



Anesthetists' Clinical Knowledge Concerning Malignant Hyperthermia

Ali S. Obeid, PhD.

Nursing (Instructor Doctor,
Anaesthesia and Intensive
Care Department, Al-Taff
University College)

Abstract:

Background: Malignant hyperthermia (MH) is a rare anesthetic emergency. It has been estimated to occur in between 1:10,000 and 1:150,000 general anesthetics but these estimates are subject to error for a variety of reasons. These include incomplete reporting of suspected reactions; failure to confirm diagnosis with definitive testing; inaccurate estimates of the total number of general anesthetics given to the relevant population (the denominator); and use of administrative databases to identify cases (Hopkins, et al., 2020).

Objectives: The study aims to identify nursing students' perception level concerning distinguishing between nursing diagnoses terms according to nursing diagnoses textbook and common clinical terms at Al-Imam Al-Hussein Medical City and Al-Hindiya Teaching Hospital (major operating rooms for both two hospitals) in Holy Kerbala'a City.

Methodology: A Descriptive quantitative approach design is conducted to assess anesthetists' clinical knowledge concerning malignant hyperthermia. The study has started on 26th of December, 2023 and ended on 25th of May, 2024. The study instrument consisted of two parts; part one deals with the characteristics of the sample which of age, gender, level of education, years of experience as an anesthetist, and participation in education course concerning malignant hyperthermia. Part two deals with anesthetists' clinical knowledge concerning malignant hyperthermia which was 20 items. The validity of instrument was obtained from 5 experts in specialty. The data analysis was done by using SPSS program version 23. the statistical methods which used in present study is descriptive and inferential statistics.

Results: the findings of present study about anesthetists' clinical knowledge concerning malignant hyperthermia revealed that the agree answer was 73.63%, while the disagree answer was 26.37 %.

Conclusions: the study concluded that anesthetists' clinical knowledge concerning malignant hyperthermia is very good.

Recommendations: The researcher recommends ensure to apply the present study on all anesthetists in Holy Kerbala'a City Hospitals so as to achieve an evidence based knowledge concerning malignant hyperthermia.

Keywords: Anesthetist, Clinical, Knowledge, Malignant Hyperthermia



Corresponding Author: Ali S. Obeid, PhD., Nursing (Instructor Doctor, Anaesthesia and Intensive Care Department, Al-Taff University College)

E-mail: alisalamobeid2021@altuff.edu.iq



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Introduction:

Malignant Hyperthermia (MH) crisis is a rare, anesthesia induced complication with incidence estimated to be 1:15,000 in children and 1:20,000 to 1:50,000 in adults. According to the Malignant Hyperthermia Association of the United States (MHAUS) (2017), MH can be triggered by frequently used anesthetic gases such as sevoflurane, desflurane, and isoflurane and also a frequently used short acting muscle relaxant called succinylcholine (MHAUS, 2017).

It is a time sensitive and critical situation that must be recognized and managed properly to ensure patient survival. Nurse Anesthesia Trainees (NATSs) may never see a MH crisis in their clinical training experience, so training in video simulation is necessary to ensure optimal patient outcomes. Malignant Hyperthermia is a drug-triggered disease that occurs when predisposed individuals are given certain anesthetics such as inhaled agents or succinylcholine. The crisis occurs most often quickly after the induction of a general anesthetic (Cain, et al., 2014).

Methodology:

Design of the Study: A descriptive quantitative approach is conducted to assess anesthetists' clinical knowledge concerning malignant hyperthermia.

Ethical Consideration: The researcher obtained the approval of Al-Taff University College/

Anesthesia and Intensive Care Department, as well as the consent of the participants in the research.

Setting of the Study: Al-Imam Al-Hussein Medical City and Al-Hindiya Teaching Hospital (major operating rooms for both two hospitals) in Holy Kerbala'a City, Iraq.

The Sample of the Study: A non-probability, purposive sample of (40) anesthetists who work at the major operating rooms were selected based on the study criteria and after obtaining a consent from them.

Instrument: The study instrument consisted of two parts; part one deals with the characteristics of the sample which of age, gender, level of education, years of experience as an anesthetist, and participation in education course concerning malignant hyperthermia. Part two deals with anesthetists' clinical knowledge concerning malignant hyperthermia which was 20 items. constructed according to review of literature.

Validity of Instrument: the validity of instrument was obtained through 5 experts.

Statistical and Data Analysis: the researcher used Package of Social Sciences version 23, and used of descriptive and Inferential Statistical for data analysis.

Results:

Table (1) the distribution of the study sample according to their socio- demographic characteristics (No. = 40)

No.	Characteristics	Freq.	%
1	Age/years		
	22-25	15	37.5
	26-29	12	30.0
	30-33	7	17.5
	34-37	3	7.5
	42-45	2	5.0
	46-50	1	2.5

		Total	40	100.0
2	Gender	Male	27	67.5
		Female	13	32.5
3	Anesthesia study level	Bachelor degree	8	20.0
		Diploma degree	32	80.0
4	Experience As an anesthetist/ years	1-4	23	57.5
		5-8	10	25.0
		9-12	3	7.5
		13-16	2	5.0
		21-25	2	5.0
		Total	40	100.0
5	Education course	No	34	85.0
		Yes	6	15.0

No: Number, **Freq.:** Frequency, **%:** Percentage

The socio-demographic characteristics of the present study in table (1) revealed that the age of study sample was about (38 %) at 22-25 years old. About two thirds of anesthetists in the present study were males which of about 68 %. The majority of the study sample have diploma degree

in anesthesia field which of 80 %. Above the half of the study sample (58 %) have 1-4 years of experience as an anesthetist. The majority of the anesthetists (85 %) participated in education course concerning malignant hyperthermia.

