Araştırma makalesi

Research article

Does the Knowledge of Nurses on Blood Pressure Measurement Affect Their Practice?

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ABSTRACT

Aim: This study was performed to evaluate whether nurses follow the measurement steps accurately while measuring blood pressure, whether they have accurate information about the procedure, and whether they apply their knowledge correctly during practice.

Material and Methods: This observational study was conducted with 106 nurses working in the internal medicine and surgical department of a university hospital in Turkey from March 15 to May 15, 2016. In the study, nurses' knowledge and application of the measurement steps were determined by observation and face-to-face interview methods. The obtained data were recorded in the information and observation forms. The same researcher made all observations, and each nurse was observed once.

Results: None of the participants fulfilled the following four steps in measuring blood pressure 1) "allowing 30 minutes for the patient to relax if the patient is tired or has been smoking", 2) "inflating the blood pressure cuff until radial artery pulse is lost", 3) "waiting for one minute following the deflation of the blood pressure", 4) "inflating the blood pressure cuff until the scale reads around 30 mm Hg above the reading from the radial artery". In contrast, a considerable proportion (respectively, 77.4%, 71%, 70%, 60%) of nurses knew these steps. Further, none of the nurses who accurately knew the same steps performed them in practice (p<0.05).

Conclusions: The study showed that while measuring blood pressure, the nurses did not comply with the steps for measuring blood pressure and did not put their theoretical knowledge of the required steps for the procedure into practice.

Keywords: Blood pressure, blood pressure monitoring, nursing

ÖZ

Hemşirelerin Kan Basıncı Ölçümü Hakkındaki Bilgileri Uygulamalarını Etkiler mi?

Amaç: Bu çalışma, hemşirelerin kan basıncı ölçümü yaparken ölçüm basamaklarını yerine getirip getirmediğini, ölçüm basamaklarını doğru bilip bilmediğini ve doğru bildiği her bir basamağı uygulamada yerine getirip getirmediğini değerlendirmek amacıyla yapıldı.

Gereç ve Yöntem: Bu gözlemsel çalışma, 15 Mart - 15 Mayıs 2016 tarihleri arasında Türkiye'de bir üniversite hastanesinin iç hastalıkları ve cerrahi bölümünde çalışan 106 hemşire ile gerçekleştirilmiştir. Araştırmada hemşirelerin ölçüm adımlarını bilme ve uygulama durumları gözlem ve yüz yüze görüşme yöntemi ile toplanmıştır. Elde edilen veriler bilgi ve gözlem formlarına kaydedilmiştir. Tüm gözlemler aynı araştırmacı tarafından yapılmış ve her bir hemşire bir kez gözlenmiştir.

Bulgular: "Yorgunluk, sigara içme gibi aktivitelerden en az biri varsa 30 dakika beklenmesi", "manşonun radial arter nabzının kaybolduğu yere kadar şişirilmesi", "manşon boşaltıldıktan sonra bir dakika beklenmesi" ve "manşonun radial arterden belirlenen değerin 30 mmHg üzerine şişirilmesi" basamaklarını, araştırmaya katılan hemşirelerden hiçbirinin yerine getirmediği gözlendi. Ancak bu basamakları hemşirelerin bilme yüzdelerinin (sırası ile %77.4, %71, %70, %60) yüksek olduğu tespit edildi. Ayrıca aynı basamakları doğru bilen hemşirelerden hiçbirinin uygulamada yerine getirmediği saptandı (p<0.05).

Sonuç: Çalışma bulgularımız, hemşirelerin kan basıncı ölçümü yaparken ölçüm basamaklarına bağlı kalmadan ölçüm yaptığını, teorikte bildiği basamağı uygulamada yerine getirmediğini gösterdi.

Anahtar kelimeler: Hemşirelik, kan basıncı, kan basıncı izlemi

INTRODUCTION

The blood pressure value is one of the indicators of an individual's health status. Therefore, it is essential to measure blood pressure properly and completely[1]. Accurate blood pressure measurement will prevent the patient from getting a false diagnosis and initiate an inappropriate treatment [2,3]. To make a precise blood pressure measurement, it is also essential for the person who will perform the measure to know the steps of the blood measurement procedure, such as preparing the patient for the procedure, selecting the cuff appropriate for the patient, instructing the patient about the procedure, paying attention to privacy and taking care of keeping the arm at heart level and to perform the measurement according to these steps[3-5].

