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**ORIGINAL RESEARCH**

# Evaluation of Short Training Program on Nurse's Knowledge and Practice Regarding Vital Signs Measurement

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## ABSTRACT

**Background:** Vital signs are a reliable way to assess the essential physiological processes of a living being. The reason they are called "vital" is that figuring out how valuable and important they are is a crucial first step in any clinical evaluation. One of the first clinical evaluations is looking at the patient's vital signs. Following orientation, education and training are two crucial components of nursing staff advancement.
**Objectives:** the current study aims to evaluate effectiveness of short training program on nurse's knowledge and practice regarding vital signs measurement.
**Methodology:** A quasi-experiment, a type of research approach, was employed. The subjects of this study were thirty nurses who worked directly with patients at the Heevi Teaching Hospital and were selected at random. Three instruments were used to collect the data: a questionnaire, sociodemographic information, and the nurses' proficiency in taking vital signs.
**Results:** The current study found that nurses' overall mean acquaintance and competence degrees increased with a statistically significant difference 30 days following the program's deployment. The nurses' performance and comprehension both significantly improved once the vital signs measuring nursing instruction was put into practice.
**Conclusion:** Nurses' expertise and proficiency in measurement of vital signs were lacking. Nurses may be able to improve their knowledge and skills after taking part in an instructional program on vital signs measurement.

***Keywords:*** vital signs program, nurses´ knowledge, skill.

## INTRODUCTION

For early detection and response to signals of deterioration, measurement and monitoring of vital signs are crucial because delayed actions could seriously jeopardize the safety of children [(1)]. Vital signs can signal a patient's deterioration as a physiological degradation that develops over time, manifests as certain symptoms, and worsens the patient's state until it reaches a critical stage through changes vital signs of the patient and quick intervention [(2)]. Vital signs are inaccurate in isolation as objective indicators since they fluctuate with age, sex, weight, fitness, environment, and medical problems, among other things. As a result, there is no unified opinion. reached regarding what quantities are healthy or bad [(3)]. Vital signs do not linearly deteriorate when a child's physiological condition changes, children who have normal vital signs may still require immediate care [(2)]. Therefore, when



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evaluating, measuring, and keeping track of the baby, kid, or adolescent's vital signs, it is important to recognize their psychological needs and take the appropriate action [4]. All vital signs should have age-appropriate normal values, and nurses who are caring for children are required to inform doctors when a vital sign is outside of that range [5]. Vital sign monitoring is necessary to give acute care inpatients a safety net by monitoring and managing children who are at risk of unfavorable physiological change in a timely and effective manner [6]. The conventional duties of nurses include keeping an eye on the health of hospitalized children and monitoring their vital signs [7]. To identify deterioration with the potential to lessen adverse consequences, vital indicators must be closely monitored. The quick response system's performance is significantly impacted by the neglect of prompt vital sign monitoring [8].

## AIMS OF THE STUDY

1. To evaluate the effectiveness of a short training course on nurse's acquaintance and skill in relation to determining vital signs at Hevi teaching hospital in Duhok municipality.
2. To ascertain the association between nurses' familiarity and socio-demographic factors such as age, gender, professional qualification, and number of years of employment.
3. To determine the association between a nurse's skill and factors from the socio-demographic spectrum, such as age, gender, education level, and length of service.

## METHODOLOGY

### Design of the study

A quasi-experimental design study carried out among nurses working in the Heevi pediatric teaching hospital at Duhok City, Iraq, to explore effectiveness of short training program on nurse's knowledge and practice toward of vital signs measurement. This study starts from 16th, December 2022 to 15th December, 2022.

### Setting of the study

A Heevi pediatric Teaching Hospital in Duhok City is where the current study is conducted. during the period from 16th December 2022 to 15th March 2023.

### The sample of the study

The study involved thirty nurses who worked in various hospital wards (medical and surgical wards) and gave patients direct care over the course of the investigation. The nurses agreed to give consents and were ready to participate willingly in the study.

### Constructing of the instrument

Structured questionnaire was utilized for collecting the data to achieve the purpose of the study. The questionnaire started with a brief statement concerning the purpose of the study, informed consent, and followed by three parts:

### Part I: Socio - demographic data sheet

Part one is the demographic, which consists of five items related sociodemographic characteristics, including their age, gender, level of education, and number of years of pediatric nursing experience.

