ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES, SCHOOL OF MEDICINE DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE

ASSESSMENT OF KNOWLEDGE, ATTITUDE, PRACTICE AND ASSOCIATED FACTORS TOWARDS FLUID BALANCE MONITORING AMONG NURSES WORKING IN ADULT ICU OF FEDERALLY ADMINISTERED GOVERNMENT HOSPITALS, ADDIS ABABA, ETHIOPIA, 2020

BY: WONDAYEHU MENGEST (BSC)

A THESIS SUBMITTED TO Addis ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR MASTERS DEGREE IN EMERGENCY MEDICINE & CRITICAL CARE NURSING.

JUNE, 2020

ADDIS ABABA, ETHIOPIA

Name of principal investigator	Wondayehu mengest
Name of advisors	Dr. Tigest worku (MD, Assistant Professor of EMCC) Ms. Achamyelesh Tadele (M.Sc in EMCCN., Lecturer in AAU)
Full title of the research project	Assessment of knowledge, attitude, practice and associated factors towards fluid balance monitoring among nurses working in adult ICU of federally administered government hospitals in Addis Ababa, Ethiopia, 2020.
Duration of project	October 2019 to June 2020.
Study area	All federally administered government hospitals in Addis Ababa Ethiopia
Total cost of the project	35,405ETB
Address of the principal investigator	Mobile Telephone: 0922146770 E-mail: mengest978@gmail.com

ACKNOWLEDGMENT

First of all, I would like to thank my almighty God to give me the strength and health until this time.

Next, I would like to give my warmest gratitude to my advisor **Ms. Achamyelesh Tadele** (MSC IN EMCCN) and **Dr.Tigest worku (MD, EMCC SPECIALIST**) who guide me throughout the proposal development process until completing thesis very patiently and for their great advisement and input in my work. Secondly my sincerest acknowledgment goes to all of my friends that support me during my thesis work.

I wish to express my special thanks to Addis Ababa University School of health science department of emergency medicine and critical care for allowing and financing me to conduct this study.

I also owe my most grateful thanks to ST.Peters specialized hospital which sponsored me to continue my education.

Finally, I would also like to thank the study participants for their volunteer participation

Table of contents

Contents

LIST OF TABLES

List of figures

LIST of ACRONYMS AND ABBREVIATIONS

A.A …….. Addis Ababa

BSC…… Bachelor of Science degree

CNE……compressive nursing education

EMCC …….. Emergency medicine and critical care

EMCCN …….. Emergency medicine and critical care Nursing

FDAGH…… federally administered Addis Ababa government hospitals

ICU…… intensive care unit

IFL…….. Insensible fluid loss

MD……. Medical doctor

Ml …….. Milliliter

Abstract

Background: Fluid Balance is net result of intake and output of fluid to provide metabolic processes to function correctly. In Intensive care unit the patient needs special consideration for Fluid balance monitoring. Fluid balance monitoring is very vital component in intensive care unit for management and good patient prognosis. Recent studies show negative fluid balance and positive fluid balance adversely affects patient morbidity, mortality and patient length of stay in hospitals.

Even if there is some related researches but still little is known regarding fluid balance monitoring.

Objectives: To assess knowledge, attitude and practice of nurses working in ICU towards fluid balance monitoring and associated factors in federally administered government hospitals, Addis Ababa, Ethiopia from October 2019 to June 2020.

Methods: institution based quantitative cross-sectional study was conducted from February to April, 2020 among federally administered government hospitals in Addis Ababa. Well-structured questionnaire for socio-Demographic characteristics, attitude, knowledge and checklist for practice was adopted from literatures with little modification. The data was entered into Epi-data, version 4.6 then analyzed by using SPSS 24 Software. Finally the result was computed and interpreted through use of descriptive statistics. Association between variables was analyzed by using logistic regression at p-value <0.2 and <0.05 considering as significant respectively.

Result: - out of 166 study participants the response rate was 96.4% with 28 ± 3.5 years mean age of study participants. Around 85(53.12%) of study participants were female in sex. Majority of participants 108(67.5%) had less than 5-years work experience. From all study participants around 85(53.1%), 85(53.1%) and 90(56.1%) of Nurses working in ICU had good knowledge, negative attitude and good practice toward fluid balance monitoring for critically ill patients respectively. Strong association and positive relationships were found between practice and knowledge

Conclusion and recommendation:- The knowledge and practice of study participants found relatively good which was above the mean score but the perception were below the mean score. So that, better to build capacity of nurses working in ICU on fluid balance monitoring was recommended for the responsible body.

Key words: knowledge, practice, fluid balance, monitoring, attitude, input/output

1. INTRODUCTION

1.1. BACKGROUND

Fluid balance monitoring is one of vital component of care provided for patients in intensive care unit.

Fluid Balance is net result of intake and output of fluid to provide metabolic processes to function correctly **(1)** .The word monitoring was used by Latin as monere meaning warn. Monitoring means therefore seeing carefully **(2)**.

Intensive care started 1953 in Denmark, which is a young specialty that give chance to save a life, come to live, restart and survive live, not to die which needs mending and care. Currently a population of increasing age and with a significant co-morbidity can be offered intensive care. The Swedish Society of Anesthesia defines as intensive care is to prevent and treat failure in one or more organ systems so that continued life can be meaningful from the patients point of view (4)

Fluid balance monitoring is assessment, recording and calculation of fluid intake and output. For instance intake can be either orally or parent rally with food, medication or alone whereas output is loss of fluid from the body in the form of urine, stool, vomit, sweating, respiration. and any tubing or procedure such as: nasogastric tube, chest tube, colostomy bag and taping **(2,5)**. Insensible loss can be calculated using the formula with considering intubation status and maximal body temperature. Insensible fluid loss (IFL) (milliliters) =800 + 20% × 800 × (maximum temperature − 37). This value was divided by 2 if the patient was intubated and Fluid intake may vary from 1.5 to 2.5 Liter per day(6) and urine output must be at least o.5ml/kg/hr in average size adult but it needs to consider what is taken while monitoring. When output is less than 0.5ml/kg/hr. it is better to document and consult the physician or near by senior staff.(6)**.**

Monitoring patient's fluid balance plays an importance role in managing and understanding patients Clinical situation **(6,7)** and Ensuring patients are adequately hydrated is an essential part of nursing care(8) Inaccurate input/output monitoring or recording may lead to the complication and patient situation may become worse(9) Recent Studies had tried to show on fluid accumulation consequences in critically ill patients, such as, respiratory failure, increased tissue edema, congestive heart failure, hypertension and also peripheral edema and positive fluid balance more than four days have increased risk of mortality respectively(10)

Fluid balance monitoring is one of the scopes of nurse's practice. More than a one fourth of fluid balance records have a difference of 500ml between the investigators calculation and the recorded calculation(2).

Having poor knowledge, perspective and practice of nurses for fluid balance monitoring and recording can result in complications with respect to on-going patient's management.

1.2. Statement of the problem

Intensive care nurses bear a large burden in both managing and implementing the interdisciplinary team's plan for fluid balance monitoring and progress towards goals as monitoring is very important component of care provided to a patient in intensive care unit (5)

As many studies indicated most of intensive care unit nurses had inadequate knowledge and practice regarding fluid balance monitoring as they do not have sufficient information specially insensible loss as output And this create a gap during intensive patient monitoring . literature shows negative fluid balance and positive fluid balance adversely affects patient morbidity, mortality and patient length of stay in hospitals (11)

In Africa, nurses viewed fluid balance monitoring as an important practice towards patient care; though the act of close observation and checking remains problematic due to lack of pre and post-service training, lack of resources and supplies ,lack of comprehensive nursing education (CNE), lack of time and workload (5)

Improper fluid balance monitoring and record keeping in nurses has been shown to have negative impacts on the health care of patients, the health care providers ,the profession and associated with the problem of under hydration or over hydration become high. Furthermore, not only it is linked with suboptimal health care service provision, the health care provider and the health organizations can also place at considerable risk of legal harm for in appropriate act of fluid balance monitoring ((10,11)

study in south Africa which was conducted at Stellenbosch university fluid balance monitoring practice was poor because of different reasons, like unfavorable attitude of nurses and insufficient knowledge towards fluid balance monitoring, low nurse-to-patient ratio, lack of in-service training , lack of guidelines, shortage of time and workload (2).

