The Association of Demographic Factors with Pain in Patients After Surgery

Alketa Dervishi[1]
Brizida Refatllari[1]
Flora Zyberaj[1]
Blerina Duka[2]
Indrit Bimi[3]
Alma Imami[1]
Miranda Çela[1]
Albana Poloska[1]

1Faculty of Technical Medical Sciences,
University of Medicine, Tirana, Albania
[2]Order of Nurses Albania UISH,
Tirana, Albania
[3]Aleksander Moisiu University,
Durres, Albania

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Abstract

Background. Pain is considered a subjective, unpleasant, multidimensional experience, which includes different emotional, affective or cognitive components, related to actual or potential tissue damage. Pain is the most common symptom that patients report after surgical procedures. Studies show that the prevalence of postoperative pain can reach up to 80%. Aim. Evaluation of the level of postoperative pain and its association with socio-demographic characteristics. Materials and Methods. This is a crossectional study carried out at University Hospital Centers, Tirana, during the period 2022 – 2023. American Pain Society Patient Outcome Questionnaire (APS-POQ-R)1995/2010 for "Evaluation of Postoperative Pain management", revised in 2010 was used for data collection. Pain assessment was conducted 6-24 hours after the surgical procedure. Results. A total of 237 patients with a mea age 49.5 (±18.9) yrs and range 18 to 88 years were interviewed. 45.6 % were females and 54.4% males. The prevalence of POP was 79.3%, 95CI (74.2.-83.7). A significant association of pain with gender, agegroup, level of education was found. Conclusion. Acute pain management continues to be a very serious clinical issue. It was concluded that the age, gender, level of education, civil status and residence of patients were significant factors in POP. In order to achieve a more effective management of POP, other studies should be carried out in the future, to evaluate in a more real way, the association of demographic data with pain after surgery.

Keywords: *Patient; Management; Postoperative pain, Prevalence*

1. Introduction

Inadequately treated postoperative pain is a hurdle in the path of perfecting the outcome of surgery. Postoperative pain can greatly influence the speed of recovery and the level of satisfaction of patients (Mimic et al., 2018).

Pain not only delays recovery both physically and psychologically, but it may also result in the development of chronic pain, which significantly whittles the quality of life. The effective management of pain requires a meticulous approach that may include pharmacologic and non-pharmacologic interventional strategies (Gan, 2017). Therefore, the management of pain would greatly benefit from a multidisciplinary approach. Management of pain should acknowledge the existence of the two different types of pain an individual may experience following any surgical procedure (acute pain and chronic pain). Pain, acute or chronic, is a complex perception generated by the brain and involves multiple factor interactions. This signifies the need for a pain management strategy that is based on detailed patient and operative history (Meissner & Zaslansky, 2019) (Rawal, 2016).

Pain can be conveniently explained through the two component systems: pathological and psychological, each of which is responsible for empowering and relatively reducing the level of pain experienced at any given time (Gan, 2017). The first step towards successful pain management, therefore, is to understand the origin and physiological basis of pain. *Pathological component* - This component refers to the alteration of tissue anatomy and physiology as a consequence of surgical trauma or associated disease, which gives rise to activation of nociceptors and release of inflammatory chemicals. This component further deals with the ascending and descending pathways (Guevara et al., 2021).

Psychological component - This is defined as the emotional responses to the discomfort. It is more broadly reputed as the mental perception, which completely differs from one individual to the other. The two components are the basis of the selection of medication for postoperative pain control, and most of the pain control medications are targeted towards interrupting the ascending or descending pathways of pain transmission (Tan et al., 2021) (Larsen et al., 2021). In addition to this, patient selection criteria, surgical, and anesthetic techniques are also dependent upon these components of pain (Petersen et al., 2016).

Postoperative pain, defined as pain that persists at the incision or operative site, is also typically the consequence of injury to the skin, muscles, and nerves, and may be compounded by other pain complaints on admission and following the procedure, such as preexisting spinal stenosis (Werner et al., 2010). It is differentiated in terms of cause and mechanism from chronic pain, which is characterized by long-term inflammation, pain from neuropathic causes, manifestations of systemic, endocrine, infectious disease, and psychogenic pain (Azevedo et al., 2012). Nevertheless, it should be noted that acute pain can also become chronic if inadequately managed. The pain that arises from surgical trauma can be broken into five main categories: somatic (involving the integument, muscles, tendons, and parietal peritoneum), visceral (external or serous surfaces of the gastrointestinal tract), and referred pain (perceived in areas removed or at a distance from the operative site), in addition to nerve and central pain (from the sympathetic nervous system activating pain).

