

# The Effect of Implementing an Educational Program Regarding Neurological Examination on Nurses at Asella Teaching and Referral Hospital in Oromia Region, Ethiopia: A Quasi-Experimental Study

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**Background:** The central nervous system assessment is typically perceived as a complicated exam that would be both time-consuming and challenging. A disciplined approach and directed guidelines can ameliorate much of the difficulties involved. Nursing staff should have the required knowledge of neurological examination is intended to facilitate the physician in clinical check-ups, which would lead to the client's enhanced well-being.

**Objective:** The study's goal is to determine the "Effect of implementing an educational program regarding neurological examination on nurses".

**Methods:** Quasi-experimental research work was carried out at Asella teaching referral hospitals in the Oromia Region of Ethiopia to assess the effect of implementing an educational program regarding neurological examination on nurses. To hand pick up 56 study samples, a convenient sampling technique was asserted. At first, a comprehension set of questions on neurological examination has been used to undertake a pre-measurement evaluation, which was accompanied by a two-week self-administered intervention in an educational program regarding the neurological examination. Followed that, the same comprehension set of questions on neurological examination was used for post-measurement evaluation among nursing professionals. The acquired data was entered into epi-info version-7 for coding and error prevention and transferred to SPSS version 22 for analysis employing descriptive and inferential statistics, and after the results of the research have been contextualized.

**Findings:** The investigation outcomes showed that the pre-measurement mean and SD were  $13.02 \pm 2.62$ , while the post-measurement mean and SD were  $22.63 \pm 3.21$ . The paired-*t*-test resulted in  $t=26.24$  ( $p=0.00$ ,  $df=55$ ,  $S^*$ ) for the effect of implementing an educational program regarding neurological examination among nurses. Whereas, linear multiple regression was explained with no statistically significant association between pre-measurement knowledge and the study's demographic factors.

**Conclusion:** The study strongly indicates that there is a significant effect of implementing an educational program regarding neurological examination among nurses.

**Keywords:** effect, implementation, educational program, neurological examination, Nurses Oromia Region, Ethiopia

## Introduction

Thereby nurse practitioners undertake a focused neurological examination, the vital processes of the central nervous system are crucial to deeper comprehension. If some of these complex processes are interrupted, the entire body probably suffers.<sup>1</sup> The compilation of information on a patient's condition central nervous system is recognized as neurological findings (consisting of the brain and spinal cord). Neurological evaluations are generally performed by both physicians and nurses.<sup>2</sup> The neurologic investigation begins with scrutiny of the patient as he or she reaches the evaluation area and continues all across the history-taking framework. The client must be supported for as little as possible, letting functional

challenges eventually emerge.<sup>3</sup> To better ensure patient outcomes, complete knowledge of the preliminary evaluation of a client with neurological diseases is compelled.<sup>4</sup>

Neurological evaluation is a technique for evaluating a client's neurologic functionality. Neurological conditions can usually manifest themselves in a multitude of ways, which include intellectual, visual, motor, and sensory symptomatology. Specific techniques enable the timely identification of potentially lethal neurologic ailments as well as the recognition of abnormalities that may have a detrimental effect on one's well-being. Moreover, neurologic assessment could be used in both the outpatient department and emergency service settings. It is also advantageous in all hospital settings, especially for being able to monitor neurologic health consequences of illnesses such as strokes, intracerebral nodules, and brain trauma.<sup>5</sup>

Nurses need to be able to evaluate the neurological system components. Nurse practitioners whose whole standard of practice includes the innovative assessment, such as nurse practitioners may evaluate this, but the data would be helpful for nursing staff taking care of patients with abnormal neurological assessment results well as. Potential neurological observations are assessed as they accompany the patient's history and the investigator's findings within the frame of reference of nervous system physical examination. Particular neurological evaluation is necessary for the diagnosis of certain neurological diseases.<sup>6</sup>

To prevent unnecessary complications, these patients may require precautionary examination and monitoring. A fundamental neurological evaluation with an emphasis on sensory-motor observations. The nurse practitioners might well use most of the testing mentioned in this, or they could select the components that respond to precise diagnostic issues posed by the patient's medical history, and overall evaluation, and focus exclusively on neurological assessment. Abnormal observations might indeed lead to significant testing, consultation with peers, or recommendation to a consultant.<sup>6</sup>

As a likely result, the research intends to investigate "The effect of implementing an educational program regarding neurological examination on nurses at Asella teaching and referral hospital in Oromia region, Ethiopia". It may strengthen the staff nurse's expertise in the aforementioned area and deliver substantial knowledge and practical expertise relevant information on neurological examination and convenient to the effective delivery of healthcare services to manage patients with neurological dysfunction.