The literature and best nursing practice emphasize the requirement of accurate and correct Fluid balance monitoring in critically ill patients. The researcher's clinical practice experience, together with the data from the informal audit, identified that fluid balance monitoring was generally not done correctly by nurses working in critical care unit(5).

This study was done in Addis Ababa federally administered government hospitals ICU where this kind of study was not done before and nurse's knowledge, attitudes and practice towards fluid balance monitoring and factors associated to it was assessed. Therefore, it will quantify KAP of nurses working in adult ICU and its associated factors, to compare the findings to other country, and to recommend effective solutions for the identified problems.

1.3. Significance of study

The findings of this study provides baseline information on the current status of nurses knowledge; attitude and practice towards fluid balance monitoring and give clue about possible factors that result in poor fluid balance monitoring as well as it will alert ministry of health, hospitals and administrative bodies to give intervention for the problem. In addition to this, policy makers will get information about the problem and associated factors while designing an intervention that improve fluid balance monitoring among nurses working in intensive care unit from the finding and also helps as base line information for further studies.

.

2. Literature review

Appropriate fluid balance monitoring is needed for diagnosis and management of critically ill patients. According to research done in Australia and New Zealand mortality for positive fluid balance is 57.2% and 32% for negative fluid balance monitoring(12) Inappropriate fluid balance monitoring or recording will make patient condition worse (9) in addition to this, health professionals like physicians , critical care nurses, surgeons and dieticians etc. requires accurate fluid balance documentation for planning of patient's treatment. It is necessary to know the exact measures of input and output for quality treatment. Such information is very necessary to prevent the patients from complications like fluid overload (13). High fluid volume intake, in line with endocrine and renal responses which enables to Decreased water and salt excretion, the accumulation of a positive fluid and sodium balance is common. Fluid excess in critically ill patients is consistently associated with adverse outcomes. This has been demonstrated both in adults and children with sepsis, ARDS (14), and acute kidney damage (10) the study noted that fluid balance monitoring improves the practices of accurate fluid balance documentations(9) . The nurses knowledge about the administration of fluid and electrolytes is most crucial to prevent the patient from the complication and assurance of the quality of care among the ICU patients (15).

2.1. Nurses knowledge towards fluid balance monitoring

Study in Pakistan showed that on average 46.67% of study participants had got knowledge about the fluid balance monitoring where to record, who is responsible for correct fluid balance calculation and measurement (7)

Study in Egypt Alexandria university witnessed that 61.67% of study participants had got moderate knowledge regarding to fluid balance monitoring and Nurses knowledge towards fluids or drugs infused continuously accounts 91.67% , clinical signs associated with hypovolemic/ hypervolemia accounts 66.67% and which vital signs are a part of fluid balance assessment of patient accounts **60%** . In spite of this nurses knowledge regarding other items of fluid balance monitoring is poor especially; average amount of urine output accounts 58.33%, factors affecting urine output accounts 41.67% , nurses action for patients who has hypovolemic/hypervolemia accounts 41.67%) and the required amount of fluid intake an adult patient per day (15)

And also a study in Egypt Assist University witnessed that nurses' knowledge related to the physiology of fluid therapy and creep shows a substantial improvement after the application of the training (p value < .001)(16)

2.2. Nurses attitude towards fluid balance monitoring

A study conducted in Egypt Alexandria University indicates most nurses believed that fluid balance monitoring improved the quality and performance of patients care, and 79.2% of study participants had positive attitudes towards fluid balance monitoring (17).

Literatures from Egypt Assist University try to show the perception of nurses has been improved after the application of the scenario based teaching. All participants agreed with inaccurate fluid balance calculation can be a risk for the critically ill patient and the concept that positive fluid balance harms patients as negative balance.(16)

2.3. Nurses practice towards fluid balance monitoring

The study done in Netherland shows that there is (5.1%) of calculation errors in fluid balance monitoring practice(18) study done south Africa Stellenbosch university showed that Forty-nine cases (33%) of incorrect calculation (19)

A study done in Pakistan shows a poor practice of nurses in ICU on average 45.47% towards fluid balance monitoring like timely input and output measurement (47%), fluid balance documentation filled by more than one person (52%), timely calculation of daily fluid balance (43%), Inaccurate fluid balance calculation (39.9%) and assessing practice through observation on average is 71.14% (7).

In the study done in Iran (48.7%) of patients fluid balance status was not monitored , (26.5%) of patients encounter fluid balance calculation error, (29.8%) of patients rate of fluid administering have an error (20) and also study done in south Africa indicate that among patients who are taking diuretic therapy there is significant fluid balance monitoring practice problem (68.9 % , 13.5%, 6.9% ,5.8%) with the following ml deviations respectively(500ml, 500ml-1000ml,1000-2000ml, greater than 2000ml) over 24 hour.(5)

2.4. Associated factors that affect fluid balance monitoring in ICU

Literature from Egypt shows Association between critical care nurses perception and knowledge regarding fluid balance monitoring in ICUs shows as nurses knowledge was moderately adequate (61.67%), nurses perception was favorable (71%) and the association between perception and knowledge was considered very statistically significant (p=0.0012).**(15)**

2.4.1 Socio-demographic characteristics

Study done in Pakistan in University of Lahore showed age distributions of nurses belong to the age group of

(20-25years, 26-30 years, 31-35years, 36-40**)** with this percent (14.9%, 39.42%, 38.46%, 7.21%) respectively. More than half (53.85%) married, all nurses are females. From 208 nurses that is working in ICU those that did General nursing diploma, Post RN BSN, completed specialization, MSN with percent of (77.4 %, 12.02%, 10.10%, 0.48%) respectively. Among nurses working in ICU (< 1year, 1-5 year, 5-10year, >10 year) have an ICU experience of (18.27%, 36.54% , 37.02% , 8.17%) respectively.(7)

According to study conducted in Egypt more than half of the nurses (51.7 %) at the age between 25 -30 years old with the majority of them (83.3%) were females. More than half of the nurses (53.3%) carrying technical institute, (58.3%) of nurses have 5 to 10 years' experience . As regard their marital status it was found that more than three quarters of them (76.7 %) was married. The majority of studied nurses (85%) did not participate in any previous training program.

2.4.2. Organizational factors

According to study done in Egypt: inaccuracy of the measuring equipment / continuous intravenous infusions, in effective time management, workload, lack of skills/ training, lack of knowledge and communication with other health-care workers (100%, 100%, 91.67%, 33.33%, 25%) respectively are factors affecting fluid balance monitoring as perceived by nurses working in ICU (7)

There was a significant association between the administration of diuretics and inaccurate fluid balance calculation (p=0.01) (5)

2.5. Conceptual Framework

After reviewing different literatures about nurses fluid balance monitoring KAP, (17)the following conceptual frame work is adopted. It shows that the relationship between the dependent variable and independent variables. When independent factors negatively affect fluid balance monitoring, Knowledge, attitude and practice, there will be inadequate intensive care unit nursing fluid balance monitoring.