Pain can also be characterized by the intensity of nociceptive stimuli. These are useful distinctions as they may necessitate modification of surgical conditions (Mohamed, 2016). Procedures that stimulate higher intensities of nociceptive stimuli will require a greater degree of anesthesia in order to perform the surgical procedure. In the related surgical context, cancer surgery inflicts a particularly large amount of somatic pain, whereas in neurosurgery the concern is with nerve pain due to the unique propensity for neural tissues to induce shock-like sensations following operative manipulation (Masigati & Chilonga, 2014). Unlike intensities of pain, the duration of pain cannot be predicted. The type of surgery and the care team's expectations have been called upon to establish its arrival. For instance, it is not uncommon to subject arthroscopy recipients to general anesthesia, even though the operation lasts around an hour. This pain assessment is usually labeled 'formal' unless other descriptions are applied to focus on the continuous needs of caregivers and patients (Yang et al., 2019).

1.1 Type of study

The study is of cross-sectional type. The questionnaires were applied to patients who have performed surgical procedures in the last three years, in different specialties near Tirana University Hospital Center, during the period 2022-2023. The study included 237 adult, conscious patients, age >18 years who underwent interventions and surgical procedures in the mentioned institutions and were treated in the ward. The selection of patient records was carried out in a systematic random manner (systematic random sampling).

Types of surgical specialties included in the study

- general surgery
- neurosurgery
- thoracic surgery

1.2 Instrument and method of data collection.

Data collection was made possible through a questionnaire of the "American Pain Society Patient Outcome Questionnaire (APS-POQ-R) 1995/2010 for "Assessment and Management of Postoperative Pain" which was adapted according to the 2010 version (Gordon, 2010), was conducted 6-24 hours after the surgical procedure.

Patient interviews were conducted by FSHMT students trained in the application of study questionnaires, which were coded in order to maintain anonymity and confidentiality.

1.3 Type of variables under study

Categorical variables:

- Gender: male vs. female (dichotomous variable).
- Age-groups: age was categorized in age-groups (ordinal variable): ≤20years old, 21-30 years old, 31-40 years old, 41-50 years old, 51-60 years old, , >60 years old, (ordinal variable)
- Education level: 8 years, secondary, high (nominal variable)
- Residence: Urban, Rural (nominal variable)
- Civil status: Single, married, divorced, widowed (nominal variable)
- Pain intensity rating scale: Visual analog (VAS), Numeric scale (NS), Verbal scale (VS) (nominal variable)

Pain intensity: It is determined on a numerical scale from 0 to 10, where 0 corresponds to "no pain" and 10 to "maximum pain intensity" (ordinal variable).

To determine the adequacy of postoperative pain management, the Pain Management Index (PMI) was used, based on the intensity level of the patient's greatest pain and categorized into 0 (no pain), 1 (1-3: pain mild), 2 (4-6: moderate pain), and 3 (7-10: severe pain).

Statistical analysis methodology. All statistical data analysis was performed in SPSS (Statistical Package for Social Sciences, version 15.0, Chicago, IL).

Statistical tests used

Logistic regression - Odds ratio OR with 95% CI confidence interval, for evaluating the association of pain with sociodemographic variables. A value of p≤0.05 was considered statistically significant.

2. Results

According to the objectives of the study, initially the sociodemographic data of patients with postoperative pain (POP) in the study were presented, such as gender, age, employment, education and civil status.

Table 1. 1 Distribution of cases by gender

Gender	N	%	cumulative %
Female	108	45.6	45.6
MALE	129	54.4	100
Total	237	100.0	

Distribution of patients with POP according to gender, where men predominate with 54.4% of cases and the rest (45.6%) are female patients, with no statistical difference between them p>0.05.