### Part II: Construct questionnaire for knowledge:

This questionnaire, which consists of 40 items, was created to assess nurses' understanding of the assessment of vital signs. Pulse, respiration, temperature, and blood pressure are the four primary sections of this questionnaire. Each item has two alternatives in the final draft. (The right response is 1, whereas the unintentionally missing or erroneous response is 0).

**Table (1):** The following is how the grading scale for nurses' knowledge was dispersed

| Rating degree | Total degree | Percentage (%) |
|---|---|---|
| Need practice | < 20 | < 50 % |
| Acceptable | 20 -30 | 50 -75 % |
| Good | > 30 -40 | > 75 % |

### Part III: Developing a skill evaluation checklist:

The final version of the checklist, which had 40 elements, was designed to measure how well pediatric nurses could measure vital signs. The four

key sections of this questionnaire are pulse, respiration, temperature, and blood pressure. The final draft offers three alternatives for each item. (Good is equivalent to 2, Acceptable is equal to 1, and Needs practice is equal to 0).

**Table (2):** The following is how the grading scale for nurses' skill was dispersed

| Rating degree | Total degree | Percentage (%) |
|---|---|---|
| Need practice | < 40 | < 50 % |
| Acceptable | 40 -60 | 50 -75 % |
| Good | > 60 -80 | >75 % |

**- Operational design:**

- **Pilot study:**

Before data collection a pilot study was carried out on the 1st November to25th November 2023on ten nurses were selected and excluded from the total number of the study sample. To achieved objective, we must be evaluating the instrument contents adequacy, relevancy, clarity and understandable by the participants of the study, to determine whether any modifications are necessary in the questionnaire items and estimation the average time required for data collection.

- **Reliability test:**

Determination of reliability of the questions items, vital signs screening questionnaire; it has obtained through evaluating ten participants selected from Heevi Teaching Hospital. Determination of reliability of the scale items was based upon the internal consistency which is indicated and measured by coefficient alpha or Cronbach's alpha and stability (test-retest) measured by Correlation coefficient (r) as aspects of reliability. It was correlated using Pearson's coefficient. For the knowledge questionnaire and skill checklist, the results were, respectively, (r =0.81, 0.83) at (p 0.01).

- **Data collection:**

The following information was gathered sequentially at Heevi Teaching hospital between the dates of 16 December 2022 and 15 March 2023: -

* For the knowledge component, information was acquired by a direct interview (face-to-face), which was conducted for 20 minutes during the pre- and post-instructional programs using the knowledge questionnaire.

The researcher spent 10 minutes before and after the instructional program personally observing each sample participant while they practiced in order to collect data for the study's skill component.

**Implementation of Instructional program:**

- **Implementation phase:**

The Heevi Teaching Hospital in Duhok City hosted the instructional intervention. It was execution over the course of four meetings and focused on four main subjects. Each lesson covered crucial material pertaining to the knowledge and technique of vital sign measurement.

Subgroup education (5 nurse for each groip) served as the foundation for the instructional program; every group had three nurses, and over the course of four weeks. The nurses in each subgroup attended each of the four instructional sessions in turn. Within a month, the plan had been carried out and completed.

- **Nurses' practices using observational checklist vital signs procedure:**

Utilizing the identical questionnaire and skill checklist used for the pre- and post-tests 30 days after the program's launch, this phase was emphasized on determining the impact of the training program.

**Ethical consideration:**

The key guideline for data collecting was ethical considerations. Nurses must sign the informed consent form the researcher has created before the interview may start. Before gathering data, the researcher made it clear to nurses what this study's goals were and how they might participate. Additionally, the study was approved locally for conduct by the Ethical Committee of the Directorate

General of Health Directorate of Planning Scientific Research Division.

**Statistical analysis:**

Following data collection, it was examined using the social science statistical package "SPSS 19" software. To determine the statistical significance of specific variables, the results were given as frequencies, percentages, chi square tests, and paired t-tests. A result is significant when the p value is less than 0.05, whereas a result is non-momentous when the p value is more than 0.05.

## RESULTS

This section of the study summarizes our conclusions regarding the influence of a brief lesson program on nurses' acquaintance and abilities related to vital sign measurement at Heevi Teaching Hospital in Duhok City.