Detailed information on blood pressure measurement is given in Nursing Fundamentals textbooks and skill guides [6-8]. In these sources, the steps of blood pressure measurement are given step by step, and even the measurement steps are shown visually and audibly in the form of a video presentation or web-accessed training videos. However, it is emphasized in the literature that skill guides are not used in blood pressure measurement.

Armstrong (2002) emphasized that nurses do not use appropriate blood pressure measurement techniques and that blood pressure measurement should be performed in measurement guidelines[9]. In their observational study on nurses (n: 21), Drevenhorn, Hakansson, & Petersson (2001) concluded that rather than following blood pressure measurement steps, nurses perform blood pressure measurement randomly[10]. Another observational study (Zaybak & Güneş, 2007) reported that about 50% of the nurses did not support the patient's arm properly by leaning it against a soft, flat place to level it with the heart while the palm is facing upward[3]. Further, 83.3% of the nurses erred in cuff placement, and most did not palpate the brachial artery. In the same study, it was observed that they did not pay attention to the BP cuff size, did not deflate the cuff properly (2–3 mmHg per second), and did not pump the bulb until the pressure was 30 mmHg higher than the systolic pressure recorded previously. The same study also stated that nurses made frequent errors in most arterial blood pressure measurement steps, which may lead to measurement errors[3]. Ahmed (1997) stated that 60% of the physicians and nurses participating in the study had insufficient knowledge about blood pressure measurement[11]. Considering the results obtained from the studies, it is seen that the blood pressure measurement, a common measurement performed by nurses in the clinical setting, is performed inadequately or inaccurately [3,12,13]. There are studies evaluating nurses' knowledge or practices regarding blood pressure measurement steps. The difference of the present study from the others is that nurses' knowledge and application steps of blood pressure measurement and performing each step they know correctly in practice are evaluated together. This research will raise awareness about whether blood pressure measurement, which is seen as an easy nursing skill, is done in accordance with the procedure steps.

Aim

This study was performed to evaluate whether nurses follow the blood pressure measurement steps accurately, whether they have accurate information about the procedure, and whether they apply their knowledge correctly during practice.

Research Questions

Do nurses perform measurements according to arterial blood pressure measurement steps?

Do nurses know arterial blood pressure measurement steps?

Do nurses perform the steps that they know correctly in practice?

MATERIAL and METHODS

Study Design

This observational and descriptive study was conducted with nurses working in a university hospital's internal medicine and surgery departments in Turkey between March 15 and May 15, 2016.

Study Sample

The universe of the study consisted of 160 nurses working in the internal medicine and surgery units of a health research and application center of a university. It was planned to include all nurses working in the units where the research was conducted when the sampling was formed and who agreed to participate in the study (N: 160). However, the study was conducted with 106 nurses, as 41 of the nurses did not want to participate in the study, and 13 of them were on leave during the study. The rate of participation in the research is 66.25%.

Data Collection Tools

The data were collected by using "personal information form (age, gender, position in the clinic, education level, clinics in which nurses are working, working time, if s/he received postgraduate training on blood pressure measurement, if s/he received training on blood pressure measurement after graduation, where did s/he get the training?)", "arterial blood pressure measurement skill observation form", and "arterial blood pressure measurement skill information form". Nursing Fundamentals textbooks, skill guides, and similar research articles were used to prepare observation and information forms. The observation form consisted of the following two options: "applied accurately" and "did not apply accurately", while the arterial blood pressure measurement skill information form consisted of the following three options: "true", "false" and "I have no idea". Both forms comprised 24 steps covering the entire process, from the beginning to the end of the arterial blood pressure measurement. The researchers prepared the forms (see table 2,3) in reference to previous reports [3,6,7,14,15]. Expert opinion was taken from four faculty members to determine the comprehensibility of arterial blood pressure skill information and observation forms. The experts were from the Fundamentals of Nursing field who conducted research

on topics similar to the research subject. Adjustments were made as per the recommendations of these experts.