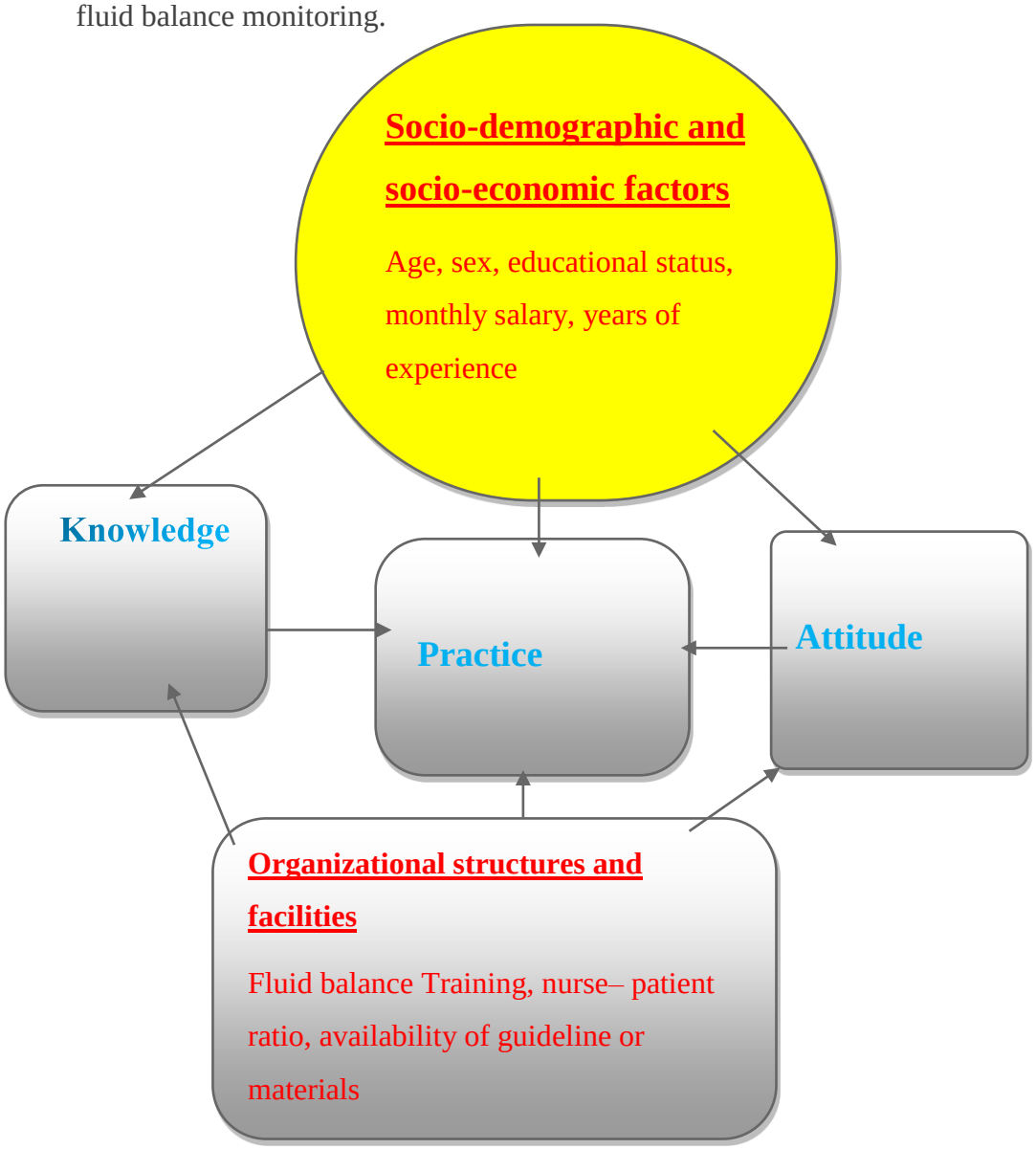

Figure 1: Conceptual framework on fluid balance monitoring

3. OBJECTIVES

3.1. General Objective

- To assess knowledge, attitude, practice and associated factors towards fluid balance monitoring among nurses working in adult ICU of federally administered Government hospitals, Addis Ababa, Ethiopia, October 2019 to June 2020.

3.2. Specific Objectives

- To assess knowledge towards fluid balance monitoring among nurses working in adult ICU
- To assess attitude towards fluid balance monitoring among nurses working in adult ICU
- To assess nurses practice during fluid balance monitoring
- To identify factors affecting knowledge, attitude and practice of nurses working in ICU on fluid balance monitoring

4. METHODS AND MATERIALS

4.1. Study Area

The study was conducted in federally administered government hospitals ICU setup found in Addis Ababa, Ethiopia. Addis Ababa is the capital city of Ethiopia and it is the largest city in Ethiopia, Its area is estimated to be 530Km2 with altitudes ranging from 2200 to 3000m above sea level, average temperature of 22.8C° and average rainfall of 1,180.4mm). Addis Ababa has 41 hospitals (14 public and 28 NGO and private)(21). All federally administered government hospitals: Tikur-Anbessa Specialized hospital (TASH), St. Paul's hospital , Addis Ababa Burn, Emergency and Trauma hospital, St. peteros hospital and Alert hospital, hospital were selected for this study due to availability of ICU service but kotebe branch of amanuel hospital were excluded from this study, because it was being prepared to be covid19 treatment center and it was difficult to got nurses actually working in ICU during my data collection.

4.1.1. Tikur-Anbessa- Specialized hospital (TASH)

Tikur Anbessa specialized hospital is located in the capital city of Ethiopia which is the largest teaching hospital in the country, which provide services to 700,000 patients per year through 77 case teams organized as outpatients (adult and pediatric), emergency (adult and pediatric), in patients (surgery and medical) and it contains with over 700 beds, and serves as a training center for undergraduate and postgraduate medical students, dentists, nurses, midwives, pharmacists, medical laboratory technologists, radiology technologists, and others who shoulder the health problems of the community and the country at large.

4.1.2 .St. Paul's hospital and abet hospital

St Paul's Millennium Medical College, as it is known today, was established through a decree of the Council of Ministers in 2010, although the medical school opened in 2007 and the hospital was established in 1968 by the late Emperor Haile Selassie. St Paul's is in the process of building its capacity quickly in a short period of time, growing from 3 to 250 faculty members in the last seven years, and expanding teaching facilities. The college has more than 2800 clinical, academic and administrative and support staffs that provide medical specialty services to patients who are referred from all over the country, teaching medicine and nursing students and doing basic and applied researches. While the inpatient capacity is more than 700 beds, The College sees an average of 1200 emergency and outpatient

clients daily(22). AaBET Hospital is affiliated by St. Paul's Hospital Millennium Medical College (SPHMMC) which was opened on August 2015 by the Federal Ministry of Health (FMoH) with the mission of providing 24/7 burn management, emergency and trauma management services. Abet hospital also provides standard ICU service.

4.1.3. St. Peters hospital

Saint peter's hospital is one of specialized hospital in Addis Ababa which was known for treating MDR-TB and any type of TB in the past, but now a days it gives all services like adult and pediatric emergency , surgery both general and neurosurgery , in patient service for medical, pediatric, obstetrics and gynecology , ICU for adult medical, surgical and toxicology, neonatal and cardiac as well as minor specialty service like psychiatry, ophthalmology , dental , currently it has 292 beds that give service to different departments.

4.1.4. Alert hospital

Alert is a medical facility on the edge of Addis Ababa, specializing in Hansen's disease, also known as "leprosy". It was originally the All Africa Leprosy Rehabilitation and Training Center (hence the acronym), but the official name is now expanded to include tuberculosis: All Africa Leprosy, Tuberculosis and Rehabilitation Training Centre.

4.2 .Study period:

The study was conducted from February to April 2020.

4.3. Study design:

Institutional based quantitative cross-sectional study design was used to assess KAP and associated factors towards fluid balance monitoring among nurses working in ICU of all federally administered government hospitals, AA, Ethiopia, 2020.

4.4. Source & Study population

4.4.1. Source population:

All nurses working in federally administered government hospitals, AA, Ethiopia.

4.4.2. Study Population:

All nurses working in adult ICU of federally administered government hospitals during study period, AA, Ethiopia.

4.5. Eligibility criteria:

4.5.1. Inclusion criteria:

The study included all nurses working in adult ICU from federally administered government hospitals in AA who are willing to participate in the study.

4.5.2. Exclusion criteria:

- Those nurses on annual leave and sick leave during data collection,

4.6. Sample size determination and procedure

4.6.1. Sample size determination and Sampling technique

Convenience sampling was used to select federally administered government hospitals as my study area and all the nurses working in those selected FAGHs were included in the study,

convenience sampling were used for two reasons

1, to select FAGH from addis ababa city administered hospitals

2, to select adult ICU from pediatric ICU, toxicological ICU, Neonatal ICU, cardiac ICU, Etc.

.

Table 1: Nurses who are working at federally administered government hospitals in Addis Ababa, Ethiopia, 2020.

S.NO	Name of hospitals	Number of ICU nurses
1	black lion hospital	42
2	Addis Ababa burn and trauma center (ABET	42
3	st.paulo's hospital	42
4	st.peters hospital	20
5	Alert hospital	20

4.7. Study Variables

4.7.1. Dependent Variable:

- Knowledge of nurses working in ICU towards fluid balance monitoring
- Attitude of nurses working in ICU towards fluid balance monitoring
- Practice of Nurses working in ICU towards fluid balance monitoring

4.7.2. Independent Variables:

Socio-demographic & economic factors

- Age
- Sex
- Educational status
- Years of experience
- Monthly salary

Organizational Factors

. Fluid balance Training

. Workload

.availability of fluid balance monitoring tool

4.8**. Operational definition**

Attitude of fluid balance monitoring; indicate that belief of nurses towards intake and output of fluid on critically ill patients.