**Table (1):** Nurses' sociodemographic traits

| Variables | Frequency | Percent |
|---|---|---|
| Age group | | |
| 21-30 year | 7 | 23.3 |
| 31-40 year | 17 | 56.7 |
| 40 year and above | 6 | 20 |
| Total | 30 | 100 |
| **Gender** | | |
| Male | 6 | 20 |
| Female | 24 | 80 |
| Total | 30 | 100 |
| **Qualification** | | |
| Nursing high school | 6 | 20 |
| Diploma | 19 | 63.3 |
| Collage and above | 5 | 16.7 |
| Total | 30 | 100 |
| **Years of experience as pediatric nurse** | | |
| 1-4 years | 16 | 53.3 |
| 5-8 years | 10 | 33.3 |
| 9 year and above | 4 | 13.4 |
| Total | 30 | 100 |

Table (1) The table presents the sociodemographic characteristics of thirty nurses who worked in different wards at the Heevi Teaching Hospital in Duhok. In terms of age, 56.7% of nurses were between the ages of 31 and 40, and 80% of them were female. It also shows that 20 percent were nursing high school graduates and 63.3 percent were graduates of institutes. The majority of nurses (53.3%) had 1-4 years of experience as pediatric nurses.

**Table (2):** Nursing knowledge average scores about vital sign measurement pre, two months and four months after execution of the program (n=30).

| Skill | No. of items | Pre- test Mean ± SD | Post- test Mean ± SD | Paired T. Value | P. Value |
|---|---|---|---|---|---|
| **Pulse** | 10 | 4.5 ± 0.97 | 5.7 ± 1.58 | -3.34 | 0.002 |
| **Respiration** | 10 | 4.57 ±1.25 | 5.66, ± 1.58 | -2.98 | 0.006 |
| **Temperature** | 10 | 4.7 ± 1.5 | 5.83 ± 1.78 | -2.4 | 0.023 |
| **Blood pressure** | 10 | 4.97 ± 1.49 | 5.0 ± 1.88 | -2.16 | 0.039 |

As shown in Table (2), there was a statistically momentous improvement in nurses' basic acquaintance of vital sign measurement (pulse, respiration, temperature, and blood pressure) 30 days after program execution compared to before program execution.

**Table (3):** Mean scores of nurses' skill about vital sign measurement pre, two months, and four months after execution of the program (n=30).

| knowledge | No. of items | Pre- test Mean ± SD | Post- test Mean ± SD | Paired T. Value | P. Value |
|---|---|---|---|---|---|
| **Pulse** | 10 | 4.4, ±128 | 5.5, ± 1.33 | -3.7 | 0.001 |
| **Respiration** | 10 | 4.23, ±1.07 | 4.96, ± 1.25 | -2.66 | 0.016 |
| **Temperature** | 10 | 4.33 ± 1.09 | 5.57 ± 1.59 | -3.41 | 0.002 |
| **Blood pressure** | 10 | 4.47 ± 1.17 | 5.53 ± 1.57 | -2.87 | 0.008 |

As shown in Table (3), Comparison of Areas of Knowledge toward Contributed Factors and Early Detection of Prostate Cancer between Pre-test and Post-test Period for The Study Group and The Control Group.

**Table (4):** Comparison of nurse's practices toward vital signs measurements between Pre-test and Post-test Period for The Study Group and The Control Group

| No. | Category | Baseline test Mean and SD | After 30 days posttest Mean and SD | DF | Paired T test | P. Value |
|---|---|---|---|---|---|---|
| **1** | **Knowledge** | 19.5 ± 4.77 | 22.47 ± 5.62 | 29 | -2.26 | 0.031 |
| **2** | **Skill** | 44.63 ± 21.21 | 53.97 ± 11.97 | 29 | -3.35 | 0.002 |

According to Table (4), there were extremely momentous correlations betwixt nurses' knowledge and performance at the baseline exam and 30 days later (p values 0.05).

**Table (5):** The total number of nurses who understood how to take vital signs before and 30 days after the training started (n = 30).

| Score | Pre test | | After 30 days post test | | X | P |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | 13.28 | 0.001 |
| **NP** | 17 | 56.7 | 10 | 33.3 | | |
| **SAT.** | 10 | 33.3 | 4 | 13.3 | | |
| **GD** | 3 | 10 | 16 | 53.4 | | |

NP = Need practice, Sat = Satisfying, GD = Good.