Pilot Study

To evaluate the functionality of the forms, a pilot test was made with ten nurses in February 2016; these nurses were not included in the sample. In line with the data obtained, the expressions that were not understood were corrected, and the final version of the forms was obtained.

Data Collection

Nurses were informed that a study would be performed regarding the blood pressure measurements of patients. They were made aware that the nurses who performed the measure would be asked some questions related to the measure after the procedure. The data relating to the descriptive characteristics of the nurses were recorded on the personal information form. Then, the nurses were asked to measure the patient's blood pressure. While the nurses were performing the measurement, the investigator observed their adherence to the measurement steps and recorded them on the "arterial blood pressure measurement skill observation form". The process of taking notes included the period from the beginning to the end of the measurement. To avoid the possible negative effects of being observed on their performance, the nurses were told that they were observed only after the procedure was over. In order to use the obtained data, verbal/written consent was taken from the nurses again. Nurses who did not give consent were excluded from the study (Table 1). Following this process, information on nurses' theoretical knowledge was collected via the face-to-face interview method using "arterial blood pressure measurement skill information form". Each item of the information form included the following options: "true", "false", and "I have no idea". The data collection for each nurse took 20 minutes maximum. In order to prevent any negative influence of the nurses who had already been interviewed on nurses who were yet to be interviewed, the study was conducted in the second department only after it was completed in the first department. Nurses who were absent on the study day were interviewed on a subsequent day at the beginning of their shift. The nurses who were unavailable due to weekly leave on the study day were interviewed on the first day they resumed their duty in the department at the beginning of their shift. Study data were collected between 8 AM and 11 PM. The same investigator performed all the observations, and each nurse was interviewed only once.

Our expectation from the study results was that all or almost all the nurses adhered to and had theoretical knowledge about the arterial blood pressure measurement steps that would enable accurate blood pressure measurement.

Data Analysis

The data were analyzed using SPSS version 21.0 package program. Categorical variables are presented as numbers and percentages. The Chi-square test was used to compare independent categorical variables. The differences between individuals' theoretical knowledge and practical applications were analyzed using the McNemar test.

The nurses' responses on the information form for arterial blood pressure measurement steps were re-coded as "true" and "false" for each step. The responses of those who marked the "I have no idea" option were coded as "false". Observations of arterial blood pressure measurement steps were grouped as "nurses who carried out the item" and "nurses who didn't perform it"; knowledge of arterial blood pressure measurement steps were grouped as "nurses with correct knowledge" and "nurses with incorrect knowledge". To provide ease of table representation in the findings section, each item in the information and observation forms was abbreviated without loss of meaning and analyzed in the same step.

The sociodemographic characteristics of the nurses were analyzed separately for each item of the blood pressure measurement steps observation and information form using the Chi-square test. The results showed no significant differences and have therefore not been included here.

Ethical Considerations

Written permissions of the institution where the study was conducted and the Non-Interventional Clinical Ethics Committee (dated 27.01.2016 and numbered 60116787-020/5430) were taken to conduct the study. Written/verbal consent was also obtained from the nurses who agreed to participate in the study.

Limitations

Nurses were observed once, as nurses were reluctant to participate in the study.

RESULTS

Sociodemographic characteristics of the nurses

98.1% of the nurses were women, 66.0% had an undergraduate/graduate degree, 92.5% were department nurses, and 68.9% worked in the surgery department. The average age of the nurses was 27.96 years; 67.9% of the nurses stated that they had been working for >2 years, and 9.4% (10 nurses) said that they had received training on arterial blood pressure measurement after their graduation. Further, 90% of those who reported that they had received training said they had received training from the institution they worked for (Table 1).

Observations regarding the nurses' application of arterial blood pressure measurement steps

The steps with the highest percentage of adherence by nurses were as follows: "focusing all attention on the manometer during the measurement (99.1%)," "leaving the antecubital fossa exposed (98.1%)," "telling that blood pressure measurement will be performed (80.2%)," and "deflation of the blood pressure cuff at a rate of 2 to 3 mmHg per second (73.6%)". None of the nurses fulfilled the following steps: "allowing 30 min for the patient to relax if the patient is tired or has been smoking", "inflating the BP cuff until radial artery pulse is lost", "waiting for another minute following the deflation of the BP cuff", and "inflating the BP cuff until the scale reads around 30 mm Hg above the reading from the radial artery". The percentage of adherence to the other steps was considerably low (Table 2).

