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Awareness about Nitrous Oxide among Allied Health Science Students

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Introduction: Nitrous oxide is an inhalational agent, also called as laughing gas. It is the first anesthetic gas..it is mainly used as a carrier gas.there are many complications by using N2O as an inhalational agent and all those complications.It is 1.5 times heavier than air..it is not metabolized in human body, excreted unchanged through lungs.A small amount gets excreted through skin(percutaneous excretion.nitrous oxide can be used for general anaesthesia, proceduralsedation,dental anaesthesia, and to treat severe pain. Aim: To assess knowledge and awareness about nitrous oxide among the allied health sciences students. Materials and Methods: This cross-sectional research was conducted with a self-administered questionnaire containing ten questions distributed amongst 100 Allied Health science students. The students were randomly selected across various disciplines of Allied Health Sciences. The study setting was designated in the university campus. The survey instrument was a questionnaire pre tested and evaluated for validity and reliability concerns. The questionnaire assessed the awareness about nitrous oxide structure, mechanism of action of nitrous oxide, adverse effects of nitrous oxide, adult dosage and complications of nitrous oxide, uses of nitrous oxide, responses were recorded and analysed. There were no incomplete responses and no dropouts from the study. The final data obtained was organized, tabulated and subjected to statistical analysis. Results: 35% of the respondents are aware of the structure of nitrous oxide ,82% were aware of uses of nitrous oxide, 87% were aware of adverse effects,79% were aware of mechanism of action of nitrous oxide, 77% were aware of normal adult dosage of nitrous oxide, 69% were aware of overdose & complications of nitrous oxide. Conclusion: There is adequate awareness amongst AHS students about use of nitrous oxide in medical applications. However, enhanced awareness initiatives and educational programmes

together with increased importance for curriculum improvements that further promote knowledge and awareness of nitrous oxide should be initiated for further understanding and benefits.

Keywords: Awareness, nitrous oxide, mechanism of action, uses, students, adverse effects.

1. Introduction

In the 1970s it became apparent that N20 was an important trace gas in the Earth's atmosphere capable of causing stratospheric ozone depletion and contributing to the greenhouse effect . At the time it was thought that the oceans were the largest source of some 70 Tg/yr . Since the only identified sink was in the stratosphere, representing a slow removal process, a large unidentified tropospheric sink had to be postulated to balance the budget

Nitrous oxide is an inhalational agent,also called as laughing gas.It is the first anesthetic gas..It has high MAC value.it is mainly used as a carrier gas.there are many complications by using N2O as an inhalational agent and all those complications and side effects must be known by the AHS students to share the knowledge among patients.[8]

Nitrous oxide can be used for general anesthesia,proceduralsedation,dentalanesthesia, and to treat severe pain.[10]Compared to other anesthetic agents,n20 has minimal effects on respiration and hemodynamics.It leads to decreased tidal volume and increased respiratory rate but has a minimal impact on overall minute ventilation.unlike other volatile anesthetics,N2O has no muscle relaxation properties.[7]

2. Materials and Method:

This cross-sectional research was conducted with a self-administered questionnaire containing ten questions distributed amongst 100 Allied Health science students.The students were randomly selected across various disciplines of Allied Health Sciences.The study setting was designated in the university campus.The survey instrument was a questionnaire pre tested and evaluated for validity and reliability concerns.

The questionnaire included ten questions eliciting the demographic data through open ended responses and multiple choice questions for the other responses.The study was approved by the Institutional Ethical Committee and informed consent was obtained from the participants. The questionnaire was posted in an online platform and the identity of the respondents were kept confidential.

The questionnaire assessed the awareness about nitrous oxide structure,mechanism of action of nitrous oxide, adverse effects of nitrous oxide, adult dosage and complications of nitrous oxide, uses of nitrous oxide, responses were recorded and analysed.There were no incomplete responses and no dropouts from the study.The final data obtained was organized,tabulated and subjected to statistical analysis.

The salient questions in the study are

1.NAME

2.AGE

3.SEX

4.YEAR OF STUDY

5.STRUCTURE OF NITROUS OXIDE

6.USES OF NITROUS OXIDE.

7.MECHANISM OF ACTION OF NITROUS OXIDE

8.ADVERSE EFFECTS OF NITROUS OXIDE

9.NORMAL ADULT DOSAGE OD NITROUS OXIDE

10.OVERDOSE COMPLICATIONS OF NITROUS OXIDE.