Table (5) demonstrates the overall level of nurses' knowledge about vital sign measurement before and 30 days after the program was implemented. Of the nurses who have studied, the majority (53.4%) had a good level of acquaintance with the subject 30 days after the program was implemented, compared to 10% before the protocol was implemented.

**Table (6):** Total nurses' proficiency with vital sign measurement before and 30 days after the program's implementation (n = 30).

| Score | Pre test | | After 30 days post test | | X | P |
|---|---|---|---|---|---|---|
| | pre | % | post | % | 7.11 | 0.029 |
| NP. | 14 | 46.7 | 6 | 20 | | |
| SAT | 10 | 33.3 | 9 | 30 | | |
| GD | 6 | 20 | 15 | 50 | | |

NP = Need practice, Sat = Satisfying, GD = Good.

Table (6) displays the overall skill level of nurses before and 30 days after the program's execution in relation to taking vital signs. After 30 days, the majority of the nurses in the study (50%) had improved their skill level in this area compared to 20% before the protocol was put into place.

**Table (7):** Relationship between nurses' overall knowledge score regarding vital sign measurement and nurses' sociodemographic characteristics (n=30).

| Variables | Baseline test | | | After 30 days post test | | |
|---|---|---|---|---|---|---|
| | Knowledge | | | Knowledge | | |
| | NP | SAT. | GD | NP | SAT. | GD |
| **Age** | | | | | | |
| 21-30 | 5 | 1 | 1 | 2 | 1 | 4 |
| 31-40 | 10 | 6 | 1 | 6 | 2 | 9 |
| 40 and above | 2 | 3 | 1 | 2 | 1 | 3 |
| $X^2$/ P.Value | (2.85) / 0.588 | | | (0.185) / 0.99 | | |
| **Gender** | | | | | | |
| Male | 4 | 1 | 1 | 1 | 1 | 4 |
| Female | 13 | 9 | 2 | 9 | 3 | 12 |
| $X^2$ / P.value | (1.09) / 0.58 | | | (0.94) / 0.63 | | |
| **Professional qualification** | | | | | | |
| Nursing high school | 4 | 1 | 1 | 4 | 1 | 1 |
| Diploma | 12 | 6 | 1 | 5 | 0 | 14 |
| Collage and above | 1 | 3 | 1 | 1 | 3 | 1 |
| X2 / P.value | (4.21) / 0.38 | | | (17.32) / 0.002 | | |
| **Years of experience as pediatric nurse** | | | | | | |
| 1-4 years | 12 | 3 | 1 | 4 | 1 | 11 |
| 5-8 years | 3 | 6 | 1 | 4 | 2 | 4 |
| 9 years and above | 2 | 1 | 1 | 2 | 1 | 1 |
| X2 / P.value | (6.6) / 0.16 | | | (3.97) / 0.44 | | |

Table (7) demonstrates that there was no correlation between the total nurses' acquaintance score with regard to vital sign measurement and the sociodemographic characteristics of nurses. Specifically, there was statistically significant variation between the total nurses' acquaintance score with regard to vital sign measurement and the age, gender, and years of experience as pediatric nurses of the nurses under study both during the pretest and one month after the test.

**Table (8):** Relationship between total nurses' skill score about vital sign measurement and sociodemographic characteristics of nurses (n=30).