## Study's Significance

### Literature Review on Neurological Assessment

Assessment is a vital nursing competence that accumulates clinical data to allow foster judgments about health initiatives and preferences in patient healthcare provision. In recent times, the nursing strategy for neurological assessment has continued to improve through the implementation of novel scientific proof assessment tools and the assistance of practice regulations.<sup>7</sup> To provide better services, nurses should first undergo a comprehensive assessment of the patient.<sup>8</sup>

The evaluation of a client's neurological standing is extremely crucial.<sup>9</sup> According to the conclusions of the succeeding literature review, the majority of studies performed on neurological assessment on efficiency research initiatives with organized instructional strategies, clinical skills, and clinical services with teaching cum demonstrations, focused specifically on neurological assessments, as a first step that the nurse practitioners must start taking to provide care and, to carry out a detailed clinical assessment.<sup>8</sup> The assessment process of a client's neurological situation is essential.<sup>9</sup> A large number of the research studies on neurological assessment on efficiencies research intervention strategies with formalized education programs, clinical expertise, and patient care with lecture cum demos, focused exclusively on neurological evaluation education and practice, cranial nerve evaluations, quality farms of hospital care in neurosurgical units, according to research results from the reviewed literature.<sup>8,10-13</sup>

Several studies had used a quantitative research method with diverse research designs such as pre-experimental (one group pre-test – post-test layout), prospective quasi-experimental investigation, and quasi-experimental one group pre-test and post-test structure, non-equivalent control group pre-test-post-test layout, and with convenient sampling as well as, with the simple random sampling methodologies. Nursing professionals, student nurses, and other healthcare providers were represented as a participant in the research. The different research measures are framed knowledge questionnaire forms on

neurological clinical assessment.<sup>8,10–13</sup> Descriptive statistics as frequencies and percentages on neurological assessment knowledge levels and mean, SD, whereas, analytical statistics such as the Paired *t*-test, one-way ANOVA, independent sample *t*-tests, and comprehensive review were used to evaluate the relevant information. The results of the study showed a significant increase in the samples' education and experience in the neurological evaluation.<sup>8,10–13</sup>

Neurological investigation knowledge evaluation was being used in cross-sectional research and numerous surveys used a quantitative research method, such as a prospective study, a cross-sectional study, and a correlational set of observations, a focus group design with suitable sampling techniques. Nursing professionals, student nurses, and other healthcare professionals functioned as survey respondents. The comprehensive study tools on Patient Satisfaction, multiple-choice questions, a semi-structured interview, and a self-administered set of questions have been used as data collection instruments. Based on a mean estimate of the studies, the research results are described as having both good and poor knowledge levels.<sup>8,10,13–18</sup>

One of the research results on teaching the neurological assessment described in the students' evaluation showed significant improvements in 5 out of 8 points. Fifty percent of residents thought the new strategy was better than the old thing, whereas 10% thought it was worse.<sup>19</sup> The study was performed on neurosurgical units in Poland, and the observations concluded that there are significant differences in the evaluation of selected issues by specific groups (both patients and nursing staff).<sup>20</sup>

Literature on enhancing neuro-oncological patient safety was undertaken. It encompasses clinical nursing elements, nursing strategies, nursing research methods, relational and organizational designs, and nursing legislation. The results reveal that the study subjects' knowledge levels had expanded.<sup>21</sup> A qualitative research approach was used to develop a tool for a preliminary nurse evaluation. According to the findings, the entire concept of initial nurse evaluation and nursing practice has been tried to introduce given the complexity of health care deserves' emphasis on responsibility and the requirement of including nursing staff in describing and supervising clinical treatment plans.<sup>22</sup>

## Operational Definitions

### Effect

It is the significant difference in pre and post-measurement mean knowledge scores among staff nurses with self-intervention in the educational program regarding neurological examination among nurses.

### Educational Program

It is the self-interventional material provided on neurological examination that aids in evaluating staff nurses' knowledge of neurological examination procedures or techniques.

### Knowledge Measurement

It helps to measure the pre and post-measurement level of knowledge scores on neurological examination among staff nurses and is determined by observing the mean scores. Below-average scores indicated poor knowledge levels, while above-average scores indicated good knowledge levels among staff nurses.

