"Effectiveness of Simulation Based Learning on Management of Hypertensive Disorders of Pregnancy (HDP) in Terms of Competency of Nursing Students in Selected Colleges of Nursing in Ambala, Haryana"

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Abstract

Context: Hypertensive Disorders of Pregnancy are major leading health problem in the obstetric population and complicates 6-10% of pregnancies. Competency of health personnel plays an important role in the management of HDP. Simulation is an ideal approach in solidifying the management of hypertensive disorders of pregnancy.

Aims: The present study aims to assess the effectiveness of simulation based learning on management of hypertensive disorders of pregnancy in terms of competency of nursing students in selected nursing colleges of Haryana.

Settings and Design: The study was conducted in M.M. College of Nursing and M.M. Institute of Nursing, Mullana, Ambala. The research includes quantitative approach and Quasi- experimental Non- equivalent control group pre-test post-test design.

Methods and Material: The study comprised to 114 nursing students who were selected by using Purposive sampling technique and data were collected using selected variables of the study participants, structured knowledge questionnaire (r = 0.7), OSCE checklist (r = 0.8) and structured clinical decision making ability questionnaire (r = 0.7) were used to collect the data by e – filling and observation technique.

Statistical analysis used: Descriptive and inferential statistics i.e. frequency, mean, median, standard deviation, chi-square, t test, U test and Correlation test. SPSS software was used for data analysis.

Results: Findings showed that **t**he mean post-test knowledge score (17.79±6.08), skills score (54.77± 7.09) and clinical decision making ability score (12.03±2.86) of nursing students in experimental group was higher than the mean post -test knowledge score (17.08± 6.20), skills score (53.28±7.44) and clinical decision making ability score (9.41±3.33) of nursing students in comparison group. The calculated Z value of post-test clinical decision making ability scores in experimental and comparison group -3.86 (p=0.00) was found to be statistically significant at 0.01 level of significance.
Conclusions: The study concluded that Simulation based learning was effective in enhancing the competency in nursing students regarding management of hypertensive disorders of pregnancy.

Key-words: Simulation based learning, Competency , management of hypertensive disorders of pregnancy, Nursing students**.**

Key messages : Simulation based learning is one of the effective educational or training method which meant to imitate the real experience in a mutual manner that allows the learner to be attentive in the learning environment and also can bring various improvement in competency among nursing students.

INTRODUCTION:

Pregnancy is the time when an embryo develops inside a woman's womb. Pregnancy usually lasts 40 weeks, or longer than 9 months, as measured from last menstrual period to birth.[1] Pregnancy is a period of transition with vital physical and emotional changes[2], and it requires ongoing care for safe confinement, early detection of complications, immediate and timely treatment. [3]

The global maternal mortality ratio in 2020, per 100,000 live births was 152, up from 151 in 2019[4] whereas as per the Sample Registration System (SRS) report carried out in 2022 by Registrar General of India (RGI) for the last three years (2017 to 2019), the Maternal Mortality Ratio of India has declined over the years to 103.[5]

The global leading cause of maternal mortality rate is haemorrhage 24%, sepsis 15%, unsafe abortion 13%, hypertensive disorders of pregnancy12%, other direct cause is 8% and 20% indirect causes. The incidence of hypertensive disorders of pregnancy increased from 16.30 million to 18.08 million worldwide, an increase of 10.92% from 1990 to 2019.[6] In India, the incidence of preeclampsia is reported to be 8-10% among the pregnant women. WHO also reports that in developing countries like India there is 40% increase in the incidence of HDP in recent years. About 2.3% of all cases of preeclampsia lead to eclampsia, and most of the deaths associated with this problem have been caused by delays in diagnosis, incorrect treatment and the midwife care program.[7]

Maternal outcomes of pregnancy can improve by interventions and adequate antenatal care, which include primary preventions, detection of increased risk and early detection of any stage of hypertensive disorders of pregnancy[8]. Competency such as knowledge, skill and decision making of nursing personnel plays vital role in the management of hypertensive disorders of pregnancy.[9] Various studies shows that the most nursing students face difficulties in the practical implementation of theoretical knowledge. This is achieved through real knowledge and understanding of health care science, in which the theory of nursing is integrated with practical skills. The teaching method that contributes to this is simulation.[10]

Simulation based learning is a systematic method of acquiring and maintaining competence that forms a bridge between knowledge and clinical practice. Simulation can be the way to develop nursing students knowledge, skills, critical thinking and decision making, as it enable students to work in an environment that closely resembles that of a hospital, helping them gain health care and nursing experience before they start working as professionals.[11]

A study reported that registered nurses perceived the gap between theory and practice that could be reduced by using high-fidelity simulation using scenario-based teaching exercises in pre-licensure pre-practice programs.[12]

With this background, the study aim was carried out to assess the effectiveness of simulation based learning on management of hypertensive disorders of pregnancy (HDP) in terms of competency of nursing students.