Good knowledge: - nurses working in ICU who score more than mean score of knowledge related questionnaire towards fluid balance monitoring.

Poor knowledge: - nurses who is working in ICU that scores less than the mean of knowledge related questionnaires towards fluid balance monitoring

ICU: - refers as a care unit that admits very critical ill patients for better investigation and intervention with special consideration.

Knowledge of fluid balance monitoring; -It is measured by the Knowledge of nurses toward fluid balance monitoring by Questionnaire.

Favorable attitude: - nurses working in ICU who scores more than mean score of Likert scale questionnaires toward fluid balance monitoring.

Unfavorable attitude: - nurses working in ICU who scores less than mean score of Likert scale questioners toward fluid balance monitoring.

Fluid balance monitoring: - measuring input, output and net consciously for critically ill patients in ICU.

Practice of fluid balance monitoring; referred to the level of nurses' monitoring skill accurately and timely in ICU admitted patients.

Good practice: - nurses working in ICU who meet above mean score of observation checklist toward fluid balance monitoring

Poor practice: - - nurses working in ICU who are unable to meet more than mean score of observation checklist toward fluid balance monitoring

Workload: nurse to patient ratio of 1 to 2 or more for those nurses working in ICU.

4.9. **Data collection tools and procedure**

The study tools were adopted from different literatures (2,5,17) with little modification to assess KAP of nurses towards fluid balance monitoring in ICU. These tools had five parts such as socio-demographic characteristic of study respondents, Knowledge, Attitude and associated factors toward fluid balance monitoring of critical ill patients using well-structured questionnaires through self-administered response method and practice through observational checklist.

Personnel for data collection include **six BSC** nurses with clinical experience of one year and above, **three MSC** nurses in emergency medicine and critical care as a **supervisor** were selected by researcher purposively and training was given for 3days by principal investigator on how to collect the intended data for this study.

4.10. Data quality assurance

To assure quality of the data the following measures had undertaken; Two weeks prior to the actual data

Collection, questionnaire had been pre tested by principal investigator on 10% of the study population at menillik referral hospital which was out of study population for its clarity, understandability, and completeness. Also for data collector and supervisor three day short training had given to enhance the quality of data and to ensure that all the data collectors to have the same information about the study tools, to follow the same survey procedures. In addition, during the actual data collection process, supervisors had cross checked consistency, completeness and any missing of data.

Data cleaning for inconsistencies, missing values and amendment were considered as needed before data analysis.

4.11 data processing and Statistical Analysis

The raw data were coded and transferred into coding sheets. Epi-data version 4.6 used for data entry and Data Analysis were done using SPSS system files (SPSS package version 24) using personal computer. Output drafts were checked against the revised coded data for typing and spelling mistakes. Finally, analysis and interpretation of data were done. The following statistical measures were used: Descriptive statistics including frequency distribution, percentage, mean, and standard deviation were used to describe different characteristics. Pearson correlation coefficient, Bivariate and multivariate logistic regressions were used. Researcher consider a significance level when p-value less than 0.2 and 0.05 in binary and multiple logistic regression respectively.

4.12 Ethical considerations

An official letter clarifying the purpose and setting of the study were obtained from the department of emergency medicine and critical care at Addis Ababa University to conduct the study. Each nurse was informed about the significance and aim of the study and then an informed written consent were obtained from each nurse before participating in the study.

4.13. Dissemination of result

The study result will be presented to AAU, Department of emergency medicine and critical care

Documents will be disseminated to all hospitals involved in study and federal Ministry of health.

Furthermore the manuscript will be submitted to national and international peer review journals for possible publication.

5. Result

From the total study 166 participants about 160 were involved in this study with a response rate of 96.4%. Including under 6 months, 100 (62.5%) study participants were under or less than 28yrs old with (mean=28 years and Std. =3.5years). Around 85(53.1%) of study respondents were females with male to female ratio 1:1.14. among study participants 140(87.5%) respondents were BSc holder with 108(67.5%) less than 5 years working experience. About 140(87.5%) nurses did not take fluid balance monitoring training working in ICU. Those nurses with nurse to patient ratio of 2 or more workload were 65(40.6%). This is not from single institution rather it is from all FAGH result

Table 2: 5.1. Socio-demographic and socio economic variables of adult ICU FAGH, A.A,2020

	N(%)
Age (mean=28 years and st.dv=3.5 years)	
Below 28 years	100(62.5)
Above 28 year	60(37.5
Sex	
Male	75(46.9%)
Female	85(53.1%)
Educational status	
Diploma nurse	15(9.4%)
BSC nurse	140(87.5%)
MSC nurse	5(3.1%)
Monthly salary	
≤5000	25(15.6%)
>5000	135(84.4%)
ICU year of experience	
≤ 5 years	108(67.5%)
≥ 5 years	52(32.5%)
Fluid balance training	
Those take	20(12.5%)
Those not take	140(87.5%)
Nurse to patient ratio in ICU	
1 to 1	95(59.4)
1 to 2 and more	65(40.6

5.2. Knowledge of ICU Nurses

From the ICU nurse's 65(40.6%) respond incorrectly about the Expected urine output in average adult person while fluid balance monitoring. On average an adult patient require fluid intake (excluding solids) per day answered only by 75(46.9%) ICU nurse's from total study participants. 90(56.3%) of study respondents not able to answer ,What percentage of incorrect fluid balance calculation do you consider acceptable, however, 130(81.3%) of ICU Nurses identify clinical signs that most likely to occur in a patient who have hypervolemia. blood products are included in the fluid balance monitoring were responded by 90(56.3%) . From all Nurses working in ICU of federally administered government hospitals in AA only about 90(56.3%) and 55(34.4%) had measure fluids that is given with drug and Fluid balance assessment does not including the following data respectively.

Table 3:- Assessment of study participant's Knowledge at federally administered government hospitals in AA, 2020

	Response	
Knowledge questioner items	correct	incorrect
Expected urine output in average adult person	95(59.4)(	65(40.6)
On average an adult patient require fluid intake (excluding solids) per day	75(46.9)	85(53.1)
What percentage of incorrect fluid balance calculation do you consider acceptable	70(43.8)	90(56.3)
clinical signs that most likely to occur in a patient who is hypervolemia	30(18.8)	130(81.3)
blood products are included in the fluid balance	90(56.3)	70(43.8)
Have you measure fluids that is given with drug	90(56.3)	70(43.8)
Among three v/s which one usually used as part of assessing	135(84.4)	25(15.6)
Frist intervention for patient not passed any urine in the catheter bag	150(93.8)	10(6.3)
Fluid balance assessment does not including the following data	55(34.4)	105(65.6)

. The mean score of knowledge questioners answered correctly by study respondents were 53.1%. From total of study participants around 85(53.1%) greater than half of ICU Nurses had good knowledge while the remaining 75(46.9%) score less than the mean termed as poor knowledge.

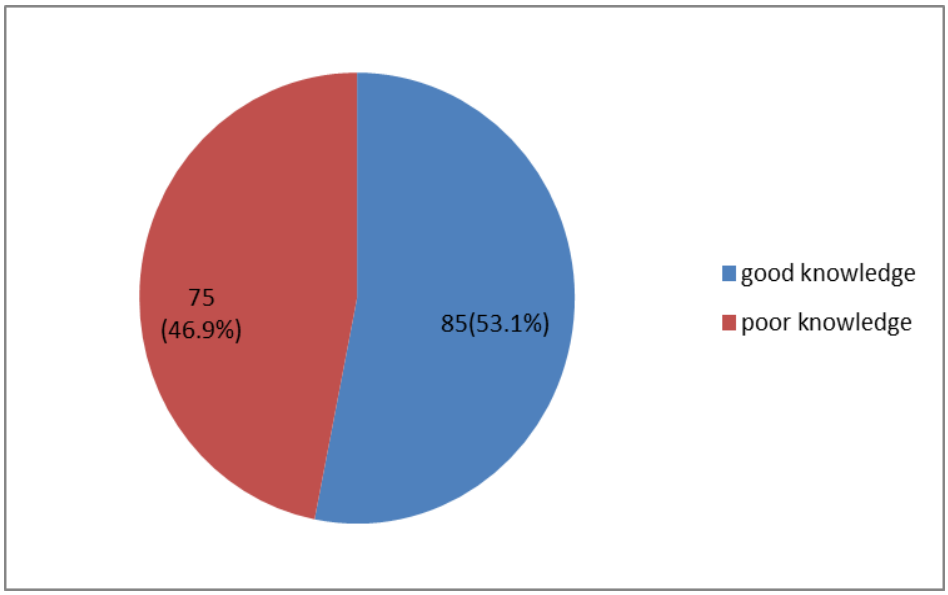

Figure 2: Nurses status Mean score of knowledge of ICU Nurses on fluid balance monitoring status

.

