Abstract
Background: Oxygen therapy refers to the administration of oxygen as a medical intervention. Inadequate oxygen administration may result in serious complications including cardiac arrhythmias, tissue injury and ultimately cerebral damage. The aim of this study was to determine knowledge and practice of nurses on supplemental oxygen therapy in Harari region, Ethiopia.
Methods: This cross-sectional descriptive study was performed on all nurses working in three public hospitals in the Harari region, Ethiopia in 2021. A self-administered questionnaire was used to assess nurses’ knowledge and practice about oxygen therapy. Demographic information was also collected using the questionnaire. Data were analyzed in SPSS 20 using descriptive statistics.
Results: Of 422 participants, 212 (50.2%) were female. The majority of nurses were 20-29 years old (40.5%) and had a Bachelor’s degree (69.9%) and 4-6 years of work experience (35.5%). We found that 61.4% and 47.3% of the nurses had good knowledge and practice level about oxygen therapy, respectively. Knowledge about oxygen therapy had no significant association with gender, age, education level, marital status and work experience.
Conclusion: Our findings indicate that there is a clear knowledge and practice gap among nurses working in the public hospitals of Harari region, Ethiopia. Therefore, extensive educational and training programs should be offered to nurses to raise their knowledge and practice about oxygen therapy.

Highlights:
What is current knowledge? All nurses have good knowledge and attitude towards oxygen therapy
What is new here? This research show that not all nurses have good knowledge and attitude towards oxygen therapy

Introduction
Oxygen therapy refers to the administration of oxygen as a medical intervention. It is a key instrument for resuscitating pre-hospital trauma patients during evaluation and transportation (3,4), preventing and managing hypoxemia and saving the lives of patients with heart and lung diseases if used at an appropriate time and in an appropriate amount according to the WHO updated guidelines (2, 5).

The optimal amount and method of oxygen delivery varies depending on patient’s underlying medical condition. The selection of appropriate oxygen delivery device and oxygen flow rate depends on many factors including patient’s age, therapeutic goals and patient’s tolerance (6). Oxygen should be prescribed to achieve a target saturation of 94-98% for most acutely ill patients or 88-92% for those at risk of hypercapnia respiratory failure (7, 8).

Oxygen can develop skin breakdown around the mask or the cannula and easily induce hypercapnia are two major side effects of oxygen therapy (9). Therefore, oxygen should be administered by trained staff.

Nurses are the primary healthcare personnel who monitor oxygen therapy and can contribute to reducing adverse effects of supplemental oxygen therapy (10). Based on studies conducted in different countries, there is a knowledge and practice gap on oxygen therapy among practicing nurses in hospitals (11–13). The present study aimed to determine the knowledge and practice of nurses on oxygen therapy in the Harari region, Ethiopia.
Humidifier reduces the risk of dry based gauze if lips or nose become dry.

Pulse oximetry is affected by nails concentration source used for low medium into nostrils connected to oxygen

Which of the following is a potential sign and symptom of oxygen toxicity?

Which of the following is a potential adverse effect of oxygen therapy?

The disposable plastic device with two protruding prongs for insertion into nostrils connected to oxygen source used for low medium concentration of oxygen (23%-44%) is...

Pulse oximetry is affected by nails varnish/paint, hyperthermia and/or patient’s position.

During oxygen therapy, apply water-based gauze if lips or nose become dry

Humidifier reduces the risk of dry oxygen and its side effects

Discussion
In this study, 61.49% of nurses had good knowledge about oxygen therapy, which is higher than the levels reported from Debre Tabor General Hospital, Ethiopia (48%) (14), CMC hospital in Punjab, India (52%) (15), Beirut, Lebanon (55.1%) (16) and Orotta National Referral Hospital in Asmara, Eritrea (56.7%) (17). However, previous studies in Rwanda (73.8%) (18), Egypt (76%) (19) and Addis Ababa, Ethiopia (63.8%) (20) reported higher levels of knowledge about oxygen therapy among nurses. This discrepancy might be due to the difference in sample size, study setting and study period.

According to the results, 47.5% of the nurses had good practice level about oxygen therapy. This finding is greater than the rates reported by studies
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conducted in Addis Ababa, Ethiopia (43.4%) [20]. Debra Tabor General Hospital, Ethiopia (33%) [14], the University Teaching Hospital of Kigali, Rwanda (32.3%) [18], Eritrean hospitals (45%) [12] and Addis Ababa, Ethiopia (43.4%) [20]. However, in a study in Egypt (19) and Iran [21], 58% and 74.5% of nurses had good practice level on oxygen therapy, respectively. This might be due to unavailability of oxygen administration guidelines and insufficient training on oxygen therapy.

In our study, the nurses had poor knowledge about normal oxygen saturation, contraindications of oxygen therapy and sign and symptoms of oxygen toxicity. About half of the nurses did not follow patients’ vital signs during and after oxygen administration. In addition, more than 75% of the participants did not wash hands before and after the procedure. Furthermore, one third of the subjects did not adjust oxygen flow rate according to the prescription.

There was some limitation in our study, the present study was a cross sectional design so it did not show temporal relationships. In addition, our study did not include nurses working in private hospitals, which questions the generalizability of our results.

Conclusion

More than half of nurses working in public hospitals of the Harari region do not have good practice about oxygen therapy. Moreover, 38.51% of the nurses do not have good knowledge about oxygen therapy. These findings indicate a clear knowledge and practice gap among nurses in the study area, which can negatively affect patients’ safety. Therefore, it is recommended to promote knowledge and practice of nurses about oxygen therapy through in-service training and workshops.

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Ethical statement

Ethical clearance was obtained by harar health science college ethical committee.

Conflict of interest

The authors declare that there is no conflict of interest regarding publication of this article.

Author contributions

Starting from title to data analysis and writing the manuscript was by AH

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