AFGHAN MEDICAL JOURNAL
KABUL UNIVERISITY OF MEDICAL SCIENCES ABU ALI IBN SINA
Volume 2, Issue 1 | May 2025 AMJ e-ISSN: 3007-0805

AWARENESS DURING GENERAL ANESTHESIA IN TEACHING HOSPITALS OF KABUL UNIVERSITY OF MEDICAL SCIENCES

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Abstract

Background: Despite improvements in monitoring, medications, and procedures accidental consciousness is a well-known side effect of anesthesia and sedation. This study aims to determine the prevalence of different types of awareness during general anesthesia in patients undergoing surgery at teaching hospitals of Kabul University of Medical Sciences.

Methods: A cross-sectional survey was designed in which 300 patients over the age of 18 had undergone general anesthesia in Kabul University of Medical Sciences hospitals. All data were collected in questionnaire forms consisting of questions related to demographic characteristics and awareness types (dream, pain, and hearing experience during anesthesia). Data were analyzed by IBM Statistical SPSS Version 26 software.

Results: Totally 300 patients (110 males and 190 females) who underwent general anesthesia were included in the study. One hundred seventy-two patients were in the age category 18-40, 102 patients in the age category 41-60 years, and 26 patients in the age category > 60 years old. Propofol was used for 231 patients (77%), ketamine for 61 patients (20.3%), and thiopental was used in eight patients (2.7%). Twenty-five patients (8.3%, 95% CI, 5.6%-11.9%) had seen dreams; 70 patients (23.3%, 95% CI, 18.8%-28.4%) had felt pain; and 43 patients (14.3%, 95% CI, 10.7%-18.6%) had hearing experience during anesthesia Generally, the adjusted effects of explanatory variables on these three different types of awareness (dream, pain, and hearing experience) during -
anesthesia were not significant. The only variable that was significantly associated with awareness was the drug category, which affected only the pain experienced during anesthesia. The adjusted odd of ratio pain experience in the propofol and ketamine groups is significantly less than in the thiopental group (AOR = 0.03 and 0.02, P = 0.012 and 0.003), respectively.

Conclusion: The prevalence of awareness during general anesthesia in this study is higher than that reported elsewhere. The more prevalent type of awareness was the pain experienced during anesthesia. The only significant association was the pain experience regarding the type of anesthetic drugs that is more prominent in the thiopental group.

Keywords: awareness during anesthesia, general anesthesia, anesthetic drugs

Introduction

Awareness during general anesthesia is a condition in which the patient can recall their surroundings or an event related to the surgery. It can be reported as pain, auditory perception, loss of motor function, helplessness, and panic [1]. We can say awareness during anesthesia has been defined as all recall of intraoperative events by a patient operated under general anesthesia [2]. Also, awareness during general anesthesia is an infrequent but serious problem with potential long-term psychological consequences for the patient and medico-legal implications for the anesthetist [3]. Studies have demonstrated that awareness during general anesthesia can be associated with psychological complications, including nightmares, lack of concentration, flashbacks, sleep disorders, post-traumatic stress disorder (PTSD), panic attacks, irritability, and even a tendency to avoid medical practice [4]. Anesthesiologists depend on a combination of intravenous medicine and inhaled anesthetic drugs to initiate and sustain a state of unconsciousness. Nevertheless, it is worth noting that in exceptional circumstances, the administration of these pharmaceuticals could encounter difficulties, leading to inadequate anesthesia and consequent consciousness during surgical procedures. This phenomenon may arise as a result of equipment malfunction, such as a breach in the delivery system, or inaccurate drug dosage calculations [5, 6]. One or two incidents of awareness under anesthesia may happen out of every 1000 patients receiving a general anesthetic (0.1% - 0.2%) [7].