| Variables | Baseline test | | | After 30 days post test | | |
|---|---|---|---|---|---|---|
| | Skill | | | Skill | | |
| | NP | SAT. | GD | NP | SAT. | GD |
| **Age** | | | | | | |
| **21-30** | 5 | 1 | 1 | 2 | 3 | 2 |
| **31-40** | 7 | 7 | 3 | 2 | 4 | 11 |
| **40 and above** | 2 | 2 | 2 | 2 | 2 | 2 |
| **$X^2$/ P.Value** | (3.02) / 0.55 | | | (3.72) / 0.45 | | |
| **Gender** | | | | | | |
| **Male** | 2 | 2 | 2 | 2 | 1 | 3 |
| **Female** | 12 | 8 | 4 | 4 | 8 | 12 |
| **$X^2$** | (0.95) / 0.62 | | | (1.11) / 0.57 | | |
| **Professional qualification** | | | | | | |
| **Nursing high school** | 4 | 1 | 1 | 3 | 2 | 1 |
| **Diploma** | 8 | 7 | 4 | 2 | 6 | 11 |
| **Collage and above** | 2 | 2 | 1 | 1 | 1 | 3 |
| **$X^2$** | (1.33) / 0.68 | | | (5.43) / 0.25 | | |
| **Years of experience as pediatric nurse** | | | | | | |
| **1-4 years** | 11 | 4 | 1 | 3 | 1 | 12 |
| **5-8 years** | 2 | 5 | 3 | 2 | 6 | 2 |
| **9 years and above** | 1 | 1 | 2 | 1 | 2 | 1 |
| **$X^2$** | (8.66) / 0.07 | | | (10.9) / 0.028 | | |

Table (8) Shows that there was no partnership betwixt total nurses' skill score about vital sign measurement and sociodemographic features of nurses: there was no statistically momentous diversity betwixt total nurses' skill score about vital sign measurement and age, gender, as well as professional qualification of studied nurses in pretest, and after one - month post-test.

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**DISCUSSION:**

Nurses frequently ignore the importance of vital signs in identifying worsening. Even though the significance of aberrant vital signs as a warning sign of impending decline, there is evidence to show that nurses have generally underemphasized this prediction [9].

**Nurses Demographical Characteristics:**

According to the current survey, the majority of precipitants (56.7%) were between the ages of 21 and 30, this study result came in contrast with Mohammed (2016) [10] research, only 38.9% of the study group's nurses were under the age of 25, compared to 35.6% who were between 26 and 30 and 25.6% who were beyond 30. In terms of the gender of the nurses, this study's findings (80% female nurses) were consistent with Walsh et al.'s (2005) [11] study, which found that 84.3% of participants were female.

Findings from data analysis revealed that graduates with a diploma represented the bulk of instructional levels (63.3%), this agrees with the studies which carried out (Amina et al., 2014) [12] reported that the study's main body (94%) had a diploma degree, also the result came as opposed to (Khalil, et al. 2013) [13] said that 76.4% of nurses had degrees from nursing schools.

Regarding the years of experience of nurses, (Ahmed Sh. 2007) [14] found that 70.3% of nurses had

under five years of experience, and 53.4% of nurses had between 1-6 years. Furthermore, 43.3% of the nurses in the study, according to Mohammed H. (2014) [15], had less than 5 years of experience. On the other hand, according to (Khalil, et al. 2013) [13], 60% of nurses have experience ranging from 10 years or longer.

The study demonstrated that, at P values of (0.031) and (0.002), respectively, there were extremely momentous relationships between pre- and posttest nurses' knowledge and skill. This demonstrated why instructional activities such as programs are seen to be crucial for improving nurses' acquaintance and abilities in relation to nursing interventions. In addition, the researcher came to the conclusion that education obtained through instructional programs may be regarded as a crucial element for delivering nursing care in the right and most up-to-date manners in order to achieve the finest outcomes when doing so. The findings of this study were significantly supported by Maria et al. (2015) [16], who discovered extremely significant connections between pre- and posttest nurses' acquaintance and practice (P. value 0.001 and 0.002, respectively). Al Yousef (2014) [17] observed that when examples of infection control rules and related measures were provided, internship nursing students' knowledge, performance, and attitude all dramatically increased. This was in line with Sleiman's (2014) [18] finding that, compared to before the procedure was put into place, both immediately following the adoption of the strategy and two months later, the mean score of nurses' practice increased statistically significantly.

**Score of knowledge**

After 30 days of executing the program, more than half of participant nurses (53.3%) had a strong degree of familiarity with vital signs measurement, compared to 10% before executing the program, according to analysis of the data about nurses' acquaintance score. (Table 5). The researcher made a comment about this finding that there is a relationship between instructional programs and improving nurses' understanding of the nursing sector, which results in nurses who have the knowledge to minimize potential mistakes while providing nursing care. According to Elshamy et al. (2015) [19], After the protocol was followed, 90% of the study's nurses reported having solid knowledge of intravenous infusion therapy. Similar research conducted by Al Yousef (2014) [17] revealed that compared to before suggestions were implemented, 84.8% of the nurses under investigation had excellent acquaintance scores with reference to infection management.