Table 1. 2. Summary statistics of age

Sample size	237
Younger age	18.0
Older age	83.0
Average age	49.5
95%CI for mean	45.8 - 54.0
Median	50.0
Standard Deviation (SD)	18.9

Table 1.2 shows the average age of the study population, which is 49.5 (±18.9) years old, ranging from 18 to 83 years old.

In figure 1, it is found that the age is not subject to normal distribution but there is a predominance of patients over the age of 50 years, compared to the age under 50 years *(Kolmogorov-smirnov p<0.01).*

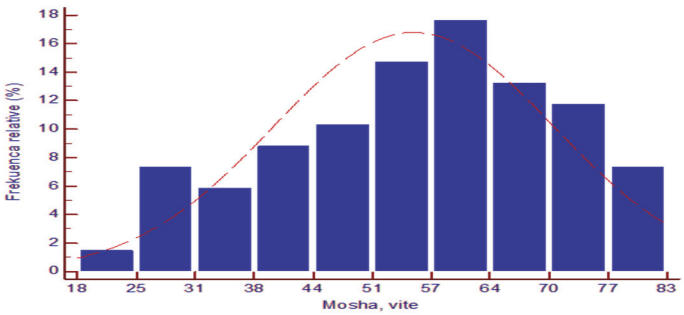

Figure 1. Age histogram of patients included in the study

Table 1. 3 Distribution of cases according to education level

Education level	N	%	cumulative %	P
8 years	28	11.7	11.7	<0.01
Medium	156	65.9	77.6	
High	53	22.4	100	
Total	237	100.0		

Based on these results, it is clear that there is a difference between patients according to their level of education, with a predominance of patients with secondary education, which is shown by the significance value (χ^2 =64.5 p<0.01) indicating a statistically significant relationship.

Table 1. 4 Distribution of cases by place of residence

RESIDENCE	N	%	cumulative %	P
Urban	144	60.8	60.8	<0.05
Rural	93	39.2	100	
Total	237	100.0		

It is established that there is a difference in the distribution of patients according to the residence with an urban predominance, which is indicated by the significance value p<0.05, which indicates a statistically significant relationship.

Table 1. 5 Distribution of cases according to civil status

Civil status	N	%	cumulative %	P
Single	34	14.3	11.7	<0.001
Married	172	73.0	87.3	
Divorced	21	8.9	96.2	
Total	237	100.0	100.0	

According to the results, it is clear that there is a difference in the distribution of patients according to marital status, with a predominance of married patients, which is shown by the significance value (χ^2 =296.4 p<0.01) which proves a statistically significant relationship.

Table 1.6 Prevalence of POP according to sociodemographic variables, according to scale (0-10)

Variables	Total (n=237)	Mild (n=81)	Moderate (n=109)	Strong (n=47)	P
Gender					
MALE	129	59 (45.7)	55 (42.6)	15 (11.6)	0.01
Female	108	22 (20.4)	49 (45.4)	32 (25.0)	
Age group, years					
≤ 50	97	29 (29.9)	39 (39.2)	29 (30.0)	0.01
>50	140	64 (45.7)	63 (45.0)	13 (9.3)	
RESIDENCE					
Rural	93	46 (49.5)	39 (41.9)	8 (8.6)	<0.01
Urban	144	35 (24.3)	70 (48.6)	39 (27.1)	
Educational level					
8 years	28	15 (53.6)	10 (35.7)	3 (10.7)	<0.01
Medium	156	53 (34.0)	72 (46.2)	31 (19.9)	
High	53	14 (26.4)	22 (41.5)	17 (32.1)	
Civil status					
Singles	34	23 (67.6)	7 (20.6)	4 (11.8)	<0.01
Married	173	58 (33.5)	82 (47.4)	33 (19.1)	
Divorced	21	4 (19.0)	11 (52.4)	6 (28.6)	
Widow	9	2 (22.2)	3 (33.3)	4 (44.4)	

Prevalence of moderate and severe POP according to sociodemographic variables: From the table above, a statistically significant relationship was found between the prevalence of moderate and severe pain according to: gender, age group, place of residence, educational level and civil status;

According to gender, with a predominance of moderate and severe pain in women in 76 (70.4%) cases compared to men in 70 (54.3%) cases, which is shown by the significance value, (χ^2 = 12.4 p=0.01).