OBJECTIVES:

To assess and compare the competency (knowledge, skill and clinical decision-making ability) of nursing students on management of hypertensive disorder of pregnancy in experimental and comparison group.

To determine the relationship between knowledge, skill and clinical decision-making ability of nursing students on management of hypertensive disorder of pregnancy in experimental and comparison group.

To seek the association of competency (knowledge, skill and clinical decision-making ability) of nursing students regarding management of hypertensive disorder of pregnancy with their selected variables.

SUBJECTS AND METHODS:

Quasi- experimental with Non- equivalent control group pretest posttest research design was adopted to assess the effectiveness of simulation based learning in terms of competency of nursing students.

Data was collected from 114 students studying BSc. Nursing 4th Year in M.M. College and M.M. Institute of Nursing, Mullana, Ambala, Haryana. Study participants were randomly allotted in experimental group (n=54) and comparison group (n=60) using purposive sampling technique. (Figure1)

Formal ethical approval was obtained from the Institutional Ethical Committee of Maharishi Markandeshwar (Deemed to be University). Mullana, Ambala, Haryana (IEC no. 2142) to conduct the study.

The study included nursing students who were pursuing B.Sc Nursing 4th year from recognized nursing colleges and having obstetrical and gynaecological nursing subject, available at the time of data collection and willing to participate and excluded the student who were absent at the time of intervention and post-test.

Data was collected by using tools -Selected variables to assess the baseline data it comprised of 4 selected variables of the nursing students such as, Gender, Nursed any patient with HDP, Sessional marks of IV Year in OBG, Clinical evaluation marks of IV year in OBG.

A structured knowledge questionnaire consisted of 35 knowledge items to assess the knowledge of Nursing Students on management of hypertensive disorders of pregnancy

To assess the skills of nursing students on management of HDP total 9 OSCE stations was prepared in which 6 manned and 3 unmanned stations with 93 items included. Nine observational checklist was prepared to assess the skills performed in each station. The items included different steps regarding management of hypertensive disorders of pregnancy and Structured clinical decisionmaking ability questionnaire was prepared to assess the clinical decision making ability of nursing students on management of hypertensive disorders of pregnancy and it comprised of 6 case scenarios with total 30 multiple choice questions. Each item had a single correct answer and awarded “1”and for an incorrect answer “0”

Content validity of tools was established and calculated ICVI & SCVI. Reliability of structured knowledge questionnaire and clinical decision making ability questionnaire was calculated by Kuder Richardson 20 method and the reliability

coefficient was found to be 0.70 that lies within an acceptable range and reliability of OSCE checklist was calculated by Inter-rater reliability method and the reliability coefficient was found to be 0.8 that lies within acceptable range.
Conventional teaching regarding hypertensive disorders of pregnancy was given to all the students through lecture cum discussion with the help of power points presentation by the subject in charge of BSc. nursing 4th year and informed consent was taken from the nursing students regarding their willingness to participate in the study. On 1st day, pre-test of the nursing students was done using selected variables, structured knowledge questionnaires, objective structured clinical examination and clinical decision making ability questionnaires through e-filling system (Google form and LMS). After pre- test, nursing students were allotted into two group's experimental group (n=54) and in Comparison group (n=60) respectively with the help of random table method.
On Second and third day, SBL video on management of hypertensive disorders of pregnancy to the nursing students of experimental group was given then total 10 SBL sessions on management of hypertensive disorders of pregnancy was administered based on two parallel case scenarios for 54 students of intervention group where each session comprise of 11 students and one last group comprise 10 students which was divided into 5 groups. On day 15th, posttest was taken regarding management of hypertensive disorders of pregnancy of the nursing students in comparison and experimental group through selected variable, structured knowledge questionnaire, objective structured clinical examination checklist and structured clinical decision making questionnaire. The data was organize, tabulate and interpret by using both descriptive and inferential statistics i.e. frequency, mean, median, standard deviation, chi-square, t test, z test and Correlation and association test. SPSS 20.00 software was used for data analysis.