**Score of skill**

When it comes to nursing skill scores, the present research showed that after a month of executing the program, 50% of participating nurses had excellent level of skill in vital sign assessment, compared to 20% before executing the program (Table 6). Due to the rising demand for medical departments. The researcher observed that it is exceedingly stressful to teach in departments that are overloaded with pupils. In many instances, the lecturer is compelled to use the lecture approach rather than relying on the practical side and manual expertise to impart knowledge. The findings, which show that small-group skill learning is more efficient than standard education. This result matched that of Elshamy et al. (2015) [19], They found that whereas 82% of nurses responded positively to intravenous infusion therapy immediately after following the regimen, there were some nurses who struggled, 30 days after applying the technique, this performance somewhat worsened to (24%), down from (2%) earlier. This was supported by Al Yousef (2014) [17] research, which showed that, whereas only 27.3% of the nurses in the study had excellent execution scores for infection control before to the recommendations' execution, those numbers rose to 84.8% following their adoption.

**Association between nurses' socio demographical features and their knowledge**

This study shown that, 30 days after the posttest, there was no momentous relationship between the nurses' acquaintance and their age, gender, or years of experience as pediatric nurses P value (0.99), (0.63), (0.44), respectively. This could be ascribed to a lack of programs for ongoing education and in-service training. The results of this study contrasted with those of Lamsal and Shrestha (2019) [20], who discovered a momentous relationship between nurses' ages and acquaintances (P. value [0.012]). In their study training program on nurses' knowledge and attitudes regarding pain treatment, Germossa and Helles (2018) [21] observed there was no statistically momentous association between nurses' gender and their acquaintance (P. value = 0.12). Additionally, our results concurred with those of Awali et al. (2018) [22], who discovered that there was no significant relationship between a nurse's level of schooling and their acquaintance and skills (P. value 0.05). The findings of Faheim and Hassan (2018) [23], who discovered a very statistically significant relationship between the mean scores of the entire investigated nurses' acquaintance and competence in pre and post instructional programs and their years of experience with p 0.001.

Concerning nurses' professional qualification there were momentous partnership between nurses' professional qualification and their knowledge P. value (0.38) in pretest however, highly momentous after 30 days posttest P. value (0.002). The amount of material that students learn during their scholastic years varies greatly between high schools, institutes, and nursing colleges, claims the study. This finding is significantly supported by Feng et al.'s (2014) [24] and Mogileeswari and Ruth's (2016) [25] findings, which showed a significant relationship between the nurse's acquaintance of fluid and electrolyte replacement therapy and their instructional background.

- **Association between nurses' socio demographical features and their skill**

The table demonstrates that there were no notable partnerships between nurses' ages, gender, professional qualification and their competence after 30 days posttest P. value (0.45), (0.57), (0.25), respectively. This result is in line with that of Mohamed and Weheida (2014) [26], who demonstrated that there were no statistically significant variations in the performance of all nurses, regardless of their age group or instructional attainment. This finding also was totally in covenant with the one reported by Taha Ekmas (2014) [27] who said that there was no significant correlation between the gender of the nurses, the drill, or the nurses' acquaintance. The finding also, matched with that of Mohammed and Taha (2016) [28] who found in their study about total parenteral nutrition at critical areas in Egypt. They claimed that there was a significantly significant relationship (P value = 0.001) between the nurse's acquaintance, practice administering total parenteral nutrition in critical care areas, and their degree of education.

The results of the current study indicated a momentous relationship between the number of years of experience and skill of nurses, with P. values of (0.07) in T1 and (0.028) in T2, respectively. This finding also was totally in covenant with the one reported by Taha Ekmas (2014) [27] who said that there was no momentous relationship between the nurse's acquaintance, training, and years of nursing experience.

**Study Limitations:**

Lack of desire to participate in the research because the nurses do not have enough time to participate due to the few numbers of staff.

## CONCLUSIONS

Nurses' expertise and proficiency in measurement of vital signs were lacking. Nurses may be able to improve their knowledge and skills after taking part in an instructional program on vital signs measurement.

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**Author contribution**

All authors discussed the results and contributed to the final manuscript and they analyzed the data and wrote the manuscript.

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