### Neurological Examination

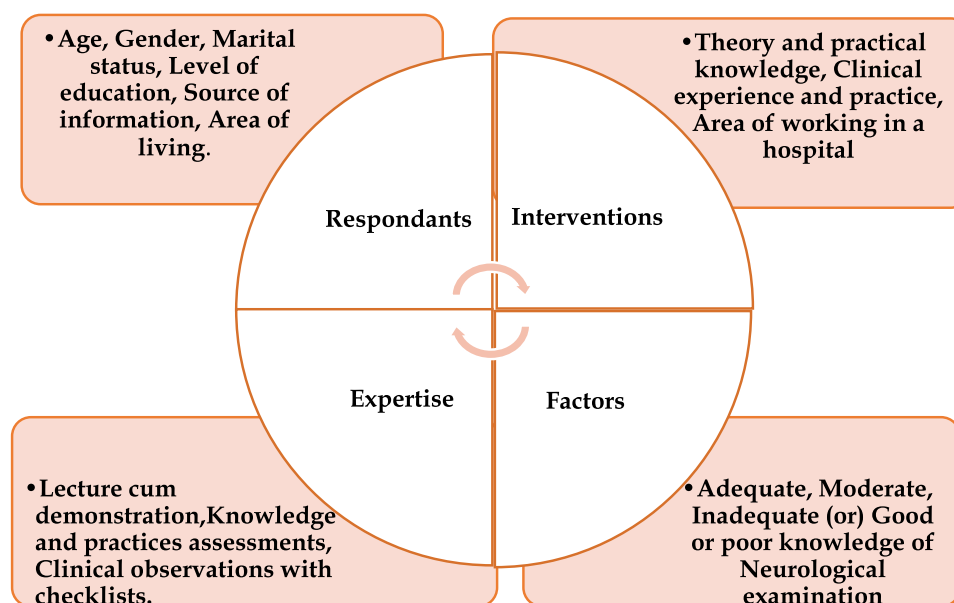
It is the procedures/approaches used for clinical assessment or evaluation of a patient with a neurological disorder to detect the neurological illness.

### Staff Nurses

The qualified staff nurses who are working in the Asella teaching and referral hospital have a minimum of one year of work experience.

## Conceptual Framework

The conceptual framework was developed by existing literature. The identified components are described as follows (Figure 1).<sup>8,10,13,14</sup>



**Figure 1** Conceptual framework on Educational Program Regarding Neurological Examination on Nurses.

## Hypotheses

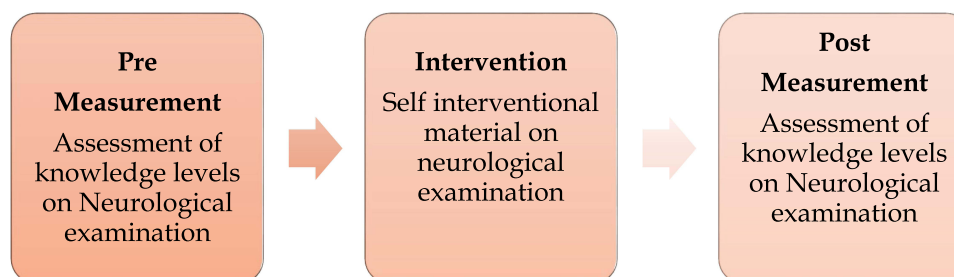
$H_0$ : There is no significant effect of implementing a neurological examination educational program among nurses.

$H_A$ : There is a significant impact on implementing a neurological examination educational program among nurses.

## Materials and Methods

The current quasi-experimental research study (pre-measurement, intervention, and post measurements) (Figure 2) was conducted at Asella teaching and referral hospitals in Ethiopia's Oromia region to examine the effect of implementing a neurological examination educational program among nurses. To carefully select the 56 study samples as well as those who met the study's qualifying conditions, a convenient sampling technique was used. The sample size was calculated using the cohen's d formula with a moderate effect size.

Geographically, the setting of Hospital is located in Asella town, welkesa kebele of the southeastern part of Ethiopia, and near to the capital city of Addis Ababa 175km. The total occupancy of the hospital is 300 and functioning with overall 27 specialty areas. It is functioning with various departments such as emergency, intensive care units of adult ICU, NICU, medicine, surgical, child health and pediatrics, pediatrics' emergency, psychiatry, maternal and child health, neonatology, oncology, Obstetrics and gynecology wards, and which includes minor and major operation theater and are allocated randomly, etc.



**Figure 2** Schematic presentation of Research design on Educational Program Regarding Neurological Examination on Nurses.

The study variables were the knowledge levels of staff nurses on neurological examination (dependent) and educational programs regarding neurological examination (independent). Whereas, demographic variables were age, gender, religion, level of education, marital status, family income per month in ETB, type of family, area of clinical experience, duration of clinical experience, and source of information.

## Eligibility Criteria

The inclusions are staff nurses working at the Asella teaching and referral hospital, who were available at the time of data collection and recruited using a convenient sampling technique. Where the exclusions are staff nurses who had participated in in-service or continuing nursing education programs on neurological examinations within 6 months before the study's commencement.

## Data Collection Tools

Data were gathered using a data collection tool divided into two sections of demographic characteristics and a competency-based questionnaire on neurological assessment.

