

# Postoperative Pain Management Among Native and Non-native Israeli Citizens—Data From the European PAIN-OUT Registry

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**Purpose:** *It has been widely reported that minority groups receive inferior emergency pain management. We aimed to determine whether this is true in the postoperative setting, as effective postoperative analgesia is an essential component of high quality medical care.*

**Design:** *A retrospective case-control study of paired 248 postsurgical Israeli patients.*

**Methods:** *Data were gathered from the European Union's "PAIN-OUT" registry. Quality of care measures, composite pain score, composite side effect score, and composite emotional score were analyzed.*

**Findings:** *Composite pain, side effect, and emotional scores were significantly higher among natives compared with non-natives. Opioid consumption did not differ between the two groups.*

**Conclusions:** *In this study, immigration status was not a predictor of inferior postoperative analgesia. In contrast, non-natives benefited more from analgesic care. We suggest this stems from differing patient expectations and attitudes toward pain management between the groups, with higher expectations for analgesia on the part of native patients accounting for these observations.*

**Keywords:** *postoperative pain, postsurgical pain, immigrants, opiates, quality of care, pain.*

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**IT IS WIDELY ACCEPTED** that minority groups often receive inferior quality medical care, even in modernized medical care systems.<sup>1,2</sup>

Differences in health care use and accessibility between ethnic minorities and the native majority have been well documented,<sup>3</sup> including

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*Conflicts of Interest: None to report.*

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the fact that immigrant populations typically experience poorer health status and derive less satisfaction from medical treatment.<sup>4</sup>

Similarly, minority patients are more likely to have their pain underestimated by providers and thus less likely to receive opioid analgesics,<sup>5</sup> resulting in their pain being undertreated.<sup>6,7</sup> This has been shown, for example, in the emergency care setting in the United States.<sup>8-10</sup> Elimination of such treatment disparities is, therefore, of major importance to public health care. Accordingly, there is an increasing interest in the relationship between ethnicity and health care quality, especially in the face of the rise in the proportion of immigrants relative to native populations in many Western countries.<sup>11</sup>

Language difficulties seem an obvious culprit in this undertreatment, but are actually only one of the several barriers in the treatment of non-native populations. Another crucial aspect, for example, is non-natives' previous exposure to different medical systems, resulting in specific biases and preformed concepts regarding medical care that may be significantly different than those of native patients. Specifically, health care systems in Western countries are generally more patient and service oriented, as is the case in Israel. Immigrants from non-Western countries, however, often experienced inferior health care in their lands of origin,<sup>12</sup> which influences their outlook on the medical care they may receive in their new country.

Despite the fact that disparity in health care between natives and non-natives is a global concern, especially in an era of increasing international immigration and an interconnected world, a paucity of the literature exists regarding pain management in minority groups in clinical settings other than emergency rooms (ERs) or delivery rooms.<sup>13,14</sup> Moreover, most of the literature is more than a decade old. Therefore, it may not correctly reflect the current situation across different societies, in other painful conditions, and in other clinical settings.

In this study, we aimed to explore whether non-native citizens receive inferior postoperative pain management compared with the native majority, because effective postoperative pain management

is an essential component of modern high quality medical care.<sup>15,16</sup>

The Israeli population is especially suited to this task because it consists of two large subgroups: "natives" (ie, Israeli born) and "non-natives" (ie, born and educated overseas, mainly in communist and Arab societies). To that end, we used data from the "PAIN-OUT" registry, an ongoing multinational postoperative pain management study funded by the European Union's 7th Framework Program, which seeks to establish an acute postoperative pain registry with data from 13 countries.

## Methods

### Subjects

A total of 471 patients undergoing orthopaedic or general surgical procedures in the Tel Aviv Sourasky Medical Center in Tel Aviv, Israel, were studied between 2010 and 2012. The study was approved by the Institutional Review Board of the Tel Aviv Sourasky Medical Center.

The data set included 471 Israeli citizens who underwent either orthopaedic or general surgical procedures between 2010 and 2012; 275 of them were Israeli born (natives) and 196 had immigrated to Israel (non-natives). More than 100 different surgical procedures were performed, so to enable meaningful analysis of the data, the procedures were grouped into eight categories (Table 1). Each category included similar procedures that are presumed to produce comparable postoperative pain.<sup>17</sup> Ninety patients who underwent relatively uncommon procedures were excluded from study. The remaining 381 patients included 215 natives and 166 non-natives. Age, sex, and the type of operation varied significantly between the two groups. A one-to-one matching based on gender, age (grouped by decade), and the surgical procedure was applied, resulting in 124 pairs (Table 2). A summary of the study procedure is depicted in Figure 1.

### Data Collection

The full study data set included a three-part record:

1. *Case features*: Patient gender, age (grouped by decade), date and the type of surgery, and ward (general surgery vs orthopaedic surgery).