Table 1. Descriptive Characteristics of the Nurses

	n	%
Gender		
Female	104	98.1
Male	2	1.9
Age		
18-20 years old	18	16.9
21 years and older	88	83.1
Mean Age	27.96	
Educational Status		
Vocational school of health /Associate degree	36	34
Bachelor/master's degree	70	66
Position Held		
Supervisor Nurse	8	7.5
Service Nurse	98	92.5
Duration of work		
Two years and less	34	32.1
Two years and more	72	67.9
Clinic Worked on		
Internal Medicine	33	31.1
Surgery	73	68.9
Status of receiving training in blood pressure measurement after graduation		
Yes	10	9.4
No	96	90.6
Place of training		
Their working institution	9	90
Educational background	1	10
Total	106	100.0

Findings of the face-to-face interview regarding nurses' knowledge of arterial blood pressure measurement steps

The steps with the highest percentage of being known by the nurses were as follows: "recording the measurement obtained (100%)", "focusing all the attention on the manometer during the measurement (99.1%)", "telling the patient that s/he should not talk during the measurement (97.2%)", "finding the brachial artery (97.2%)", "ensuring that the manometer is referenced to zero pressure (96.2%)", "supporting the arm to level it with the heart (95.3%)", "telling that blood pressure measurement will be performed (94.3%)", and "once the measurement is completed, removing the cuff and rolling down the sleeve (91.5%)". The steps with the lowest percentage of being known were "leaving the antecubital fossa exposed (20.8%)" and "wrapping the lower edge of the cuff 2-3 cm above the antecubital fossa (12.3%)" (Table 2).

Comparison of nurses' knowledge and practices regarding arterial blood pressure measurement steps

The steps that were known accurately and had the highest percentage of adherence in practice were as follows: "focusing all attention on the manometer during the measurement (98.1%)", "telling the patient that blood pressure measurement will be performed (74.5%)", "recording the obtained data (68.9%)", "informing about the measurement result (61.3%)", "deflation of the blood pressure cuff at a rate of 2 to 3 mmHg per second (60.4%)", and "supporting the arm to level it with the heart (43.4%)" (Table 3).

DISCUSSION

In this study, it was evaluated whether the nurses know and apply the steps of blood pressure measurement, such as ensuring hand hygiene, checking the material before the procedure, giving information about the procedure, waiting for 30 minutes to check if there is an activity such as fatigue or smoking, and whether they fulfill the steps they know in practice.

Hand hygiene is one of the essential steps that help prevent the transmission of microorganisms and infections[16]. In the present study, very few nurses (17.9%) were attentive to hand hygiene before performing blood pressure measurements. However, the percentage of those who gave a correct answer to the question about hand hygiene was high (89.6%) (Table 2). Only 17% of those who gave a correct answer practiced hand-hygiene practices (Table 3). An observational study examining the adherence of hospital staff in hand-hygiene practices (n: 112) reported that the percentage of compliance was 78%[17]. The reason for the different findings in our study compared to that in other studies might be that the nurses in our study did not know they were being observed, while those in the other study knew that they were being observed. Our result suggests that although nurses know about hand hygiene, they neglect it in practice.

The knowledge and practice of the person who measures blood pressure gain relevance when combined with the reliability of the tools to be used[18]. In our study, only two of the nurses adhered to the "checking of the materials" step, although the majority had accurate knowledge about it (89.6%) (Table 2). Only one of the nurses who had accurate knowledge performed this step correctly (Table 3). One study (n: 127) has reported that 98.4% of nurses knew that the materials should be checked[11]. In a study that measured the blood pressure measurement technique using the observation method, it was stated that 50% of the nurses checked the materials[9]; however, in another study, 14 of 21 nurses performed checking[10]. An examination of the studies revealed that our results on nurses' knowledge were similar to those reported by Ahmed (1997) and that they differed from other reports[11]. The difference may be due to the differences in the methods used in the studies. We conducted our study in a real hospital setting and observed each nurse once.