Section one, titled “demographic data”, contained information such as age, gender, religion, level of education, marital status, monthly family income in ETB, family type, area of clinical experience, duration of clinical experience, and source of information.

Section two is titled “competency-based questionnaire of neurological examination assessment.” It consists of 30 different aspects or questions, with a maximum score of 30. Each appropriate response is worth one point, while the inaccurate response is worth zero.

## Scoring Key Knowledge Levels on Neurological Examination

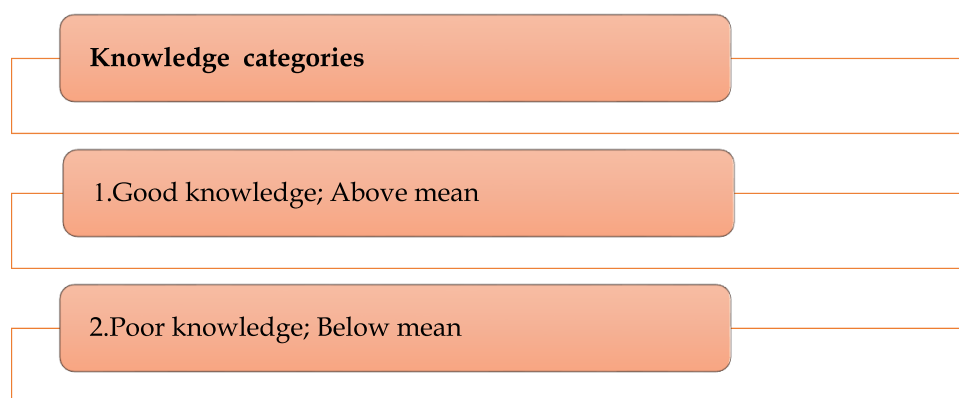
The scoring key is divided into two distinct knowledge categories: good knowledge with above-average (mean) knowledge and poor knowledge with below-average (mean) knowledge (Figure 3).

## Study Intervention

The study intervention was an “educational program regarding neurological examination” prepared by searching the available literature. The comprehensive questions were prepared from the below components. It includes an introduction of the topic, clinical manifestations, Physical Examination, and Components of neurologic assessment on cerebral function, Cranial nerves, Motor system, Reflexes, and Sensory system.

Cerebral Function assessment -It includes Mental Status, Intellectual Function, Thought Content, Emotional Status, Perception, Motor ability, and Language ability, Impact on lifestyle.

Cranial nerve examination -I (olfactory), II (optic), III (oculomotor), IV (trochlear), VI (abducens), V (trigeminal), VII (facial), IX (glossopharyngeal), X (vagus), XI (spinal accessory), XII (hypoglossal).



**Figure 3** Scoring key of knowledge levels on neurological examination.

Motor System Examination-It includes Muscle size, tone, strength, coordination, and balance.

Examination of the Reflexes-Deep tendon reflexes - Biceps, Brachioradialis, Triceps, Patellar, Ankle Reflexes, and superficial or cutaneous reflexes- Abdominal reflexes, Plantar or Babinski response.

Assessment of sensory system-Tactile sensation, Pain and temperature, Vibration, Proprioception, Stereognosis.

Assessment of the patient with Glasgow coma scale-The components is motor responsiveness, verbal performance, and eye-opening.<sup>23-26</sup>

## Procedure for Data Collection

Eight assigned BSC nurse data collectors from the Asella teaching and referral hospitals from various departments of emergency, medicine, and surgical wards carried out the data collection process, and prior training on the data collection process was provided for three days. Data was collected from study participants for 6 weeks, from 11 October 2021 to 20 November 2021. HIMS nursing directorates were used to identify a list of Asella teaching and referral hospital staff nurses. An adequate description of the study's purpose was used to acquire informed written permission from research participants, and samples were obtained using a convenient sampling technique from randomly chosen divisions of adult ICU, NICU, medicine, surgery, obstetrics, and gynecology, and pediatric wards.

Initially, a pre-measurement evaluation with a knowledge questionnaire on neurological examination was performed. The staff nurses were instructed on the appropriate research methodology and were requested to read and fill out the demographic criteria of the study, followed by completion of the competency questionnaires. Followed by, supplying self-interventional material on neurological examination to each staff nurse and advising people on through reading of the self-intervention over two weeks beginning with the distribution of self-study material. On completion of two weeks, each research participant was approached again and provided a post-measurement competence questionnaire on neurological examination and directed to complete the evaluation. The research investigators collected the questionnaires, which were reviewed for clarity and completeness by each of the staff nurses before collection.

Before the commencement of the main research study, the validity of the tool was obtained by consulting the 10 members of the same field experts among health care professionals, especially neuro physicians and professors from medical-surgical nursing. The reliability of the tool was obtained by applying the test-retest method. The obtained r-value was 0.97, this indicates the tool was reliable and can be used for the main research study. The pilot study was conducted among 5 staff nurses who are working in the Rehoboth hospital which is near to Asella teaching and referral hospital and are excluded from the main study. The pilot study clearly explained that the study was feasible and can advance to the main research study.