Incidence rates for obstetric and cardiac patients are higher overall, at 0.4 percent and 1.1-1.5 percent, respectively [8], and intraoperative awareness during general surgery, as reported in the literature, varies between 0.1% and 0.9% [9]. and also The incidence of awareness has been reported to be between 0.1% and 0.2% in the general surgical population in the Western world [8, 10]. Patients undergoing cesarean section, cardiothoracic surgery, or emergency surgery, patients with a difficult airway, and those developing intraoperative hypotension are among those considered to have increased chances of awareness, and the incidence in this group may be as high as 1-2% [11]. Another study shows the incidence of intraoperative awareness was reported to be 1.2% in 1960 [12]. Recent studies showed the incidence to be

0.1-0.2% in low-risk surgical procedures [8, 13]; however, it can reach 1% for patients at increased risk [14]. General anesthesia was administered to 7 million patients in 2012 in South Korea; therefore, intraoperative awareness can be estimated to occur in 7,000-14,000 cases [12].

The incidence of awareness in developed countries is found to be 0.1%–0.2% [8, 13]. Although there are very few studies in the developing world,

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Received 04 Apr 2025; Received in revised form 05 May 2025; Accepted 20 May 2025; published Online 27 May 2025.

the incidence of intraoperative awareness is thought to be somewhat higher as compared to the Western world [15]. This may in part be due to increased patient load, limited patient knowledge, a lack of trained hospital staff, reliance on older, cheaper, but less effective drugs, and a lack of proper equipment both for providing anesthesia and monitoring the patient. Therefore, the goal of this study is to assess the prevalence of the different types of awareness (dream, pain, and hearing experience) during general anesthesia and the possible adjusted effects of two demographic characteristics (gender and age) and anesthetic drug types in patients undergoing surgery at the teaching hospitals of Kabul University of Medical Sciences "Abo Ali ibn Sina".

Methods and Materials

This cross-sectional analytical survey was conducted among 300 patients at Kabul University of Medical Sciences Hospitals to assess the prevalence of different types of awareness during general anesthesia based on convenience sampling .

All operated patients in different departments (general surgery department, urology surgery department, orthopedic surgery department, abdominal surgery department, neurology surgery department, and ENT surgery) of Kabul University of Medical Sciences hospitals with the age of > 18 years old and a good state of consciousness were included in this research. The following patients were excluded from this study: patients with mental health problems who do not answer questions correctly; patients in a coma with a worse condition; patients who did not wake up properly from anesthesia; patients in mechanical ventilation; and patients who are not allowed to participate in the study**.**

After admission to the hospitals, patients were scheduled for surgery; they planned to undergo general anesthesia. On the day of surgery, the patients were shifted to their respective operating rooms, and the anesthesia team took the patients and gave them general anesthesia. After the surgery, the patients are transferred to the intensive care unit. We visited the patients after 24 hours.

We collected data based on a modified Brice questionnaire, It had three sections. The first two sections include demographic details such as age, sex, type of surgery and, anesthetic drugs. The third section contains the modified form of the Brice questionnaire, which is a standard questionnaire to elicit awareness among patients under general anesthesia; we classified participants into three classes based on different types of awareness (dream, pain, and hearing experience). The questionnaire was then translated to Dari for data collection. [16, 17].

The number of participants included in the study was determined entirely by the number of patients who consented during the time available to complete this investigation. Results are reported as percentages of respondents to the surveys and are presented with a 95% confidence interval (CI). Descriptive statistics with 95% CI were used to describe the prevalence of three types of awareness in the study population. Also, analytical statistics (binary logistic regression) was used to investigate the adjusted effects of two demographic characteristics (gender and age) and anesthetic drug types on three different forms of awareness (dream, pain, and hearing experience) during anesthesia.

Results

A total of 300 patients (190 females and 110 males) participated in our study. The ages of the patients ranged from 18 years old to 85 years old, with a median of 35 years old and a mean age of 38.38. Propofol was used for 231 patients (77%), ketamine for 61 patients (20.3%), and thiopental was used in 8 patients (2.7%). The socio-demographic characteristics of the participants in this study are presented in Table 1.