5.3. Attitude of nurses working in adult ICU of FAGH, A.A, 2020.

Table 4 shows that about 105(65.5%) ICU nurses agree to there are many other patient activities that are more important than fluid balance monitoring. A 110(68.8%) study participants agree to there are too many people who fill in one patient's fluid balance chart. Around 120(75%) agree that as nurse working in ICU I am responsible for more than one patient and it is difficult to supervise all fluid balance monitoring. Up to 80(50%) agree with the design of the fluid chart sheet. About 115(72%) of respondents disagree the final 24hour fluid balance is correctly calculated all the time. Around100 (62.5%) of nurses working in ICU agree up on Fluid balance assessment is important to guide ICU nursing care. Among nurses working in ICU 60(37.5%) disagree inaccurate fluid balance calculation can be a risk for managing critically ill patients..

Table 4: Attitude of nurses working in adult ICU of FAGH, A.A, 2020

	Response	
Attitude of study participants'	Agree	disagree
Fluid balance monitoring is important as like that of other activities	105(65.5)	55(34.4)
There are too many people who fill in one patient's fluid balance chart	110(68.8)	50(31.3
As nurse working in ICU I am responsible for more than one patient so Fluid balance monitoring is not necessary	120(75)	40(25)
I am satisfied with the design of the fluid chart sheet. It Is straight forward	80(50)	80(50)
The space to write the fluid number on the chart is adequate	85(53.1)	75(46)
The final 24hour fluid balance is not correctly calculated all the time	115(72)	45(28)
Fluid balance assessment is important to guide ICU nursing care	100(62.5)	60(37.5)
Inaccurate fluid balance calculation can be a risk	100(62.5)	60(37.5)
Fluid balance information is recorded in too many different places	35(22)	125(78)

The mean of attitude believe of ICU Nurses towards fluid balance monitoring of critical ill patients were 53.1 About 85(53.1%) of study participants were record below the mean that is termed as negative attitude while 75(46.9%) considered as positive attitude towards fluid balance monitoring of critical ill patients.

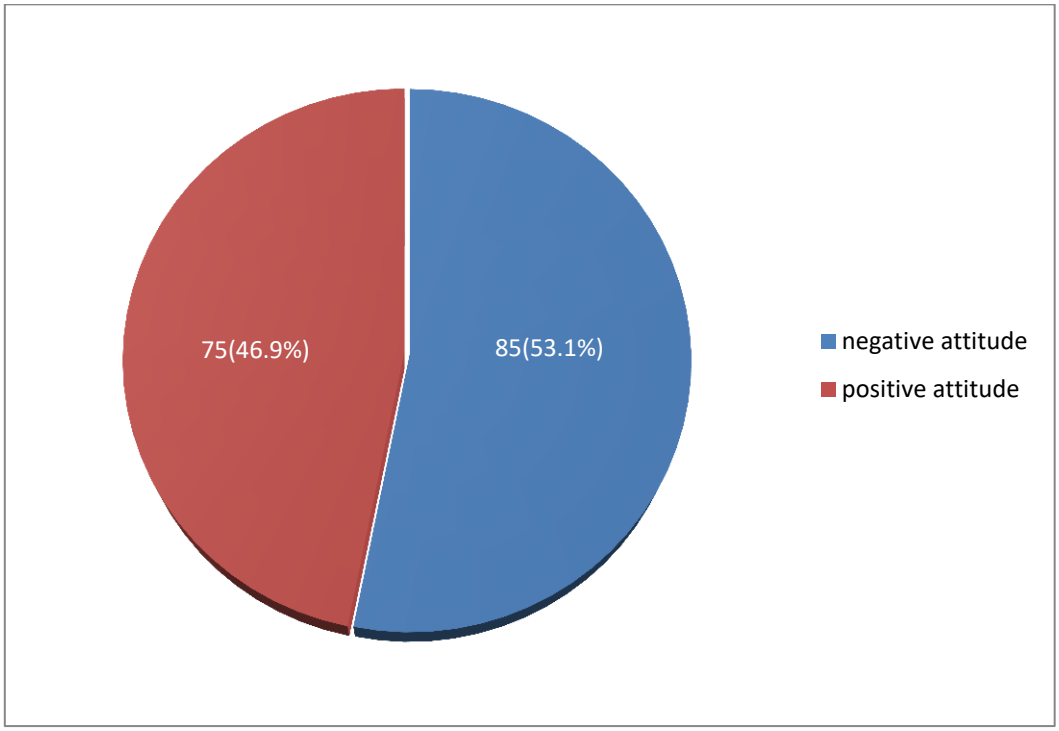

Figure 3: Attitude mean score of nurses on fluid balance monitoring status working in ICU of federally administered government hospitals, A.A Ethiopia, 2020

.

5.4. Practice of nurses working in adult ICU of FAGH, A.A, 2020

From practice of Nurses working in ICU 150(93.8%) Check the amount, type of fluid aganist docters prescription, 75(46.9%) of nurse's inaccurately adjust the flow rate, 120(75%) of nurses not Document the prescribed fluid on char and 80(50%) document the time started. 90(75%) of Nurses were not mentioned amount of fluid infused and 90(75%) document additives which added to the fluid.

Table 5: Practice of nurses working in adult ICU of FAGH, A.A, 2020

	Observation	
practice of ICU Nurses	perform	not perform
Check the amount, type of fluid aganist docters prescription	150(93.8)	10(6.2)
Accurately adjust the flow rate	85(53.1)	75(46.9)
Document the prescribed fluid on chart	40(25)	120(75)
document the time started	80(50)	80(50)
mentioning amount of fluid infused	40(25)	90(75)
document additives which added to the fluid	90(56.2)	70(43.8)

The mean practice of ICU Nurses is 56.25%. More than half of study 56.3% participants score as good practice whereas 70(43.7%) had poor practice from overall practice done through observation of nurses who were working in ICU of federally administered government hospitals.

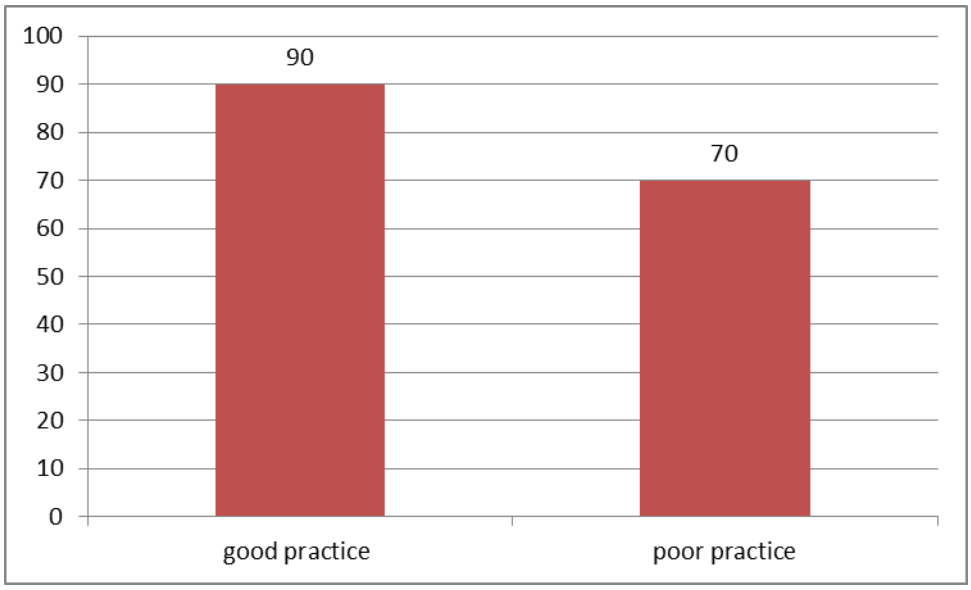

Figure 4: practice of nurses working in ICU of federally administered government hospitals, A.A, Ethiopia, 2020