## Data Quality Assurance

Prior beginning of the data collection process for the research investigation, the task delegation was divided among the primary investigator, study supervisors, and assigned data collectors, and the study process of data collection was explained to the staff nurses. Here, the principal investigator, supervisors, and data collectors ensure that the obtained data quality standards are maintained.

## Ethical Considerations

Ethical authorization was obtained first from the research and publication department at Arsi University, College of Health Science, which aided the writing of an official letter to the selected hospitals of Asella teaching and referral hospitals, as well as acquiring study approval from the hospital administrations. Each respondent gave written informed consent, and their anonymity and confidentiality were kept or preserved. Participants were clearly explained, the right to decline in or withdraw from the research at any time based on the interests of the study population.

## Plan for Data Analysis

Data analysis is designed following the study's unique goals. The acquired data is input into the Epi-info version-7, and after entry and screening, it is uploaded into the SPSS version-21 for further analysis. It was planned according to the component's description below. The data analysis is divided into five components, which are explored below as well. The

data were examined using descriptive statistics (frequency and percentages, Mean, SD, and inferential statistics (paired *t*-test, multiple regression analysis).

## Results

The study results are emphasized following the study objectives in the sections listed below.

### Section-I

#### Demographic Variables- Frequency and Percentage Distribution Among Staff Nurses Participating in a Neurological Examination Educational Program (n=56)

According to their age, (24) 42.8% were 26–30 years, (16) 28.6% were 31–35 years, and (16) 28.6% were 36–40 years; the gender of the respondents was as follows (32) 57.1% were male, and (24) 42.9% were female; As per the religion, (20) 57.1% were Muslim, (24) 42.9% were orthodox, (8) 14.3% were protestant, and (4) 7.1% were others; The respondents' level of education, (56) 100% were all B.Sc. Nursing; In respect to the respondents' marital status, (44) 78.6% were married, while (12) 21.4% were unmarried; The respondents' Family income each month in ETB (Ethiopian birr), (32) 57.2% earned 5000–7000/–, (12) 21.4% earned 7001–9000/–, and (12) 21.4% earned 9001–11,000/–; Upon the respondents' family type, (16) 28.6% were nuclear families, (36) 64.3% were joint families, and (4) 7.1% were extended families; As the area of clinical experience of the respondents, (16) 28.6% were worked in emergency area/ ICU, (8) 14.3% were worked in medical ward, (8) 14.3% were worked in surgical ward, (24) 42.8% were worked in others category; On the duration of clinical experience of the respondents, (8) 14.3% had 1–3 years, (16) 28.6% had 3.1–5 years, (12) 21.4% had 5.1–7 years, (20) 35.7% had above 7 years; whereas, the Source of information of the respondents, (48) 85.7% had hospital experience/ observations, (4) 7.1% had undergone special educational programs, (4) 7.1% had class teaching/book referring (Table 1) (Figure 4A–J).

**Table 1** Description of Demographic Characteristics of Staff Nurses on Educational Programme Regarding Neurological Examination (n=56)

Sl. No	Name of the Variable	Frequency	Percentage	Mean	SD
Age	20–25	–	–	2.86	0.84
	26–30	24	42.8		
	31–35	16	28.6		
	36–40	16	28.6		
	Above 40	–	–		
Gender	Male	32	57.1	1.43	0.49
	Female	24	42.9		
Religion	Muslim	20	35.7	1.93	0.89
	Orthodox	24	42.9		
	Protestant	8	14.3		
	Any other specify	4	7.1		
Level of education	Diploma in Nursing	–	–	2.00	0.00
	BSc Nursing	56	100		
	MSc Nursing	–	–		

(Continued)