One of the crucial factors for ensuring accurate blood pressure measurement is the selection of a cuff suitable for the patient's anatomy. In our study, we also observed whether the cuff suitable for the patient's arm diameter was selected during the step of checking the materials. However, we observed that the same sphygmomanometer was used for all patients, and the nurses did not have any awareness regarding this issue.

Table 2. Nurses' Practice and the Knowledge States regarding the Steps of Arterial Blood Pressure Measurement

Blood pressure measurement steps	Observation				Knowledge			
	Nurses who carried out the item		Nurses who didn't perform it		Nurses with the correct knowledge		Nurses with incorrect knowledge	
	n	%	n	%	n	%	n	%
1. Ensure hand hygiene	19	17.9	87	82.1	95	89.6	11	10.4
2. Check the instrument	2	1.9	104	98.1	95	89.6	11	10.4
3. Tell the patient that blood pressure measurement will be carried out	85	80.2	21	19.8	100	94.3	6	5.7
4. Wait for 30 minutes if there is an activity such as fatigue or smoking	0	0	106	100	82	77.4	24	22.6
5. Be aware of the previous blood pressure measurement value	1	0.9	105	99.1	83	78.3	23	21.7
6. Observe privacy	5	4.7	101	95.3	43	40.6	63	59.4
7. Tell patient not to talk during the measurement	27	25.5	79	74.5	103	97.2	3	2.8
8. Support the arm at heart-level	50	47.2	56	52.8	101	95.3	5	4.7
9. Expose the antecubital fossa	104	98.1	2	1.9	22	20.8	84	79.2
10. Identify the brachial artery	15	14.2	91	85.8	103	97.2	3	2.8
11. Wrap the lower end of the cuff at 2-3 cm above the antecubital fossa	14	13.2	92	86.8	13	12.3	93	87.7
12. Ensure that the manometer shows the value zero	1	0.9	105	99.1	102	96.2	4	3.8
13. Feel brachial artery with the passive hand	27	25.5	79	74.5	75	70.8	31	29.2
14. Place the diaphragm of the stethoscope above the brachial artery	24	22.6	82	77.4	104	98.1	2	1.9
15. Inflate the cuff until the radial artery pulse disappears	0	0	106	100	71	67.0	35	33.0
16. Wait for one minute after deflating the cuff	0	0	106	100	70	66.0	36	34.0
17. Inflate cuff to 30 mmHg above the value determined from the radial artery	0	0	106	100	60	56.6	46	43.4
18. Deflate air in the cuff by 2 or 3 mmHg per second	78	73.6	28	26.4	88	83.0	18	17.0
19. Monitor manometer visually during the measurement	105	99.1	1	0.9	105	99.1	1	0.9
20. Remove the cuff and fix the clothes on the arm after measurement	6	5.7	100	94.3	97	91.5	9	8.5
21. Record the value obtained	73	68.9	33	31.1	106	100	0	0
22. Inform the patient about the blood pressure measurement result	72	67.9	34	32.1	94	88.7	12	11.3
23. Clean the stethoscope and diaphragm after the measurement	1	0.9	105	99.1	77	72.6	29	27, 4
24. Ensure hand hygiene	1	0.9	105	99.1	82	77.4	24	22.6

Table 3. The Situation of the Nurses Who Perform the Steps They Know Right in Practice