3. Results:

35% of the respondents are aware of the structure of nitrous oxide (Fig.1) ,82% were aware of uses of nitrous oxide (Fig.2), 87% were aware of adverse effects,79% were aware of mechanism of action of nitrous oxide, 77% were aware of normal adult dosage of nitrous oxide, 69% were aware of overdose & complications of nitrous oxide.

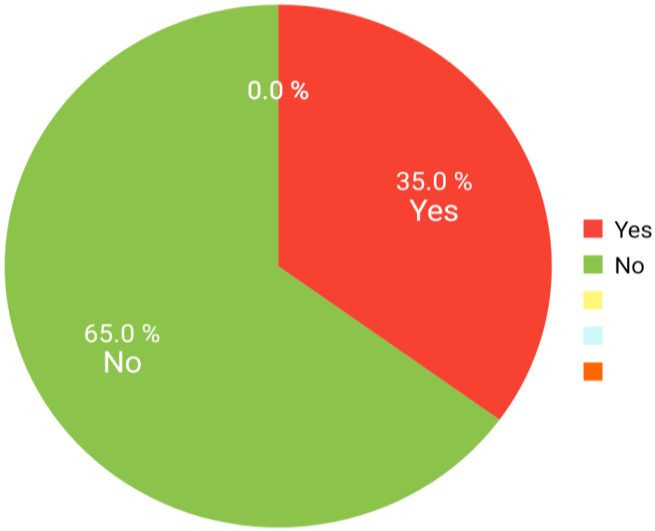

Fig.1. Awareness about the structure of nitrous oxide

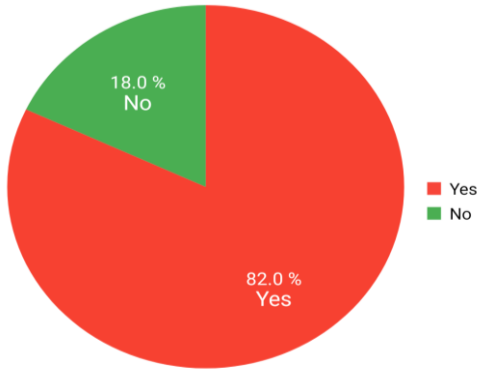

Fig.2.awareness about uses of nitrous oxide

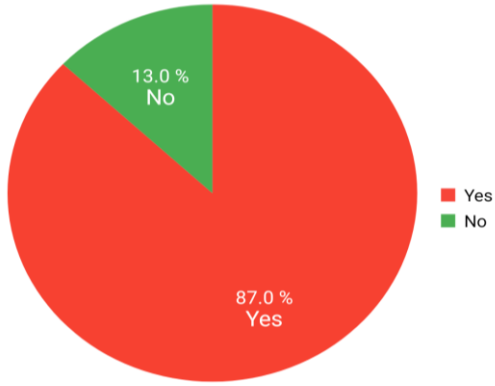

Fig.3.awareness about adverse effects of nitrous oxide

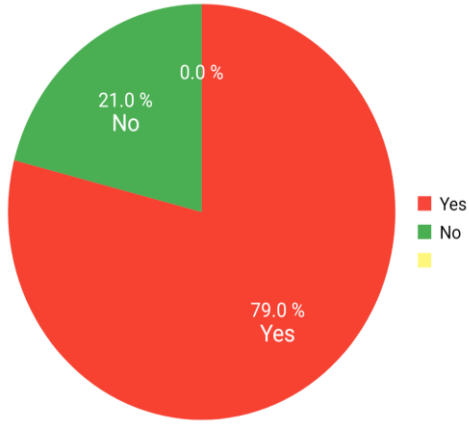

Fig.4.awareness about mechanism of action of nitrous oxide

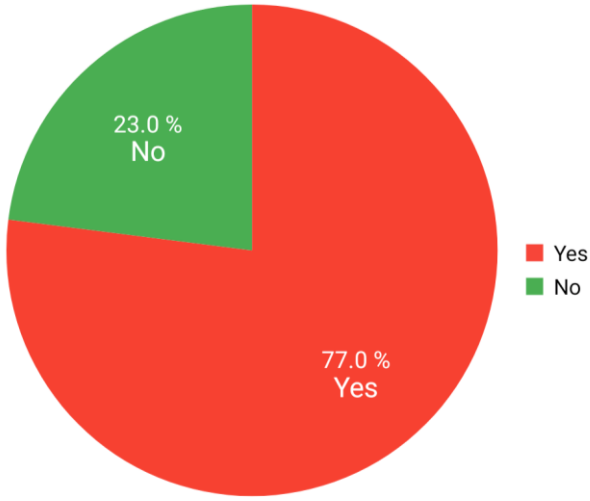

Fig.5.awareness about normal adult dosage of Nitrous oxide

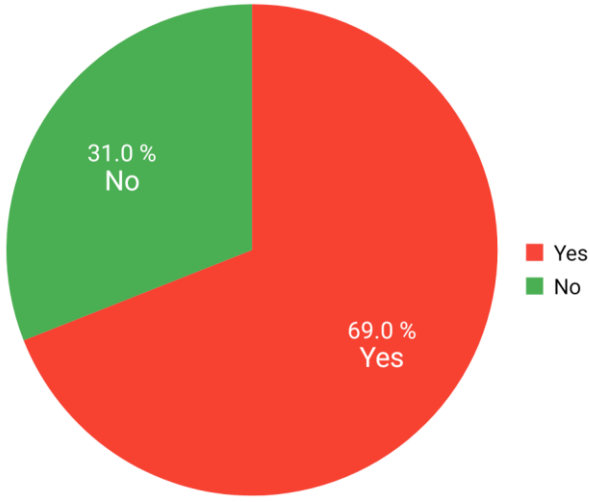

Fig.6.awareness about overdose complications of nitrous oxide.

4. Discussion:

Commonly known as “laughing gas”, this odorless substance is used in medicine, as an anesthetic.. It is the whipped-cream chargers that people buy for recreational use. The gas is usually inhaled by discharging a canister containing small amounts of the gas into a balloon.(6)It takes effect quickly and produces brief euphoria. Some users will want to repeat this, but for the vast majority of people, use is restricted to a few episodes a year(8).there is limited awareness about the structure of nitrous oxide among AHS students so awareness

needs to be created.

Nitrous oxide is an odorless, colorless, non-flammable gas. While nitrous oxide is not flammable, it will support combustion to the same extent as oxygen does. It leads to a state of euphoria, explaining its nickname 'laughing gas.' Nitrous oxide is the least potent inhalational anesthetic. Compared to other anesthetic agents, nitrous oxide causes minimal effects on respiration and hemodynamics. This activity outlines the indications, mechanism of action, methods of administration, significant adverse effects, contraindications, monitoring, and toxicity of nitrous oxide, so providers can direct patient therapy to optimal outcomes in anesthesia and other conditions where nitrous oxide has therapeutic benefit.(13)