**Table 1** (Continued).

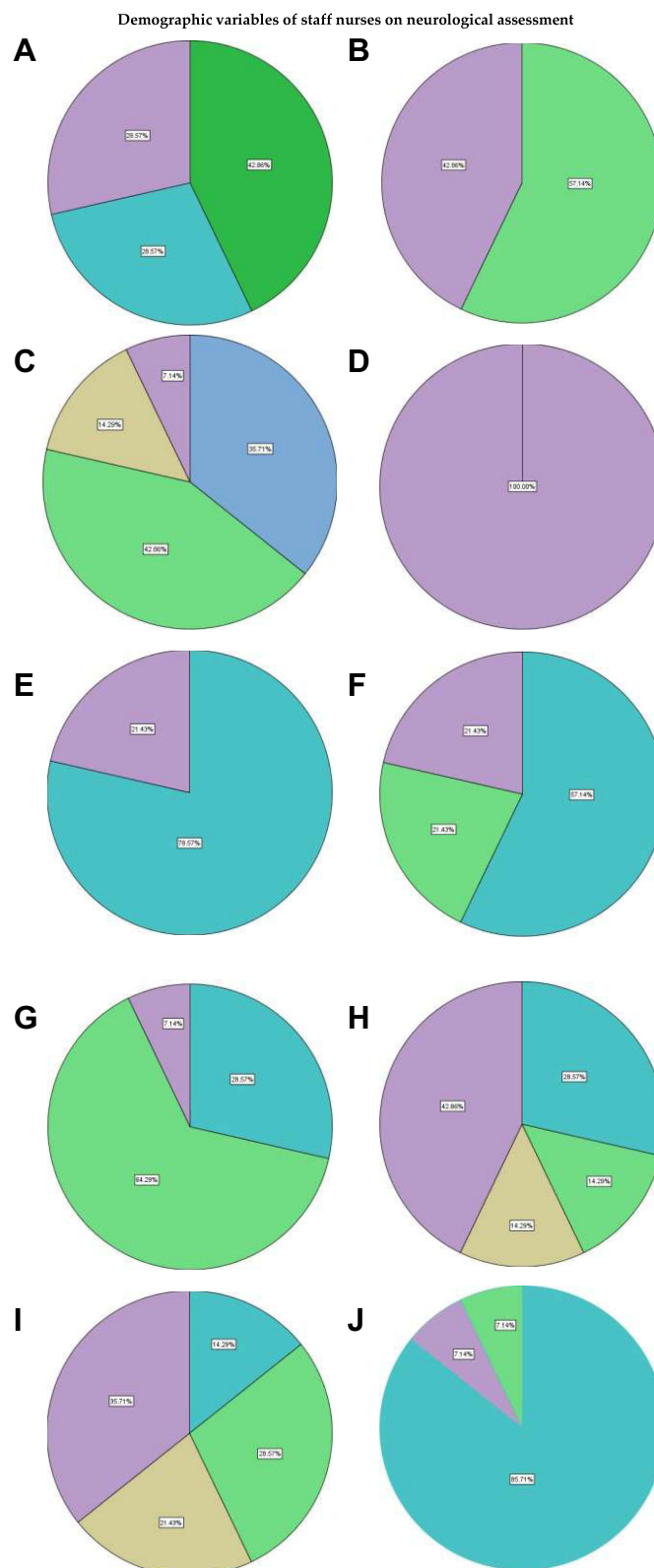
Sl. No	Name of the Variable	Frequency	Percentage	Mean	SD
Marital status	Married	44	78.6	1.21	0.41
	Un-married	12	21.4		
	Any other specify	-	-		
Family income per month in ETB	5000–7000/-	32	57.2	1.86	1.19
	7001–9000/-	12	21.4		
	9001–11,000/-	12	21.4		
	Above 11,000/-	-	-		
Type of family	Nuclear	16	28.6	1.79	0.56
	Joint	36	64.3		
	Extended	4	7.1		
	Single	-	-		
Area of clinical experience	Emergency area/ ICU	16	28.6	2.71	1.28
	Medical ward	8	14.3		
	Surgical ward	8	14.3		
	Any others Specify	24	42.8		
Duration of clinical experience	1–3 years	8	14.3	2.79	1.09
	3.1–5 years	16	28.6		
	5.1–7 years	12	21.4		
	Above 7 years	20	35.7		
Source of information	Hospital experience/ observations	48	85.7	1.29	0.80
	Undergone special educational programs	4	7.1		
	Books/ Mass media	-	-		
	Class teaching/Book referring.	4	7.1		

## Section-II

### Frequency and Percentage Distributions of Pre and Post-Measurement Knowledge Levels on Neurological Examination Among Staff Nurses in Terms of Mean, SD, and Effect of Educational Program on Neurological Examination (n=56)

The knowledge levels of staff nurses in the educational program regarding neurological examination, the frequency, and percentage of pre-measurement poor knowledge levels were (44) 78.57%, good knowledge was (12) 21.43% with a mean  $\pm$  SD of 13.02 $\pm$ 2.62, and post-measurement knowledge levels as overall good knowledge were (56) 100% with a mean  $\pm$  SD of 22.63 $\pm$ 3.21. The paired t-value calculated was = 26.24,  $P = (<0.00)$ ,  $df=55$ ,  $S^*$ . Hence, the stated hypothesis  $H_A$  was accepted, and  $H_0$  was declined (Table 2)(Figure 5).





**Figure 4** Percentage distributions on demographic variables of staff nurses (A) – age (B) gender (C) – religion (D) - level of education (E) -marital status (F) - family income per month in ETB (G) - type of family (H) - area of clinical experience (I) - duration of clinical experience (J) - source of Information.