Blood pressure measurement steps	Nurses with correct knowledge				Nurses with incorrect knowledge				p
	Nurses who performed the step		Nurses who didn't perform it		Nurses who performed the step		Nurses who didn't perform it		
	n	%	n	%	n	%	n	%	
1. Ensure hand hygiene	18	17	77	72.6	1	1	10	9.4	0.001
2. Check the instrument	1	0.9	94	88.7	1	1	10	9.4	0.001
3. Tell patient that blood pressure measurement will be carried out	79	74.5	21	19.8	6	5.7	0	0	0.006
4. Wait for 30 minutes if there is an activity such as fatigue or smoking	0	0	82	77.4	0	0	24	22.6	0.001
5. Be aware of the previous blood pressure measurement value	0	0	83	78.3	1	0.9	22	20.8	0.001
6. Observe privacy	1	0.9	42	39.6	4	3.8	59	55.7	0.001
7. Tell patient not to talk during the measurement	26	24.5	77	72.6	1	1	2	1.9	0.001
8. Support the arm at heart-level	46	43.4	55	51.9	4	3.8	1	0.9	0.001
9. Expose the antecubital fossa	22	20.8	0	0	82	77.4	2	1.8	0.001
10. Identify the brachial artery	15	14.2	88	83	0	0	3	2.8	0.001
11. Wrap the lower end of the cuff at 2-3 cm above the antecubital fossa	0	0	13	12.3	14	13.2	79	74.5	1.000
12. Ensure that the manometer shows the value zero	1	0.9	101	95.3	0	0	4	3.8	0.001
13. Feel brachial artery with the passive hand	19	17.9	56	52.8	8	7.5	23	21.8	0.001
14. Place the diaphragm of the stethoscope above the brachial artery	24	22.6	80	75.5	0	0	2	1.9	0.001
15. Inflate the cuff until the radial artery pulse disappears	0	0.0	71	67	0	0	35	33	0.001
16. Wait for one minute after deflating the cuff	0	0.0	70	66	0	0	36	34	0.001
17. Inflate cuff to 30 mmHg above the value determined from the radial artery	0	0.0	60	56.6	0	0	46	43.4	0.001
18. Deflate air in the cuff by 2 or 3 mmHg per second	64	60.4	24	22.6	14	13.2	4	3.8	0.143
19. Monitor manometer visually during the measurement	104	98.1	1	0.9	1	1	0	0	1,000
20. Remove the cuff and fix the clothes on the arm after measurement	6	5.7	91	85.8	0	0	9	8.5	0.001
21. Record the value obtained	73	68.9	33	31.1	0	0	0	0	0.001
22. Inform the patient about the blood pressure measurement result	65	61.3	29	27.4	7	6.6	5	4.7	0.001
23. Clean the stethoscope and diaphragm after the measurement	1	0.9	76	71.7	0	0	29	27.4	0.001
24. Ensure hand hygiene	1	0.9	81	76.4	0	0	24	22.7	0.001

Mc Nemar test

Our results suggest that nurses did not know this step and did not implement it.

The measurement may be inaccurate when a cuff that does not suit the patient's arm diameter is used[19]. If the size of the cuff is larger than the circumference of the arm, the blood pressure measurement will be lower than the actual value; and if the size is smaller, it will be higher than the actual value [20,21]. The study results on this subject show differences. In one study, half of the nurses, and in another study less than half of the nurses do not know the appropriate cuff size for the patient [11,22]. Machado et al. (2014) examined the nurses' theoretical and practical knowledge about blood pressure measurement and reported that only one nurse knew that a cuff suitable for the patient's arm diameter had to be selected, while eight nurses performed this step in practice[23]. The observational study conducted by Zaybak and Güneş (2007) evaluated nurses' method of measuring indirect arterial blood pressure, and it was observed that nurses did not pay attention to the cuff size[3]. This may cause measurement errors[19].

Our study revealed that none of the nurses paid attention to whether the patient was engaged in any activities before the measurement, while more than half of them accurately knew this step (Table 2). None of the nurses who knew of it performed this step in practice (Table 3). For blood pressure measurement, measurement should be performed 20–30 minutes after activities, such as smoking and exercise[20]. Although its importance is emphasized in the literature, results regarding the correct application and knowledge of this step show difference in the studies[24,25]. Zaybak and Güneş (2007) showed that all nurses performed this step of blood pressure measurement[3]. In the study of Machado et al. (2014), while the vast majority of nurses accurately knew this step of blood pressure measurement (90.3%), > 50% paid attention to it in practice[23]. Minor et al. (2012) reported that 98% of patients were not allowed to take rest before the measurement[26]. Korkmaz and İpek Çoban (2015) revealed that most nurses ignored this step[14]. The difference between the studies is thought to have resulted from the differences in the time given to patients before performing blood pressure measurements. In the study of Zaybak and Güneş (2007), the time given to patients for waiting before the measure was 5 minutes, while it was 30 minutes in other studies[3]. These results suggest that nurses hurriedly perform blood pressure measurements.