According to the age group with predominance of moderate and severe pain in the age group ≤ 50 years old in 68 (70.1 %) of the cases compared to the age group > 50 years old in 76 (54.3%) of the cases which is shown by the significance value (χ 2 =20.5 p=0.01).

According to the residence with predominance of moderate and severe pain in patients from the urban area in 109 (75.7%) of the cases compared to the rural area in 47 (50.5%) of the cases (χ^2 = 31.2 p<0.01) which is shown by the value of significance.

According to the level of education with predominance of moderate and severe pain in patients with higher education in 39 (73.6%) cases compared to 8-year education with 13 (46.4%) cases (χ^2 = 26.7 p<0.01) that indicated by the significance value).

According to the marital status with predominance of moderate and severe pain in patients married in 115 (66.5%), divorced in 16 (81%) cases and widowed in 7 (77.8%) cases (χ^2 = 79.8 p<0.01).

Table 1. 7 Association of moderate and severe pain with sociodemographic variables

Variables	N (%)	OR (95%CI)	P
Gender			
MALE	70 (54.3)	1	
Female	76 (70.4)	2.1 (1.7- 3.8)	0.01
Age group			
≤ 50	68 (70.1)	2.0 (1.4- 3.4)	0.01
>50	76 (54.3)	1	
RESIDENCE			
Rural	47 (50.5)	1	
Urban	109 (75.7)	3.0 (1.7 – 5.3)	<0.01
Education level			
8-year	13 (46.4)	1	
Medium	103 (66.0)	2.2 (0.9 – 5.0)	0.06
High	39 (73.6)	2.2 (1.1 – 4.8)	0.03
Civil status			
Single	11 (32.4)	1	
Married	115 (66.5)	1.9 (1.1 - 4.8)	0.02
Divorced	16 (81.0)	2.6 (1.73 - 15.1)	0.01
Widow	7 (77.8)	2.1 (1.35 - 15.3)	0.01

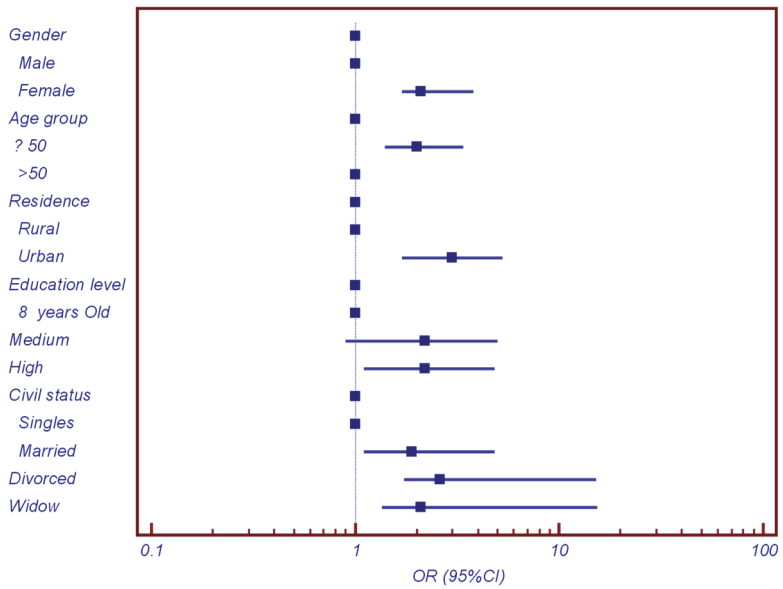

Figure 2. Association of the prevalence of moderate and severe pain with sociodemographic variables

Through binary logistic regression analysis, it results that:

Women are 2.1 times more likely to experience pain compared to men [OR=2.1 95%CI (1.7-3.8) p=0.01]

The age group ≤ 50 years is 2 times more likely than the age group >50 to experience pain [OR =2.0 95%CI (1.4 – 3.4) p=0.01]

Patients from urban areas are 3 times more likely than patients from rural areas to experience pain [OR =3.0 95%CI (1.7 – 5.3) p<0.01]

Patients with higher education are 3.2 times more likely than patients with 8 years of education to experience pain [OR =3.2 95%CI (1.1 – 4.8) p=0.03]

Married patients are 1.9 times more likely than single patients to experience pain [OR =1.9 95%CI (1.1 – 4.89) p=0.02]

Divorced patients are 2.6 times more likely than single patients to experience pain [OR =2.6 95% CI (1.7 – 15.1) p=0.01]

Widowed patients are 2.1 times more likely than single patients to experience pain [OR =2.1 95%CI (1.3 – 15.3) p=0.01

3. Discussion

Postoperative pain is a problem that is considered vital in clinical practice, and studies in recent decades suggest that POP\this symptom is not experienced in the same way in all patients. We understand pain in a multifactorial way with a fundamental impact on peoples quality of life and their socio-cultural environment.