Table (2) Anesthetists' Clinical Knowledge Concerning Malignant Hyperthermia for the Study Sample

No.	Items		F.	%
1.	Malignant Hyperthermia (M.H) is an extensive stimuli to certain anesthetics	Disagree	2	5.0
		Agree	38	95.0
2.	(M.H) causes several symptoms, of increased temperature, increased flexibility, and sensitive cardiac arrhythmia	Disagree	3	7.5
		Agree	37	92.5
3.	Symptoms of malignant hyperthermia are fatal	Disagree	15	37.5
		Agree	25	62.5
4.	The cause of (M.H) is inherited (mutation)	Disagree	31	77.5
		Agree	9	22.5
5.	Anesthetic drugs that cause (M.H): cysphenylcholine, isoflurane, sevoflurane, and halothane	Disagree	16	40.0
		Agree	24	60.0
6.	(M.H) causes complications such as muscle cell breakdown syndrome, kidney failure, difficulty with blood clotting, and death.	Disagree	7	17.5
		Agree	33	82.5
7.	There are non-pharmacological accelerators of (M.H), such	Disagree	10	25.0

	as intense exercise, stress resulting from exposure to a heat source, and even emotional stress.	Agree	30	75.0
8.	(M.H) causes a noticeable increase in carbon dioxide pressure and an acceleration in respiratory rates	Disagree	4	10.0
		Agree	36	90.0
9.	(M.H) causes an increase in the rate of oxygen gas consumption, causing metabolic and respiratory acidosis	Disagree	10	25.0
		Agree	30	75.0
10.	Most (M.H) crises occur inside operating rooms	Disagree	19	47.5
		Agree	21	52.5
11.	The onset of a malignant hyperthermia attack occurs in the first hours of exposure to the accelerating agent, depending on the type of inhaled anesthetic.	Disagree	11	27.5
		Agree	29	72.5
12.	The first step in treating (M.H) is to reduce or eliminate the precipitating factor	Disagree	12	30.0
		Agree	28	70.0
13.	The gas condenser (anesthesia mask) must be turned off or removed to eliminate the factor accelerating the occurrence of (M.H)	Disagree	12	30.0
		Agree	28	70.0
14.	The oxygen gas pressure concentration must be set to a maximum of 100%	Disagree	7	17.5
		Agree	33	82.5
15.	Increase the ventilation rate per minute 2-3 times the normal amount	Disagree	3	7.5
		Agree	37	92.5
16.	Giving dantrolene to relax spastic muscles	Disagree	11	27.5
		Agree	29	72.5
17.	Dantrolene works to stop the nerve signals received by the muscles to make them less responsive by reducing calcium in the cells	Disagree	14	35.0
		Agree	26	65.0
18.	Open an intravenous line to give replacement fluids and insert a diuretic tube immediately	Disagree	3	7.5
		Agree	37	92.5
19.	Conduct laboratory tests and send a blood sample to the genetic laboratory to confirm whether the patient has malignant hyperthermia syndrome or not	Disagree	11	27.5
		Agree	29	72.5
20.	The blood sample tested is from peripheral vein blood	Disagree	10	25.0
		Agree	30	75.0
	Total	Disagree	26.37 %	
	Total	Agree	73.63 %	

Table (2) presented the anesthetists' clinical knowledge concerning malignant hyperthermia. It was **73.63 %** for agree answers, while disagree was **26.37 %**.

Discussion:

Regarding socio-demographic characteristics which are presented in table (1) The finding of the present study shows that age group of 22-25 years old is the most participants (38 %). This means

the majority of them are young adults. Throughout the data analysis in chapter four, about two thirds of the participants were males (68 %). The level of study was in a high percent, where (80 %) of the anesthetists have diploma degree in anesthesia specialty (58 %). This means the majority are new employees. In relation to the educating course about malignant hyperthermia in the present study, the majority of the participants didn't participate in such course of concern (85 %).

Through the assessment of anesthetists' clinical knowledge concerning malignant hyperthermia, it was revealed that agree answers was about (74%), while the disagree answers was (26 %). The researcher see that anesthetists' have good information about clinical knowledge concerning malignant hyperthermia within the study sample.

Conclusions:

In conclusion, the results of the current study the study concluded anesthetists' clinical knowledge concerning malignant hyperthermia is very good. The study recommended to apply the present study on all anesthetists in Holy Kerbala'a City Hospitals so as to achieve an evidence based knowledge concerning malignant hyperthermia. The researcher also suggest conducting periodically continuous educating courses concerning malignant hyperthermia principle in operation

rooms and intensive care units as could as possible to make staff aware for this vital subject for patients safety who are undergoing anesthesia.

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