During the procedure, the patient's arm to be measured is supported by leveling it with the heart with the palm facing upward[25]. Our study revealed that almost half of the nurses (47.2%) adhered to this step, and the majority (95.3%) had accurate knowledge about it (Table 2). It was determined that almost half of those who accurately answered the question (43.4%) applied this step (Table 3). When the patient's arm is not supported, there may be an increase in the blood pressure due to isometric muscle movements[27]. Therefore, the obtained measurement may be inaccurate[20]. However, the studies on this subject differ in their findings. Some studies reported that nurses did not pay attention to the positioning of the arm during the measurement[3,26] while others reported that most nurses paid attention to the arm position of the patient during the measurement[3] and answered the question about arm position accurately[28]. The difference between the studies is believed to be due to the difference in sampling. Our result suggests that although nurses accurately know that the arm positioning should be considered during the measurement, they do not pay attention to it in practice; thus, we conclude that only knowledge is insufficient for accurate practice.

In our study, most nurses (98.1%) performed the step of leaving the antecubital fossa exposed, while only 22 nurses gave accurate answers about this step. All those who had proper knowledge also performed this step accurately. While 15 of the nurses performed the step of determining the brachial artery during the measurement, almost all had precise knowledge about it. Only 15 of the nurses who had accurate knowledge performed this step in practice, 14 completed the step of wrapping the lower edge of the cuff 2–3 cm above the antecubital fossa, and 13 nurses had accurate knowledge about it (Table 2). However, it was indicated that none of those who had proper knowledge practiced it (Table 3). The cuff should be placed 2–3 cm above the point where the brachial artery is palpated[20]. If the cuff is placed on the stethoscope, it may result in a false reading[19]. The results suggest that nurses are focused on completing the work and ignore the possibility of obtaining inaccurate results during the measurement.

If the needle is not initially referenced to zero, the measurement will be inaccurate[20]. Our study indicated that only one nurse took measures considering this step while the majority (96.2%) had accurate knowledge about it (Table 2), and only one of those who had proper knowledge practiced it (Table 3). Our result showed that this step, which is very important for preventing measurement error, is not performed, although it is known in theory. Thus, the knowledge of the nurses does not affect the practice.

Timely and accurate measurement recording saves time and minimizes the risk of errors[29]. More than half the nurses (68.9%) recorded the result in our study, and all had accurate knowledge about it (Table 2). More than half (68.9%) of those who knew this step correctly were found to practice it (Table 3). In a study wherein nurses were both observed and assessed in terms of their knowledge, almost all nurses recorded the result and knew that they had to record it[23]; an observational study revealed that the vast majority of nurses (82.2%) recorded the measurement results[23].

It has been observed that most of the measurement steps are known accurately but not applied. In addition, it has been observed that most of the steps that are known accurately are not fulfilled in practice. This showed that nurses do not put what they know into practice. This may be because nurses are from different educational levels. In the Turkish context, nurses can be graduates from various academic backgrounds ranging from high school education to bachelor degrees, all of which result in their differences in terms of their knowledge and practices. On the other hand, only 10 of the nurses stated that they received training on blood pressure measurement after graduation

to compensate for such differences. Another reason can be that the working experience period of the nurses is different. The literature emphasizes that educational levels, working experience, and continuous education are essential in blood pressure measurement knowledge and skills [2,30,31].

CONCLUSION

Our study results revealed that although the percentage of nurses knowing about the arterial blood pressure measurement steps was high, the percentage of those who correctly practiced these steps was low. Thus, although nurses have accurate knowledge of arterial blood pressure measurement, they tend to hurry during the measurement and therefore do not adhere to the guidelines. The results also revealed that they focus on completing the work and thus do not realize that they practice the procedure in a way that may lead to measurement errors.

It is recommended to take arterial blood pressure measurement steps among the in-service training topics, have nurses measure blood pressure in accordance with the arterial blood pressure measurement steps, and explain the importance of making measurements.

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