According to the findings of this study, of the total participants, 25 (8.3%, 95% CI, 5.6%-11.9%) had dream experience during anesthesia, 70 (23.3%, 95% CI, 18.8%-28.4%) patients had pain during anesthesia, and 43 (14.3%, 95% CI, 10.7%-18.6%) patients had hearing experience during anesthesia (table 2).

Table 1 Distribution of Participants According to Gender, Age, and Anesthetic Drugs (n = 300)

Demographic characteristics, drugs, and habits		Count	Column N %	95.0% Lower CL for Column Valid N %	95.0% Upper CL for Column Valid N %
Gender	Female	190	63.3%	57.8%	68.6%
	Male	110	36.7%	31.4%	42.2%
age in year	18-40	172	57.3%	51.7%	62.8%
	41-60	102	34.0%	28.8%	39.5%
	> 60	26	8.7%	5.9%	12.2%
Drugs	Propofol	231	77.0%	72.0%	81.5%
	Ketamine	61	20.3%	16.1%	25.2%
	Thiopental	8	2.7%	1.3%	5.0%

Table 2 Prevalence of different types of awareness during anesthesia (n = 300)

Awareness types	**Yes/No**	Count	Column N %	95.0% Lower CL for Column N %	95.0% Upper CL for Column N %
Dream experience during anesthesia	No	275	91.7%	88.1%	94.4%
	Yes	25	8.3%	5.6%	11.9%
Pain experienced during anesthesia	No	230	76.7%	71.6%	81.2%
	Yes	70	23.3%	18.8%	28.4%
hearing experience during anesthesia	No	257	85.7%	81.4%	89.3%
	Yes	43	14.3%	10.7%	18.6%

The proportion of awareness in each drug group is as follows: 1. Propofol group: dream experience during anesthesia 16 (64.0%, 95% CI, 44.5%-80.0%), pain experienced during anesthesia 54 (77.1%, 95% CI, 66.3%-85.8%), hearing experience during anesthesia 32 (74.4%, 95% CI, 60.1%-85.6%). 2. Ketamine group: dream experience during anesthesia 8 (32.0%, 95% CI, 16.4%-51.5%), pain experienced during anesthesia 10 (14.3%, 95% CI, 7.6%-23.9%), and hearing experience during anesthesia 8 (18.6%, 95% CI, 9.2%-32.1%). 3. Thiopental group: dream experience during anesthesia 1 (4.0%, 95% CI, 0.4%-17.2%), pain experienced during anesthesia 6 (8.6%, 95% CI, 3.7%-16.8%), and hearing experience during anesthesia 3 (7.0%, 95% CI, 2.0%-17.5%). Table 3**.**

Table 3 Prevalence of different types of awareness based on the types of anesthetic drugs (n = 300)

Awareness types	Yes/No	Anesthetic drugs	Count	Column N %	95.0% Lower CL for Column N %	95.0% Upper CL for Column N %
Dream experience	Yes	Propofol	16	64.0%	44.5%	80.5%
		Ketamine	8	32.0%	16.4%	51.5%
		Thiopental	1	4.0%	0.4%	17.2%
	No	Propofol	215	78.2%	73.0%	82.8%
		Ketamine	53	19.3%	14.9%	24.2%
		Thiopental	7	2.5%	1.1%	4.9%
Pain experience	Yes	Propofol	54	77.1%	66.3%	85.8%
		Ketamine	10	14.3%	7.6%	23.9%
		Thiopental	6	8.6%	3.7%	16.8%
	No	Propofol	177	77.0%	71.2%	82.0%
		Ketamine	51	22.2%	17.2%	27.9%
		Thiopental	2	0.9%	0.2%	2.8%
Hearing experience	Yes	Propofol	32	74.4%	60.1%	85.6%
		Ketamine	8	18.6%	9.2%	32.1%
		Thiopental	3	7.0%	2.0%	17.5%
	No	Propofol	199	77.4%	72.0%	82.2%
		Ketamine	53	20.6%	16.0%	25.9%
		Thiopental	5	1.9%	0.7%	4.2%