Thus it cannot be a sole anesthetic agent, and it is often combined with a more potent and volatile anesthetic. The combination of analgesic and anesthetic effects makes nitrous oxide a valuable adjunct. Nitrous oxide has a low blood solubility leading to a quick onset and offset. The low solubility leads to a concentrating effect for administered volatile agents in the lungs and is known as the second gas effect.[1)When used alone, nitrous has limited respiratory effects, but when used in combination with other sedatives, hypnotics, or opioids, it can potentiate the respiratory depressant effects of these agents.

Diffusion hypoxia: Following discontinuation of nitrous oxide, the concentration gradient between the gasses in the lung and alveolar circulation rapidly reverses. This can lead to rapid dilution of the oxygen in the alveoli, and subsequent hypoxia and 100% oxygen administration should follow nitrous oxide cessation.Post operative Nausea and Vomiting: Nitrous has an increased risk of postoperative nausea and vomiting (PONV) compared with other agents, but this is controllable with prophylactic anti-emetics.[4).

When nitrous oxide is used recurrently, it may lead to megaloblastic anemia with neurologic dysfunction. This situation also may occur in patients with an unrecognized cobalamin deficiency (vegans, pernicious anemia, hereditary disorders of cobalamin, and folate metabolism).[8].This study shows that there is moderate awareness about the overdose management of nitrous oxide so awareness need to be created.

5. Conclusion:

There is adequate awareness amongst AHS students about use of nitrous oxide in medical applications. However, enhanced awareness initiatives and educational programmes together with increased importance for curriculum improvements that further promote knowledge and awareness of nitrous oxide should be initiated for further understanding and benefits.

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