**Table 2** Pre and Post Measurement of Knowledge Levels of Staff Nurses on Neurological Examination with Paired t-Value (n=56)

Knowledge Levels	Before Measurement		After Measurement		Paired t-value
	Frequency	Percentage	Frequency	Percentage	
Poor	44	78.57	-	-	t=26.24
Good	12	21.43	56	100%	0.00
Mean±SD	Mean	SD	Mean	SD	df=55
	13.02	2.62	22.63	3.21	S**

Note: S \*\*Significant.

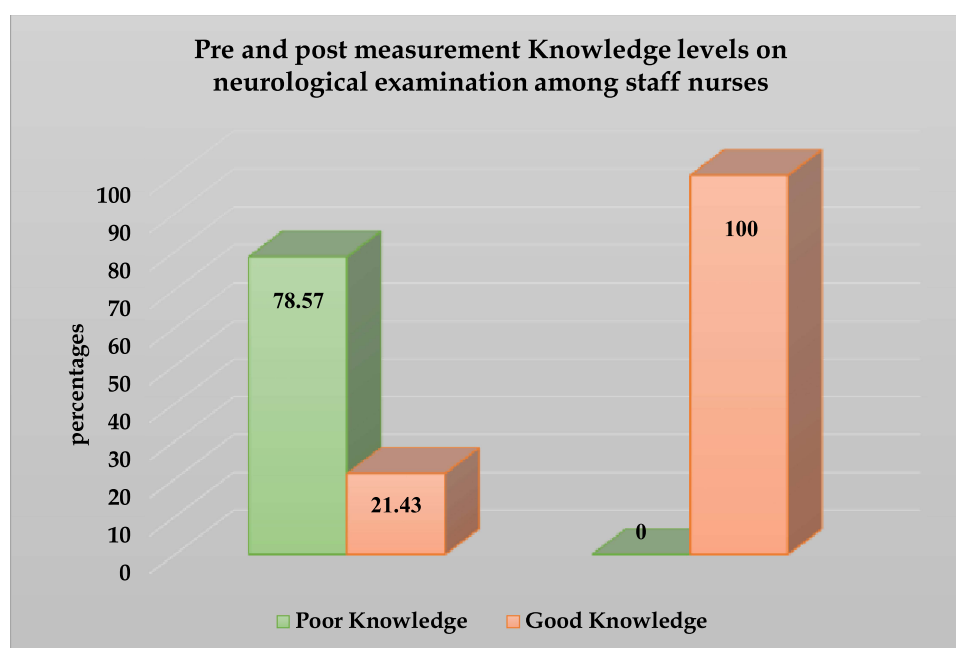
### Section-III

#### The Association Among Pre-Measurement Knowledge Levels in Educational Programs Regarding Neurological Examination (n=56)

According to the final results of the multiple linear regression analysis, there is no significant association between pre-measurement knowledge and the demographic factors of the respondents in terms of age, gender, religion, education level, family status, family income per month in ETB, type of family, area of clinical experience, duration of clinical experience, and source of knowledge (Table 3).

### Discussion

An interventional study was conducted on an educational program regarding neurological examination on nurses at Asella teaching and referral hospital in the Oromia region, Ethiopia, 2020. The study findings on knowledge levels of neurological examination among staff nurses were, before measurement 44 (78.57%) were identified with poor knowledge levels and 12 (21.43%) were with good knowledge levels. While in after measurement 56 (100%) were notified with the good knowledge levels. However, in another similar study knowledge levels of neurological examination components were, in the assessment of the Glasgow Coma Scale 55.56% had poor knowledge, and 41.48% and 2.96% with satisfactory knowledge and good

**Figure 5** Percentages on before and after measurement knowledge levels on neurological examination among staff nurses.