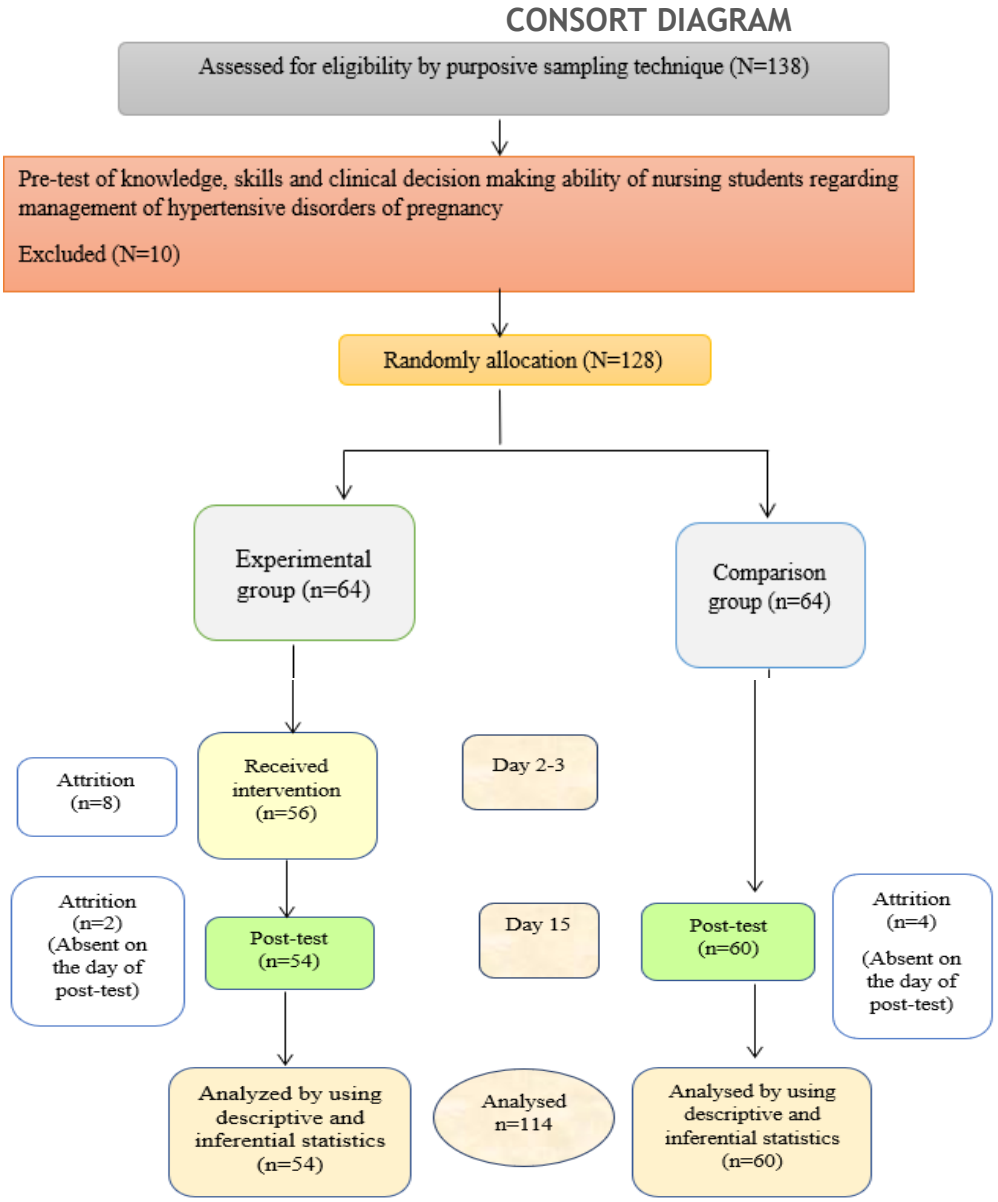

Figure 1. CONSORT diagram showing sample size

RESULTS:

The results of this study were starting with the demographic distribution of participants as shown in [Table- 1]
The computed Chi- square value was found to be statistically nonsignificant regarding gender, Nursed patient with HDP, Sessional marks in OBG and Clinical evaluation marks in OBG ward.