The prevalence of the different types of awareness in the male group is as follows: dream experience during anesthesia 8 (32.0%, 95% CI, 16.4%-51.5%), pain experienced during anesthesia 22 (31.4%, 95% CI, 21.5%-42.9%), and hearing experience during anesthesia 12 (27.9%, 95% CI, 16.3%-42.4%). The awareness in the female group is: dream experience during anesthesia 17 (68.0%, 95% CI, 48.5%-83.6%), pain experienced during anesthesia 48 (68.6%, 95% CI, 57.1%-78.5%), and hearing experience during anesthesia 31 (72.1%, 95% CI, 57.6%-83.7%) (Table 4).

The prevalence of different awareness according to their age categories is as follows: 18-40 age category: dream experience during anesthesia 13 (52.0%, 95% CI, 33.1%-70.5%), pain experience during anesthesia 37 (52.9%, 95% CI, 41.2%-64.2%), and finally hearing experience during anesthesia 22 (51.2%, 95% CI, 36.6%-65.6%). 41-60 years age category: dream experience during anesthesia 9 (36.0%, 95% CI, 19.5%-55.5%), pain experienced during anesthesia 26 (37.1%, 95% CI, 26.5%-48.8%), and finally hearing experience during anesthesia 18 (41.9%, 95% CI, 28.0%-56.7%). > 60 years age category: dream experience during anesthesia 3 (12.0%, 95% CI, 3.5%-28.7%), pain experienced during anesthesia 7 (10.0%, 95% CI, 4.6%-18.6%), and finally hearing experience during anesthesia 3 (7.0%, 95% CI, 2.0%-17.5%). Table 5.

Table 4 Prevalence of different types of awareness based on gender (n = 300).

Awareness	Yes/ No	Gender	Count	Column N %	95.0% Lower CL for Column N %	95.0% Upper CL for Column N %
Dream experience	Yes	Male	8	32.0%	16.4%	51.5%
		Female	17	68.0%	48.5%	83.6%
	No	Male	102	37.1%	31.5%	42.9%
		Female	173	62.9%	57.1%	68.5%
Pain experience	Yes	Male	22	31.4%	21.5%	42.9%
		Female	48	68.6%	57.1%	78.5%
	No	Male	88	38.3%	32.2%	44.7%
		Female	142	61.7%	55.3%	67.8%
Hearing experience	Yes	Male	12	27.9%	16.3%	42.4%
		Female	31	72.1%	57.6%	83.7%
	No	Male	98	38.1%	32.4%	44.2%
		Female	159	61.9%	55.8%	67.6%

Table 5 Prevalence of different types of awareness based on the age categories (n = 300)

Awareness types	Yes /No	Age in years	Count	Column N %	95.0% Lower CL for Column N %	95.0% Upper CL for Column N %
Dream experience	Yes	18-40	13	52.0%	33.1%	70.5%
		41-60	9	36.0%	19.5%	55.5%
		> 60	3	12.0%	3.5%	28.7%
	No	18-40	159	57.8%	51.9%	63.5%
		41-60	93	33.8%	28.4%	39.6%
		> 60	23	8.4%	5.5%	12.1%
Pain experience	Yes	18-40	37	52.9%	41.2%	64.2%
		41-60	26	37.1%	26.5%	48.8%
		> 60	7	10.0%	4.6%	18.6%
	No	18-40	135	58.7%	52.3%	64.9%
		41-60	76	33.0%	27.2%	39.3%
		> 60	19	8.3%	5.2%	12.3%
Hearing experience	Yes	18-40	22	51.2%	36.6%	65.6%
		41-60	18	41.9%	28.0%	56.7%
		> 60	3	7.0%	2.0%	17.5%
	No	18-40	150	58.4%	52.3%	64.3%
		41-60	84	32.7%	27.2%	38.6%
		> 60	23	8.9%	5.9%	12.9%