Table 5: Nurses who were working in ICU reasons for not documenting fluids balance during monitoring

In this study some of nurses did not document fluid balance monitoring result the reasons for this was : no adequate staff, lack of time, no obligation from hospital, no motivation, unsatisfied monthly income with their respective score 10(6.3), 10(6.3), 20(12.5) and 5(3.1) while 110 of participants document fluid balance monitoring result as well.

	reasons	Frequency	Percent
Not document	no adequate staff	10	6.3
	lack of time	10	6.3
	no obligation from Hospital	20	12.5
	no motivation	5	3.1
	unsatisfied monthly income	5	3.1
Those who document		110	68.8
total		160	100.0

5.4. Association of dependents variables

5.4.1. Association of KAP among ICU Nurses at federally administered government hospital in AA, 2020.

Strong association and positive relationships were found between practice and knowledge, those nurses who have good knowledge of fluid balance monitoring had 7.35 times more likely to have good practice than nurses with poor knowledge . (OR = 7.35, p < 0.01) and y. The attitude had positive risk exposure with practice (r = 1.28, p < 0.2) in bivariate logistic regression but it statistically in significant after multivariate analysis with p-vale of greater than 0.05.

Table 6: Associated Factor analysis of KAP using among ICU Nurses at federally administered government hospital in AA, 2020.

variables	test	knowledge	attitude	practice
knowledge	chi-square	1	1.133	7.35
	Significance		.429	.000
	N	160	160	160
attitude	chi-square	1.133	1	1.28
	Significance	.429		.115
	N	160	160	160
practice	Chi-square	7.35	1.28	1
	Significance		.115	
	N	160	160	160

5.4. 2. Associated Factor analysis of ICU Nurses Attitude

Bivariate logistic regression was conducted to assess those variables which had influence over attitude of nurses working in ICU. From bivariate logistic regression analysis factors: fluid balance training, Sex, workload and level of education of study participants had been seen at p-value <0.2 so that those variables were taken to multivariate analysis. The training (OR=0.333, P-value=0.043), sex (OR=9.6, P-value=0.000) workload (OR=3.09, P-value=0.001). and level of education(OR=8.17,)

Multivariate logistic regression was conducted for those variables which passed from bivariate logistic regression, the result showed that: nurses who took informal on job training(not standard training) (all federally administered government hospitals , already I investigator study all as unit) had 1.2 times good perception for fluid balance monitoring but it is statically insignificant (AOR =1.265(.376-4.259) with p-value greater than 0.05, female nurses who had been working in ICU had 8 times good attitude for fluid balance monitoring than males (AOR=8.325 (4.611-19.988) and p-value of less than 0.05), among nurses working in adult ICU who had no workload were 2.2 times good in attitude than who had workload.(AOR=2.215(1.017-4.824) and p-value of less than 0.05 while training and ICU experience had positive risk exposure with attitude of nurses working in ICU. Moreover age and salary had no influence over attitude of respondents.

Table 7: Associated Factor analysis of Attitude using Pearson correlation among ICU Nurses at federally administered government hospital in AA, 2020

Variables	attitude		COR (CI, 95%)	P-value	AOR	P-value
	positive	negative				
Age ≤ 28 years >28 years	45 30	55 30	**1** **.818**(.431-1.554)	0.540		
Sex Male female	15 60	60 25	**1** **9.6**(4.611-19.988)	.000	8.325(3.922-17.674)	.000
Icu experience ≤ 5years ≥ 5 years	54 21	54 31	1 1.476(.755-2.885)	.255		
Salary ≤ 5000 >5000	15 60	10 75	1 1.875 (.786-4.472)	.156		
Training taken not take	5 70	15 70	1 0.333(.115_.967)	. 043	1.265(.376 4.259)	.704
Workload Yes no	20 55	45 40	1 3.094(1.590 -6.021)	.001	2.215(1.017-4.824)	.045
Level of edu. Diploma Degree MSC	13 62 5	2 78 0	1 8.177(1.779 37.599)	.007		

5.4. 3. Associated Factor analysis of ICU Nurses knowledge using Logistic regressions

From six variables analyzed and conducted by bivariate logistic regression to assess, those variables which had influence over knowledge of nurses working in ICU only about two variables were entered together to multivariate logistic regression to control confounding factor at p-values less than 20%.
Females are 8.17 times more likely had good knowledge (AOR= 8.17, CI=8.32(3.922-17.674, P= 0.000) than males Nurses working in ICU. Those nurses who had more work load were 2.2 times poor knowledge than nurses less workload.

Table 8: Associated Factor analysis of knowledge among ICU Nurses at federally administered government hospital in AA, 2020

Variables	**knowledge**		**COR (CI, 95%)**	**P-value**	**AOR**	**P-value**	
	good	poor					
Age							
≤ 28 years	45	55	1				
>28 years	30	30	.818(.431-1.554)	.540			
Sex							
Male	15	60	1				
female	60	25	9.600(4.611-19.9)	.000	8.32(3.922-17.674)	.000	
Icu experience							
≤ 5years	54	54	1				
≥ 5 years	21	31	1.476(.755-2.885)	.255			
Salary							
≤ 5000	15	10	1				
>5000	60	75	.533(.224-1.272)	.156			
Training							
taken	5	15	1		1		
not take	70	70	.333(.115-.967)	.043	.791(.235-2.661)	.704	
Workload							
Yes	20	45					
no	55	40	3.094(1.59-6.021)	.001	2.215(1.017-4.824)	.045	

5.4.4. Associated Factor analysis of ICU Nurses practice using logistic regressions

Out of six variables conducted by bivariate logistic regression to determine that factor which have significant influence over skill of practice about four variables entered together for multivariate logistic

regression. The output of multivariate logistic regression showed that those nurses with age of greater than 28 years had 3.9 times good practice from less than 28 years. (OR=3.95, p-value of 0.001) and among nurses those paid monthly salary greater than 5000 ETB were 4.2 times good practice from those nurses less than monthly salary of 5000ETB. (OR= 4.213, CI (1.386-12.8) and p-value of 0.011). However, sex, training, ICU experience and workload had positive risk of exposures on skill of practice

Table 9: Associated Factor analysis of Nurses working in ICU practice among ICU Nurses at federally administered government hospital in AA, 2020

Variables	practice		COR (CI, 95%)	P-value	AOR	P-value
	good	poor				
Age						
≤ 28 years	**55**	**45**	**1**		**1**	
>28 years	**15**	**45**	**3.667(1.8-7.4)**	**.000**	**3.947(1.805-8.632)**	**.001**
Sex						
Male			**1**			
female			**0.001**	**0.999**		
Icu experience						
≤ 5years	**50**	**58**				
≥ 5 years	**20**	**32**	**1.379(.703-2.708)**	**.350**		
Salary						
≤ 5000	**20**	**5**	**1**		**1**	
>5000	**50**	**85**	**6.8(2.403-19.3)**	**.000**	**4.213(1.386-12.8)**	**.011**
Training						
taken	**15**	**5**	**4.636(1.594-13.9)**	**.005**		
not take	**55**	**85**				
Workload						
Yes	**35**	**30**	**1**			
no	**35**	**60**	**.5(.263-.950)**	**.034**	**.486(.225-1.051)**	**.067**

6. DISCUSSION

Institution based cross-sectional study design was carried out to assess Knowledge, Attitude, practice and Associated factors among nurses working in adult ICU at federally administered government hospitals in Addis Ababa. In current study, male and female nurses working in ICU were almost proportional (1:1.14) different from this study done in Pakistan showed that all nurses working in ICU were females and most of them were diploma nurses around 77.4% while in the current study most nurses were BSC nurses around 87.5% (7).

In current study only 12.5% of study participants had taken fluid balance training this was even before 2 years nearly similar to this study done in Egypt less than 15% did participate in previous training program (16).

Out of 166 Nurses working in ICU, about 160 study participants involved with a response rate of 96.4%. From total of study respondents around 85(53.1%) and 90(56.1%) of Nurses working in ICU had good knowledge and good practice toward fluid balance monitoring for critically ill patients respectively. while 85(53.1%) of nurses had score unfavorable attitude.