Table-1 Frequency, Percentage Distribution and Chi Square Showing Comparison of Experimental and Comparison Group in terms of Selected Variables of Nursing Students N=114

Sr. No.	Selected Variables	Experimental group n=54 f (%)	Comparison group n= 60 f (%)	$\chi 2$	df	p value
1	Gender					
1.1	Male	11(20%)	16(27%)	0.62	1	0.43^{NS}
1.2	Female	43(80%)	44(73%)			
2	Nursed patient with HDP					
2.1	Yes	18(33%)	25(42%)	0.84	1	0.35^{NS}
2.2	No	36(67%)	35(58%)			
3	Sessional Marks in OBG					
	00-37	13(24%)	23(38%)	2.67	1	0.10^{NS}
3.1	38-75	41(76%)	37(62%)			
3.2						
4	Clinical evaluation marks in OBG Ward					
4.1		03(6%)	00	4.72	2	0.09^{NS}
4.2	00-50	39(72%)	51(85%)			
4.3	51-80	12(22%)	09(15%)			
	81-100					

^{NS} Not significant (p>0.05) $\chi 2$ (1) = 3.84
$\chi 2$ (2) = 5.99

The result of paired t- test showed significant difference (p<0.05) in mean knowledge score (t= 5.41, p=0.00*) in experimental group and in comparison group (t=4.12, p= 0.00*)
The results of independent "t" - test revealed no significance difference between the group with regard to knowledge score in pre- and post-test (p< 0.05)

Table-2 't' Test showing difference in Pre-test and Post-test Knowledge Score of Nursing Students on Management of Hypertensive Disorder of Pregnancy in Experimental and Control N=114

Variable	Experimental group	Comparison group	t §	P
Pre- test	12.61 ±4.54	12.85 ±5.84	0.24	0.81^{NS}
Post test	17.79±6.08	17.08±6.20	0.61	0.53^{NS}
t f	5.41f	4.12		
p	0.00*	0.00*		

^{NS} Not significant (p>0.05) t(112)=1.98
*significant (p<0.05)

[Table 2] t- test shows difference in pre- and post-test knowledge score on management of hypertensive disorders of pregnancy (N=114)

The results of Wilcoxon signed- ranked test showed a statistically significant difference (p= 0.00*) in the post test mean skill score in experimental group [Table 3]. The results of Mann- Whitney U-test showed no statistically significant difference between groups with regard to pre- test skill score (p<0.05) [Table3].

Table-3 Mean, Standard Deviation, Z Value and P Value of Pre-test and Post-test Skill scores of Nursing Students on Management of Hypertensive Disorders of Pregnancy in Experimental and Comparison Group N=114

	Experimental group	Comparison group	Z §	p value
Pre test	33.18±7.45	31.75±7.00	-0.98	0.32^{NS}
Post test	54.77±7.09	53.28±7.44	-0.97	0.33^{NS}
Z f	-6.39	-6.68		
P Value	0.00*	0.00*		

^{NS} Not significant (p>0.01) Z= -2.57to 2.57
*Significant (p<0.01)

[Table 3] Mann- Whitney U- test and Wilcoxon signed- rank test shows difference in pre- and post- test skill score among nursing students regarding management of hypertensive disorders of pregnancy (N=114)

The results of Wilcoxon signed- ranked test showed a statistically significant difference (p= 0.00*) in the mean of post-test clinical decision making ability score in experimental group [Table 3]. The results of Mann- Whitney U-test showed statistically significant difference between groups with regard to post test clinical decision making ability score (p<0.05) [Table 4].

Table -4 Mean, Standard Deviation, Z Value and P Value of Pre-test and Post-test Clinical Decision Making Ability scores of Nursing Students on Management of Hypertensive Disorders of Pregnancy in Experimental and Comparison Group N=114

	Experimental group	**Comparison group**	**Z §**	**p**
Pre test	09.25±4.46	09.16±3.80	-0.17	0.86^{NS}
Post test	12.03±2.86	09.41±3.33	-3.86	0.00*
Z ᶠ	-4.60	-0.43		
P Value	0.00*	0.66^{NS}		

^{NS} Not significant (p>0.01) Z= -2.57to 2.57

*Significant (p<0.01)

Table 4 Mann- Whitney U- test and Wilcoxon signed- rank test shows difference in pre- and post- test clinical decision making ability score among nursing students on management of hypertensive disorders of pregnancy (N=114)

Table – 5 Spearman Correlation showing relationship between the Pre-test and Post-test Score of Knowledge, Skills and Clinical Decision Making Ability of Nursing Students on Management of Hypertensive Disorders of Pregnancy in Experimental group and Comparison group N=114

