge regarding hyperbaric oxygen therapy [7].

Section III: Evaluation of the Effectiveness of VATP on Knowledge regarding hyper baric oxygen therapy among B.Sc. Nursing Students.

Present study findings showed a significant difference between the pre-test and post-test median scores. The analysis of mean, SD and mean percentage of knowledge scores in pre-test and post-test revealed that the total mean knowledge score increased by 57% with mean±SD of 34.40±2.330, after the administration of VATP.

Paired 't' test was used to analyze the difference between the pre-test and post-test knowledge scores regarding Hyper baric oxygen therapy among B.Sc. Nursing students. The difference of knowledge (2.021-2.000, $p < 0.005$) scores was found to be highly significant. This finding contradicts with the findings of Janet Bello (2010) found the effectiveness of teaching programme on hyperbaric medicine among nurses shown that the trained hyperbaric nurse uses critical thinking skills in the areas of quality improvement by gathering, assessing and evaluating data for patients going into the altered environment of 100% oxygen under increased atmospheric pressure [8].

Section IV: Association between post-test knowledge regarding hyperbaric oxygen therapy among B.Sc. Nursing Students.

No significant association was found between the pre-test and post knowledge scores and demographic variables like age, sex, education, religion, family type, monthly family income, occupation.

4. Testing of research hypothesis

Paired 't' test was used to analyze the difference between pre-test and post-test knowledge scores of B.Sc. Nursing students. A significant increase in the post-test score was observed among B.Sc. Nursing students regarding Hyper

baric oxygen therapy. Hence the stated research hypothesis, "The mean post-test score of subject exposed to VATP on knowledge Hyper baric oxygen therapy will be significantly higher to their mean pre test scores regarding Hyper baric oxygen therapy among B.Sc. Nursing students" was accepted. It reveals that VATP was very effective in improving the knowledge B.Sc. Nursing students regarding hyperbaric oxygen therapy.

5. Conclusion

The total mean percentage of knowledge scores of B.Sc. Nursing students in the pre-test was 29% with total mean ± SD of 14.50±3.564 and in the post-test, the total mean percentage of knowledge scores was 86% with total mean ± SD of 34.4 ±2.330. The study findings revealed that the Video-Assisted Teaching Programme was highly effective in improving the knowledge of B.Sc. Nursing Students regarding hyper baric oxygen therapy.

6. Recommendations

- Similar study can be undertaken with a larger sample to have a better generalization.
- A comparative study may be carried out on knowledge regarding Hyper baric oxygen therapy among Student and staff Nurses.
- Alike studies may be undertaken with a control group.
- The study recommends that community groups, peer groups, school curricula, and other channels like mass media can be utilized as effective means of transmitting important health messages to create awareness of Hyper baric oxygen therapy.

7. Acknowledgements

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8. References

1. Dr. Balasubramanian T. Hyperbaric oxygen therapy in ENT. Otolaryngology online, 2006.
2. Available at-http://drtbalu.com/hyperbar_oxy.html
3. Carrie Carls, Michael Molyneaux and William Ryan. Hyperbaric oxygen therapy for treatment of diabetic foot ulcers. Wound Care Advisor, 2013, 2(1).
4. Available at-http://woundcareadvisor.com/wp-content/uploads/2013/01/hyper_j-f13.pdf.
5. Richa Wadhawan, Yehoshuva Reddy, Kaushal Luthra, Dharti Gajjar, Gaurav Solanki. Hyperbaric Oxygen Therapy; Utility in Medical & Dental Fields. Journal of Science. 4(10).
6. Available at-www.journalofscience.net
7. Hyperbaric Oxygen treatment trust. What is Hyperbaric oxygen treatment.
8. Available at-<https://www.hyperbaricoxygentherapy.org.uk/what-is-hbot>.
9. Kalani M, Jörneskog G, Naderi N, Lind F, Brismar K. Hyperbaric Oxygen (HBO) therapy in treatment of diabetic foot ulcers. Long-term follow-up. Journal of

- Diabetes Complications. 2002; 16(2):153-8.
10. Available at-
<http://www.ncbi.nlm.nih.gov/pubmed/12039398>
 11. Fink D, Chetty N, Lehm JP, Marsden DE, Hacker NF. Hyperbaric oxygen therapy for delayed radiation injuries in gynaecological cancers. *Int. J Gynecol Cancer*. 2006; 16(2):638-42.
 12. Available at-
<http://www.ncbi.nlm.nih.gov/pubmed/16681739>
 13. Asl MT, Yousefi F, Nemati R, Assadi M. Childhood Brain Injury. *Journal of Int. J Clin Exp Med*. 2015; 8(1):1101-7.
 14. Available at- www.hypermed.com.au
 15. Janet Bello, ACHRN, Laura Josefsen. The Advantage to Having Registered Nurses in Hyperbaric Facilities Wound Care and Hyperbaric Medicine, 2017, 8(1).