Our study shown that about **85(53.1%)** of ICU Nurses had good knowledge towards fluid balance monitoring for critically ill patients. Unlike to this ,Study done in Egypt Alexandria University witnessed that **61.67**% of study participants had got good knowledge regarding to fluid balance monitoring, this may be due to most of nurses took training during their ICU working time**.(16)** .

In current study showed that about **85(53.1%)** of ICU Nurses had negative attitude towards fluid balance monitoring. This result not in line with others study conducted in Egypt indicates most nurses believed that fluid balance monitoring improved the quality and performance of patients care, and **79.2**% of study participants had positive attitudes towards fluid balance monitoring **(20**), this may be due to influence of workload.

In current study only 70(43.7%) of nurses working in ICU correctly answered acceptable percentage of incorrect fluid balance calculation, this was nearly similar to the study done in south Africa 49 (33%) participants were answered incorrect calculation error (20).

While study done in Iran (26.5%) of patients encounter fluid balance calculation error**(22**) and in Netherland showed that there is (5.1%)of calculation errors in fluid balance monitoring practice**(21)** this

was not in line with current study where 56.25% of nurses working in ICU had fluid calculation error this may be due to lack of frequent fluid balance training .

In current study 90(56.1%) of nurses working in ICU had good practice which was nearly similar to a study done in Pakistan showed a good practice of nurses in ICU on average 55.5% towards fluid balance monitoring**(7).**

In our study knowledge and practice have strong association, those nurses working in ICU who had good knowledge had 7.3 times good practice than poor knowledge with (OR=7.33, CI 3.57-15.062 and P-value of less than 0.01 level) , knowledge & perception have strong association (OR=1.133) but P-value were 0.42 which is statistically insignificant this may be due to lack of updated training and level of education matters , While the study done in Egypt showed that association between perception and knowledge was considered very statistically significant (p=0.0012). This is due to Egypt Assist University try to show the perception of nurses has been improved after the application of the scenario based teaching (16)

7. Strength and Limitation of study

7.1. Strength of the study

- Using multivariate logistic regression analysis to control the effect of possible confounding factor.
- Participation of nurses was also generally satisfactory with 96.4% response rate.
- practice assessed through standard observational checklist
- Using MSC and BSC nurses for data collection
- as per to the researcher's knowledge This is the first study in its kind primer study done in Ethiopia

7.2. Limitation of the study

- Observation bias (practice was assessed via direct observation really it was so difficult but I did it as well , they did not know what I am observing to prevent bias)
- Using cross-sectional study design
- Paucity of articles despite tremendous effort

8. Conclusion and Recommendation

8.1. Conclusion

The findings provide understanding of KAP among nurses working in ICU of federally administered government hospitals in Addis Ababa, Ethiopia. The attitude of study respondents found was negative while the knowledge and practice of study respondents is slightly better , which is near more than the mean of knowledge and practice. There were positive correlation between knowledge and attitude with sex and workload, while practice with age and salary.

8.2. Recommendation

To FMOH and Federal Ministry of Education

- Better to give more emphasis on way to improve attitude on fluid balance monitoring in ICU at federal hospitals.
- Frequent on job training for nurses working in ICU on fluid balance training has to be delivered

To federally administered hospitals in Addis Ababa

- Female nurses will be encouraged to work in ICU
- Better to give training for nurses working in ICU on fluid balance monitoring.
- Nurses better to enhance their knowledge and practice on fluid balance training by taking various online courses and reading new journal articles

Upcoming researchers

- Prospective cohort study strongly recommended
- To do research in similar and different settings

9. Reference

1. Welch K (2010) Fluid balance. Learning Disability Practice; 13: 6, 33-38.

2. Diacon A. Fluid balance monitoring in critically ill patients. 2012. :146.

3. Berthelsen PG, Cronqvist M. The first intensive care unit in the world: 2003;47:1190-1195.

4. Controversies In Intensive Care Medicine: 9783939069614: Medicine & Health Science Books @ Amazon.com [Internet]. [cited 2020 Jan 2]. Available from: https://www.amazon.com/Controversies-Intensive-Care-Medicine-Kuhlen/dp/3939069612

5. Diacon A, Bell J. Investigating the recording and accuracy of fluid balance monitoring in critically ill patients. South Afr J Crit Care [Internet]. 2014 Oct 29 [cited 2019 Nov 23];30(2):55. Available from: http://www.sajcc.org.za/index.php/sajcc/article/view/193

6. Schneider AG, Baldwin I, Freitag E, Glassford N, Bellomo R. Estimation of fluid status changes in critically ill patients: Fluid balance chart or electronic bed weight? J Crit Care [Internet]. 2012 Dec [cited 2019 Nov 13];27(6):745.e7-745.e12. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0883944112000032

7. Aslam S, Afzal M, Kousar R, Waqas A, Gilani S. The Assessment of Nurses' Knowledge and Practices about Fluid and Electrolytes Monitoring and Administration among Cardiac Surgery Patients: A Case of Punjab Institute of Cardiology. Int J Appl Sci Biotechnol. 2017 Jun 29;5:208.

8. Shepherd A. Measuring and managing fluid balance. Nursing Times2011;107(28):12-6.

9. Scales K, Pilsworth J. The importance of fluid balance in clinical practice. Nurs Stand R Coll Nurs G B 1987. 2008 Aug 30;22(47):50–7; quiz 58, 60

10. Prowle JR, Bellomo R. Fluid administration and the kidney: Curr Opin Crit Care [Internet]. 2010 Aug [cited 2019 Nov 22];16(4):332–6. Available from: https://insights.ovid.com/crossref?an=00075198-201008000-00008.

11. Samoni S, Vigo V, Bonilla Reséndiz LI, Villa G, De Rosa S, Nalesso F, et al. Impact of hyperhydration on the mortality risk in critically ill patients admitted in intensive care units: comparison between bioelectrical impedance vector analysis and cumulative fluid balance recording. Crit Care [Internet]. 2016 Dec [cited 2019 Nov 27];20(1):95. Available from: http://ccforum.biomedcentral.com/articles/10.1186/s13054-016-1269-6

12. RENAL Replacement Therapy Study Investigators, Bellomo R, Cass A, Cole L, Finfer S, Gallagher M, et al. An observational study fluid balance and patient outcomes in the Randomized Evaluation

of Normal vs. Augmented Level of Replacement Therapy trial. Crit Care Med. 2012 Jun;40(6):1753–60.

13. Han PY. Factors predictive of intravenous fluid administration errors in Australian surgical care wards. Qual Saf Health Care [Internet]. 2005 Jun 1 [cited 2019 Nov 22];14(3):179–84. Available from: http://qualitysafety.bmj.com/lookup/doi/10.1136/qshc.2004.010728

14. Silversides JA, Perner A, Malbrain MLNG. Liberal versus restrictive fluid therapy in critically ill patients. Intensive Care Med [Internet]. 2019 Oct 1 [cited 2019 Dec 11];45(10):1440–2. Available from: https://doi.org/10.1007/s00134-019-05713-y

15. RENAL Replacement Therapy Study Investigators, Bellomo R, Cass A, Cole L, Finfer S, Gallagher M, et al. An observational study fluid balance and patient outcomes in the Randomized Evaluation of Normal vs. Augmented Level of Replacement Therapy trial. Crit Care Med. 2012 Jun;40(6):1753–60.

16. Han PY. Factors predictive of intravenous fluid administration errors in Australian surgical care wards. Qual Saf Health Care [Internet]. 2005 Jun 1 [cited 2019 Nov 22];14(3):179–84. Available from:

17. Asfour HI. Fluid Balance Monitoring Accuracy in Intensive Care Units. IOSR J Nurs Health Sci [Internet]. 2016 Apr [cited 2019 Nov 22];05(04):53–62. Available from: http://iosrjournals.org/iosr-jnhs/papers/vol5-issue4/Version-1/G0504015362.pdf

18. Mank A, Semin-Goossens A, v.d. Lelie J, Bakker P, Vos R. Monitoring Hyperhydration during High-Dose Chemotherapy: Acta Haematol [Internet]. 2003 [cited 2019 Nov 27];109(4):163–8. Available from: https://www.karger.com/Article/FullText/70964

19.Gonzalez F, Vincent F. The fluid balance in the critically ill patients: what are we talking about? Minerva Anestesiol. 2011 Aug;77(8):766–7.