Groups		**Skills**		**Clinical decision making ability**	
Experimental group (n=54)		**Pre-test**	**Post-test**	**Pre-test**	**Post-test**
	Pre-test	$0.11(0.39^{NS})$		$0.16(0.24^{NS})$	
	Post-test		0.30(0.02*)		0.38(0.04*)
Knowledge					
Comparison group (n=60)		**Pre-test**	**Post-test**	**Pre-test**	**Post-test**
	Pre-test	$0.94(0.47)^{NS}$		0.29(0.02*)	
	Post-test		0.34(0.00*)		0.38(0.00*)

NS Not significant (p>0.05) **r at 112= 0.19**

***Significant (p<0.05)**

Data presented in [Table 5] showed that there was statistically significant correlation between pre-test and post-test knowledge and skills in Experimental group, (r=0.11, p=0.39) (r=0.30, p=0.02) and also in between pre-test and post-test knowledge and clinical decision making ability (r=0.16, p=0.24) (r=0.38, p=0.04).

In Comparison group, there was statistically significant correlation between pre-test and post-test knowledge and skills (r=0.94, p=0.47) (r=0.34, p=0.00) and also in between pre-test and post-test knowledge and clinical decision making ability (r=0.29, p=0.02) (r=0.38, p=0.00).

DISCUSSION:

In the present study, maximum of the Nursing Students 80% were female in experimental group and (73%) were female in Comparison group respectively. These findings was consistent with the study conducted by Angelina A Joho et al. (2017) regarding knowledge on prevention and management of pre eclampsia and eclampsia among nurses in primary health setting , where it was found that majority (84.3%%) of nurses were female. Majority of the participants were female in the study as the strength of students in BSc. nursing 4th year were more in female students than male students.

The mean post-test knowledge score (17.79±6.08) of nursing students was higher than the mean pre-test knowledge score (12.61± 4.54) regarding management of Hypertensive disorders of pregnancy in Experimental group. These findings were consistent with the study conducted by Mai M., Galal A et.al (2021) to evaluate the effectiveness of simulation and self-efficacy of maternity Nurses in Management of pre eclampsia and eclampsia. where it was found that the level of knowledge score (80%) was higher in post management of pre eclampsia and eclampsia. The findings of the study showed gain in knowledge of nursing students in both Experimental and Comparison group which revealed that Simulation based learning regarding management of Hypertensive Disorders of pregnancy was effective in Experimental group whereas conventional teaching on management of Hypertensive disorders of pregnancy help in gain of knowledge in Comparison group.

The mean post-test skills score (54.77±7.09) of nursing students was higher than the mean pre-test skills score (33.18±7.45) regarding management of Hypertensive Disorders of Pregnancy in Experimental group. These findings were

consistent with the study conducted by Naglaa Zaki Hassan Roma et. al (2019) to determine the effect of high fidelity simulation based training program on intern students' knowledge and skills about management of eclamptic fits. The total mean scores of skills in the study group was (193.87+4.78) compared to (97.73±18.3) of the control group after intervention. The findings of the study showed enhancement of skills of nursing students in both Experimental and Comparison group which signified that Simulation based learning management of Hypertensive Disorders of pregnancy was effective in Experimental group whereas conventional teaching helps in enhancement of skills in Comparison group. The mean post-test clinical decision making ability score (12.03± 2.86), of nursing students was higher than the mean pre-test clinical decision making ability score (9.25±4.46) regarding emergency management of Hypertensive Disorders of Pregnancy in Experimental group. These findings were consistent with the study conducted by Catherine Olubummo (2017) where it revealed that the post-test CCTST score (14.19 $\pm$ 5.02) was higher than the mean pre- test skill score (13.19 $\pm$ 4.53) after the use of simulation to increase critical thinking of perinatal nurses in the care of pre eclampsia patients. The study signified that simulation based learning is effective in development of CDMA in experimental group.

FUTURE RESEARCH

A mixed method study may be conducted to identify barriers to the development of clinical simulation or different that may be encountered.

A comparative study can be conducted to find out the effectiveness of simulation based learning with other traditional teaching strategies in terms of competency regarding Management of Hypertensive Disorders of pregnancy.

A study can be carried out using innovational teaching strategies like self instructional module, structured teaching program and M-learning strategy.

The nursing personnel must encourage about the importance of attending the continuing education sessions in the form of workshop, conferences, training program and reviewing updated nursing care regarding management of hypertensive disorders of pregnancy

CONCLUSION

Based on the findings of the study, it can be concluded that simulation based learning was effective in enhancing the competency in terms of knowledge, skills and clinical decision making ability of nursing Students on management of hypertensive disorders of pregnancy. Simulation based learning showed significantly better results as seen through performance in skills and clinical decision making ability questionnaire.

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Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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