**Table 3** Association Between Knowledge and Demographics

Sl.No	Name of the Variable	Frequency	Percentage	Mean	SD	R	F	t				
Age	20–25	–	–	2.86	0.84	0.252	0.346	0.03 NS				
	26–30	24	42.8									
	31–35	16	28.6									
	36–40	16	28.6									
	Above 40	–	–									
Gender	Male	32	57.1	1.43	0.49			0.252	0.346	0.60 NS		
	Female	24	42.9									
Religion	Muslim	20	35.7	1.93	0.89					0.252	0.346	0.17 NS
	Orthodox	24	42.9									
	Protestant	8	14.3									
	Any other specify	4	7.1									
Level of education	Diploma in Nursing	–	–	2.00	0.00	0.252	0.346					–
	BSc Nursing	56	100									
	MSc Nursing	–	–									
Marital status	Married	44	78.6	1.21	0.41							0.252
	Un-married	12	21.4									
	Any other specify	-	-									
Family income per month in ETB	5000–7000/-	32	57.2	1.86	1.19			0.252	0.346	0.49 NS		
	7001–9000/-	12	21.4									
	9001–11,000/-	12	21.4									
	Above 11,000/-	-	-									
Type of family	Nuclear	16	28.6	1.79	0.56	0.252	0.346			0.63 NS		
	Joint	36	64.3									
	Extended	4	7.1									
	Single	-	-									
Area of clinical experience	Emergency area/ ICU	16	28.6	2.71	1.28					0.252	0.346	0.37 NS
	Medical ward	8	14.3									
	Surgical ward	8	14.3									
	Any others Specify	24	42.8									
Duration of clinical experience	1–3 years	8	14.3	2.79	1.09			0.252	0.346			0.05 NS
	3.1–5 years	16	28.6									
	5.1–7 years	12	21.4									
	Above 7 years	20	35.7									
Source of Information	Hospital experience/ observations	48	85.7	1.29	0.80	0.252	0.346					0.48 NS
	Undergone special educational programs	4	7.1									
	Books/ Mass media	-	-									
	Class teaching/Book referring.	4	7.1									

knowledge, respectively.<sup>18</sup> In another similar study, the knowledge levels were well demonstrated ie, in pre-test inadequate 1 (1%), moderate 52 (63%), adequate 30 (36%), and in post-test knowledge levels, moderate 2 (2%), adequate 81 (98%) consecutively.<sup>8</sup> One of the studies on student nurses' documented knowledge scores for neurological evaluation pre-test knowledge classifications and percentages were (N=60), average 52 (87%), good 8 (13%), whereas the pre-test practice classifications and percentages were with average practice 55 (88.33%), and good practice was 7 (11.67%).<sup>10</sup>

According to the research findings on the effect of educational intervention on neurological examination, the before measurement means and SD out of 30 scores were  $13.02 \pm 2.62$ , whereas the after measurement means and SD were  $22.63 \pm 3.21$ , and the effect of implementing an educational program on neurological examination on nurses as  $t\text{-value} = 26.24$  ( $p=0.00$ ,  $df=55$ ,  $S^*$ ). Another similar study contrasting results of pre and post-test mean and SD interpretations were  $12.7 \pm 2.56$ ,  $17.41 \pm 1.97$ ,  $t=1.66$  (out of 20 scores);<sup>8</sup> as per the study on neurological examination knowledge and practices, the knowledge score was  $16.9 \pm 2.047$ ,  $27.1 \pm 1.818$ ,  $t=30.61$ ; and practices scores was  $19.06 \pm 2.26$ ,  $28.73 \pm 1.47$ ,  $t=29.31$ ;<sup>10</sup> one of the components on neurological examination as cranial nerve examination, the knowledge measures as  $13.45 \pm 4.25$ ,  $20.38 \pm 4.34$ ,  $t=13.83$ ;  $10.95 \pm 2.93$ ,  $16.95 \pm 2.52$ ,  $t=19.36$ <sup>13</sup> respectively and the studies level of significance was identified at  $p=0.05$ . As well as, one of the study's GCS total scores was  $7.38 \pm 1.96$ ;<sup>11</sup>

According to the result obtained from the linear multiple regression analysis, there is no significant relationship between prior measurement knowledge and the demographic variables of the study. As per the findings from another similar study on significant association with neurological examination, there was no relation between expertise, educational levels, training program, and level of knowledge.<sup>11</sup> Apart from Area, the research findings found a correlation among statistical characteristics and skill assessments, such as age, sex, past knowledge, and source of knowledge.<sup>13</sup> The findings of a study on neurological assessments with an Association between knowledge and education level showed a substantial relationship between the two variables. There was also a relation between knowledge and age. All in all, this study confirms the importance of skills and knowledge in assessing GCS level.<sup>18</sup>

## Limitations

The outcome of the investigation is confined to- Asella teaching and referral hospital, Asella town and Staff nurses have at least one year of clinical experience.

## Recommendations

A similar study could be conducted on a large-scale population of staff nurses and student nurses. A similar study may replicate the experimental and control group designs.

## Conclusion

The study revealed that there is a significant impact of implementing an educational program regarding neurological examination on nurses at Asella teaching and referral hospital in the Oromia region, Ethiopia.

## Ethical Clearance

It is obtained from the college of health sciences, Arsi University as well from the Asella teaching and referral hospital with the reference number of A/U/H/S/C120/7704/14 (Date: 27/03/2014 EC. Each study respondent gave written informed consent, and their anonymity and confidentiality were kept or preserved.

## Acknowledgment

Study participants of Asella teaching and referral hospitals, Arsi zone, Ethiopia.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Disclosure

The authors report no conflicts of interest in this work.

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