20. Asfour HI. Fluid Balance Monitoring Accuracy in Intensive Care Units. IOSR J Nurs Health Sci [Internet]. 2016 Apr [cited 2019 Nov 22];05(04):53–62. Available from: http://iosrjournals.org/iosr-jnhs/papers/vol5-issue4/Version-1/G0504015362.pdf

21. Lemecha G. Personal Communication. Addis Ababa; 2008. - Google ፍለጋ [Internet]. [cited 2019 Dec 17].

22. Saint Paul's Millennium Medical College – OUR SPECIALITY, YOUR WELL-BEING [Internet]. [cited 2020 Jan 1]. Available from: https://sphmmc.edu.et/

23. ALERT (medical facility). In: Wikipedia [Internet]. 2018 [cited 2020 Jan 2]. Available from: https://en.wikipedia.org/w/index.php?title=ALERT_(medical_facility)&oldid=83809169

8. ANNEX: Questionnaires

ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENES, DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE.

INFORMATION SHEETS, My name is wondayehu mengest. I am from AAU. I will be conducting a study on KAP of Nurses towards fluid balance monitoring on critical ill patients in ICU at federally administered hospitals in AA for a partial fulfillment requirement of MSc degree in Emergency Medicine and Critical Care Nursing. I am here to assess KAP of Nurses towards fluid balance monitoring on critically ill patients in ICU with associated factors between variables. I would appreciate your participation in this study and selected to participate in this study. So you are kindly requested to respond to all statements or questions based on the instruction given. Your information is used only for research purpose and is kept confidential. The following are some general information about the study.

Objectives of the study: This study aim to assess Knowledge, Attitude and Practice of Nurses towards fluid balance monitoring on critical ill patients in ICU at federally administered hospitals in Addis Ababa, Ethiopia, 2019/2020.. Confidentiality: All information taken from you will be kept confidential and won't be accessible to any third party; your name won't be registered on the question sheet, So that you will not be identified for any reason.

Benefits of the study: For your participation in the study no payment will be granted or has no any special privilege to you, but participating in the study and giving your genuine information will provide great input to bring change on Knowledge, Attitude and Practice of Nurses towards fluid balance monitoring on critical ill ICU patients.

Risks of the study: The study procedure does not bear any physical or psychological trauma. Furthermore, you will not be forced to respond or give information that you do not know.

Consent: Your participation in the study will be totally based on your willingness. You have the right not to participate from the beginning, or you may stop participating at any time after starting the participation.

Rights as a participant: If you have any questions about the study please be free to ask and contact me. Your participation in this study is voluntary and you can answer any individual questions or all of the questions concerning about your knowledge and attitude toward fluid balance monitoring on critically ill patients without confusion. In addition, I hope that you will be participating in this survey since your views are very important.

Informed consent, Are you voluntary to participate in this study? 1. Yes: 2. No:

Instruction: Please respond to the following questions by encircling or put a '✓' mark on the option you have

Part one: socio-demographic data of nurses working at federal administered government hospitals in Addis Ababa, Ethiopia, 2020.

S.no	Questions	Response categories	Remark
101	Age in years	----------	
102	Sex	1. Male 2. Female	
103	What is the highest level of education you have attained?	1. College diploma 2. Bachelor degree 3. MSc and above	
104	Years of experience (in years)	----------	
105	Monthly salary	……Ethiopian Birr	

Part two: assessing knowledge of nurses working in ICU at federal administered government hospitals in Addis Ababa, Ethiopia, 2020.

201, which one of the following is expected urine output in average adult person

1) 50 ml/kg /hour 2) 0.5 ml/kg/hour 3) 20 ml/kg /min 4) 5 ml/kg /hour

202, on average an adult patient requires a fluid intake (excluding solids) per day of Approximately:

1) 500-1000 ml 2) 1000-1500 ml 3) 1500-2000 ml 4) 1500-2500ml

203, clinical signs that most likely to occur in a patient who is in the state of Hypervolemia:

1) Dyspnea, tachypnea, tachycardia 2) Arrhythmia, dyspnea, desaturation

3) Anuria, thirst, hypertension 4) Hypotension, edema, petechial

204, what percentage of incorrect fluid balance Calculation do you consider Acceptable when managing a critically ill patient:

1) 0-5%, in this case 0-100 ml 2) 5-10%, in this case 100 ml or more, less than 200 ml

3) 10-25%, in this case 200 ml or more, less than 500 ml 4) >25%, in this case 500 ml or more

205. Blood products are included in the fluid balance

1) Unsure 2) Yes

3) No 4) Depends on unit policy

206. do you calculate fluids that is given with drug as fluid input?

1) Yes 2) NO

207. During the past hour your patient has not passed any urine in the catheter bag. The first thing you do, is

1) Call the doctor 2) Check if the urinary catheter is free flowing

3) Remove the urinary catheter 4) Increase the infusion rate

208. among these three vital signs which one usually used as part of assessing your patient's fluid balance assessment:

1) Temperature, limb movements, heart rate

2) Fluid intake, urine production, nasogastric drainage

3) Urine production, GCS, respiratory rate

4) Blood pressure, pulmonary arterial wedge pressure, bowel activity

209. Fluid balance assessment does not include the following data:

1) Weight, central venous pressure, peripheral pulses

2) Electrolytes, edema, crackles

3) Vancomycin level, airway pressure, pupil reaction

4) Jugular vein distension, specific gravity changes, oxygen saturation

Part three: attitude related questions of nurses working in ICU at federal administered government hospitals in Addis Ababa, Ethiopia, 2020.

NO		Strongly disagree	disagree	agree	Strongly agree
301	There are many other patient care activities that are more important for me to attend to than recording the intake and output every hour				
302	There are too many people who fill in one patient's fluid balance chart				
303	As intensive care unit nurse I am responsible for more than one patient, and it is Difficult to supervise all the fluid balance activities				
304	I am satisfied with the design of the fluid balance chart sheet. It is straightforward to complete				
305	The space to write the fluid numbers on the chart is adequate				
306	The final 24-hour fluid balance is correctly calculated all the time				
307	Fluid balance assessment is important to guide ICU nursing care in critically ill patients				
308	Inaccurate fluid balance calculation can be a risk For the critically ill patient				
309	Fluid balance information is recorded in too many different places on Critical care observation and patient records				

PART FOUR: PRACTICE OF NURSES WORKING IN ICU AT FEDERAL ADMINISTERED GOVERNMENT HOSPITALS IN ADDIS ABABA, ETHIOPIA, 2020.

Observational check list

NO	Check list	Yes	NO
401	Check the amount, type of fluid against doctor's Prescription		
402	Accurately adjusts the flow rate		
403	Document the prescribed fluid on chart		
404	Document the time started		
405	Mentioning the amount of fluid infused		
406	Document the additives which added to the fluid		

TABLE 3 : **PART FIVE. FACTORS AFFECTING FLUID BALANCE MONITORING OF NURSES WORKING AT FEDERAL ADMINISTERED GOVERNMENT HOSPITALS IN ADDIS ABABA, ETHIOPIA, 2020.**

S no	**Questions**	**Response categories**	**Remark**
501	Did you receive fluid balance monitoring standard training	1. Yes 2. No	If no go to Q 503
502	If yes for Q 501. When did you receive the training?	…….years……months ago	
503	Do you record fluid balance monitoring you have provided for all patients?	1. Yes 2. No	If yes go to Q505
504	If "No" to Q 503, what were your reasons? (more than one answer is possible)	1. I could not find adequate recording sheets 2. Unfamiliarity with standard of nursing fluid balance monitoring 3. Lack of skill 4. No adequate staff 5. Lack of time 6. No obligation from the hospital 7. No motivation from supervisors 8. Unsatisfied monthly income 9. If others, please specify ……	
505	On average for how many patients do you provide fluid balance monitoring per day?	……patients	
506	Is fluid balance monitoring sheet easily available in your department?	1. Yes 2. No	

Deceleration

I undersigned, MSC student declare that this thesis is my original

Work for partial fulfillment of the requirement for the degree of masters of

Science in emergency medicine and critical care nursing

Name: wondayehu mengest

Signature ----------

Date……..

Place: Addis Ababa University College of health science department

Of emergency medicine and critical care nursing

Date of submission: 19/06/2020. This thesis has been submitted with my/ our approval as university examiner or advisor(s).

Name Examiner:

Signature _____ Date _____

Name Advisors:

1. Ms. Achamyelesh Tadele Signature _____ Date _____
2. Dr.Tigest Work Signature _____ Date _____