we conducted a binary logistic regression to evaluate the adjusted effects of explanatory variables (gender, age, and anesthetic drug types) on the different types of awareness (dream, pain, and hearing experience during anesthesia). Regarding the pain experience, only the anesthetic drug types affect the pain experience. The adjusted odd of pain experienced in the propofol and ketamine groups is significantly less than in the thiopental group (AOR = 0.03 and 0.02, P value = 0.012 and 0.003), respectively, but the other two variables (gender and age) do not significantly affect this type of awareness. Table 6. Regarding the dream and hearing experience during anesthesia, no one of these explanatory variables significantly affects these types of awareness while controlling the other variables.

Table 6 adjusted the effects of independent variables on pain experience during anesthesia.

Independent variables	P value	Exp(B)	95% C.I.for EXP(B)

			Lower	Upper
Gender (male)	.521	.783	.372	1.651
Age				
18-40 years	.279	3.548	.358	35.179
41-60 years	.170	4.500	.526	38.495
Drugs				
Propofol	.012	.030	.002	.462
Ketamine	.003	.020	.001	.257

Reference group: gender (female), age (> 60 years), and in drugs (thiopental).

Discussion

This cross-sectional survey assessed the prevalence of awareness during general anesthesia in patients undergoing surgery at the teaching hospitals of Kabul University of Medical Sciences "Abo Ali ibn Sina" in 2021. The results of descriptive statistics showed that 25 patients (8.3%) of the patients had dreams during the surgery, 70 patients (23.3%) patients felt pain during surgery, and 43 patients (14.3%) of the patients heard and remembered the voice of the operating room personnel and some unintelligible sounds during surgery and general anesthesia. The present study's findings showed that there was awareness during general anesthesia with various manifestations such as dreams, pain, and hearing experience during anesthesia in the studied samples, and the results of this research are almost consistent with research in different countries [13, 18-23].

The more prevalent type of awareness is pain experienced during anesthesia; this finding is consistent with the findings of Tadese Tamire et al [24]. Gender does not significantly affects the prevalence of different types of awareness, which is inconsistent with other studies, which may be due to the small sample size [12]. The only association (difference in pain experience in drug groups) may be due to the analgesic effects of ketamine and the small sample size, which is a clue for further research in this regard[25].

However, because of the cross-sectional design of the study, convenience sampling method, and small sample size, we cannot generalize the results and analysis but may be a clue to further and more comprehensive studies.

Conclusion

The results of the present study showed that awareness during anesthesia occurs with a high prevalence in patients undergoing surgery. Patients had experiences of remembering things between sleep and waking, dreaming, pain, and also hearing experiences during anesthesia. The more prevalent type of awareness was pain experience. Among different types of awareness, only the pain experience was associated with one explanatory variable (anesthetic drug type). This type of awareness was significantly higher in the thiopental group than the other two drugs (propofol and ketamine). However, the dream and hearing experience levels were not significantly associated with these explanatory variables.

Ethics approval and consent to participate

Before starting the research, permission was obtained from the research committee of the Kabul University of Medical Sciences (IRB No: 03/01/1400 according to 24/12/2021) to start our study on the prevalence of awareness during anesthesia in the Kabul University of Medical Sciences hospitals. Before evaluation, observers were introduced to the patient, and good manners were maintained with the patients until the patients answered all the questions accurately. Patients were assured that all their information was safe and their identities were perfectly preserved. Once the patients agreed to participate in the study, they were asked to sign the informed consent form.

Competing interests: The authors report no conflicts of interest in this work.

Funding: None

Author Contributions: ZE**,** conceived and designed the study, collected and analyzed data, wrote the manuscript draft, and finalized the manuscript. MBO, assisted in analysis, contributed to manuscript writing, and provided critical revisions, and BK, Supported with literature review, and manuscript proofreading.

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