For an unbiased measurement, pain assessment was conducted 6-24 hours after the procedure to capture patients' pain accurately without immediate interference from anesthesia or postoperative analgesics.

The prevalence of POP in our study was high 79.3% 95%CI (74.2.-83.7). The prevalence of moderate and severe pain prevails in women at 70.4% of their total compared to men (54.2%).

In our study, a statistically significant association of the prevalence of moderate and severe pain was found in the age group <50 years in 70.1% of cases (p<0.01). However, according to other authors, it is conluded that it is wrong to assume that elderly patients experience less pain compared to younger patients (Herr et al., 2004), Other studies report a lower frequency and intensity of pain in older individuals. The reduction in pain at older ages may be because older patients have a weakened peripheral nociceptive function, which may decrease pain in some contexts and reduce opioid requirements than younger patients (Murray & Retief, 2016).

Regarding gender, a statistically significant correlation with pain was found in our study. Despite numerous studies that focus their research on the differences in the perception of pain according to gender, the effect that this factor can have on patients cannot be definitively determined (Samulowitz et al.,2018). This is due to the fact that men and women are socialized and perceive pain differently, adapting to specific circumstances.

In various studies it is emphasized that the intensity of pain is affected by gender and the pain threshold is lower in women than in men and most women express their pain more often than men (Mei et al., 2010**).** According to some other studies, it is found that women are more likely than men to experience moderate to severe acute pain after surgery. This finding is in accordance with studies conducted in Germany and the USA (Mei et al., 2010) (Zalon, 2014) (Tighe et al., 2014)

According to the results of this study regarding education, the largest number of patients 156 (65.9%) had completed secondary education, followed by 53 (22.4%) who had completed higher education and 28 (11.7%) patients who had completed only 8-year basic education (p<0.01), with a predominance of moderate and severe pain in patients with higher education in 39 (73.6%) cases compared to 8-year education in 13 (46.4%) cases ($\chi^2 = 26.7$ p<0.01) which is indicated by the significance value).

Similar findings are also reported by another study in which patients had almost the same level of education and prevalence, namely with low education (27.8%), secondary education (61.2%) and high education (11.0%) (Wylde et al., 2011). Based on the level of education, data from other studies refer to the predominance of moderate and strong POP in patients with higher education in 42 (79.2%) of cases (p<0.01) which is shown by the significance value (Gottschalk et al., 2007).

Differences in the perception of pain seem to be related to cultural, educational and genetic aspects, but the literature remains to be reviewed in further studies (Meschini et al., 2020).

In our study, most patients (60.8%) live in urban areas and (39.2%) in rural areas. This distribution of patients is similar to the distribution in other study, where 72% were residents in urban areas and 28% in rural areas (Joshi, 2005). According to the place of residence, we have a predominance of moderate and severe pain in patients from the urban area in (70.1%) of the cases compared to the rural area in 43 (46.2%) of the cases (p<0.01) which is shown by the significance value, a result which is consistent with other studies (Joshi & Ogunnaike, 2005).

According to the results of this paper**,** 14.3% of patients are single, (73%) are married, (8.9%) are divorced, while (3.8%) are widowed. In the study, a difference was found in the distribution of patients according to marital status, with a predominance of married patients (73%) (p<0.05).

4. Conclusion

The study provides information about the level of POP and the correlation with sociodemographic data according to the experience and experience of patients after surgical procedures. It was concluded that the age of patients, gender, level of education, civil status, residence were significant factors in POP. In order to achieve a more effective management of POP, other studies should be carried out in the future, to evaluate in a more real way, the association of demographic data with pain after surgery.

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