Table 1. Patient Distribution Across Procedural Categories

	42	15	20	7	21	6	1
Superficial surgical procedures	Minor laparoscopic Procedures	Major laparoscopic procedures	Major open surgical procedures	Arthroscopic orthopaedic procedures	Hip or knee replacement	Open reduction of fracture with internal fixation, large bones	Open reduction of fracture with internal fixation, radius and ulna

Number of included pairs is depicted for each category in the first row.

2. *Pharmacotherapy data*: Type of anesthesia and pain medications administered in the first 24 hours postoperatively.
3. *Patient-reported outcome measures*: Patients completed an International Pain Outcomes questionnaire, a validated pain measure,<sup>18</sup> regarding their pain in the first 24 hours post-surgery. To exclude language difficulties as a confounder, questionnaires were administered to patients in their native language.

### Data Analyses

Analyses focused on the following parameters:

1. Measured on an 11-point scale from 0 to 10 where 0 is least and 10 is maximal:
  - a. *Maximal pain*—the worst pain the patient had since surgery.
  - b. *Minimal pain*—the least pain the patient had since surgery.
  - c. *Feeling helpless*—did the pain cause the patient to feel helpless.
  - d. *Feeling anxious*—did pain cause anxiety.
  - e. *Patient satisfaction*—was the patient satisfied with the results of analgesic treatment.
  - f. *Side effects*—patients were asked to describe the severity of their side effects (nausea, itching, dizziness, drowsiness).
  - g. *Pain-related motor disability*—whether pain interferes with activities in bed such as turning, sitting up, changing position.
2. Expressed as a percentage of time on a scale from 0% to 100%:
  - a. *Severe pain*—what proportion of the day did the patient experience severe pain (visual analogue scale [VAS] > 7).
  - b. *Pain relief*—what proportion of the day did the patient experience significant pain relief (VAS < 3).
3. Expressed as a “yes” or “no” answer:
  - a. *Information availability*—did the patient receive information regarding analgesic treatment.
  - b. *Analgesic demand*—would the patient have liked to receive more pain treatment than actually provided.

### Statistical Analyses

Paired comparison between the groups (ie, natives and non-natives) was conducted using the paired *t* test for continuous variables. In addition, we

**Table 2. Patient Data and Descriptive Results (N = 248)**

	Natives, n = 124	Non-natives, n = 124	P Value
Age (y)	48 ± 1.7	53 ± 1.7	< .05
Woman/men	62/62	62/62	N/A
Opiates (equivalent milligrams of oral morphine)	142 ± 14	147 ± 23	NS
Anxiety	2.5 ± 0.28	2.4 ± 0.2	NS
Feeling helpless	3.6 ± 0.3	2.5 ± 0.3	< .01
Maximum pain	6.6 ± 0.2	6.0 ± 0.2	.09
Minimum pain	2.6 ± 0.2	2.1 ± 0.2	.13
Interference in bed	6.16 ± 0.3	5.47 ± 0.3	.09
Satisfaction	7.1 ± 0.3	7.4 ± 0.3	NS
Pain relief (% time)	0.42 ± 0.05	0.47 ± 0.05	NS
Severe pain (% time)	0.24 ± 0.04	0.16 ± 0.04	< .05
Dizziness	2.9 ± 0.3	2.35 ± 0.27	NS
Drowsiness	5.27 ± 0.3	3.7 ± 0.3	.001
Nausea	3.1 ± 0.34	2.2 ± 0.3	NS

NS = not statistically significant.

used the Wilcoxon non-parametric test for ordinal scale variables and the McNemar test for binary variables. Statistical Analysis System (SAS) for Windows version 9.2 was used for all statistical analyses. A threshold of  $P < .05$  was used to determine statistical significance.

**Results**

Overall, 124 pairs were studied, with an equal female/male ratio in both native and non-native

groups (62/62). The mean age for native and non-native groups was  $48 \pm 1.7$  and  $53 \pm 1.7$  years, respectively. Non-natives were significantly older ( $P < .05$ ), yet it should be kept in mind that all pairs were matched based on decade, that is, within an age range of  $\pm 10$  years.

The mean period of time since immigration was  $33 \pm 20.9$  years. Of the 124 non-native patients, 57 emigrated from the former Soviet Union and other former communist societies (eg, Poland), 27 emigrated from Arab countries, 10 emigrated from other third-world countries (eg, Ethiopia), and the remaining 30 moved from Western countries (eg, Britain, France).

**Opioid Consumption**

Opioids were converted to oral morphine equivalents using conventional conversion tables. The mean total opioid consumption during the surgical procedures and in the first 24 hours postoperatively was comparable between the two groups, with  $142 \pm 14$  and  $147 \pm 23$  mg morphine equivalent units for the native and non-native groups, respectively. These means were not statistically significant.

**Pain Severity**

Natives tended to provide higher maximal pain scores than non-natives ( $6.6 \pm 0.2$  vs  $6.0 \pm 0.2$ ,  $P = .09$ ), higher minimal pain scores than non-

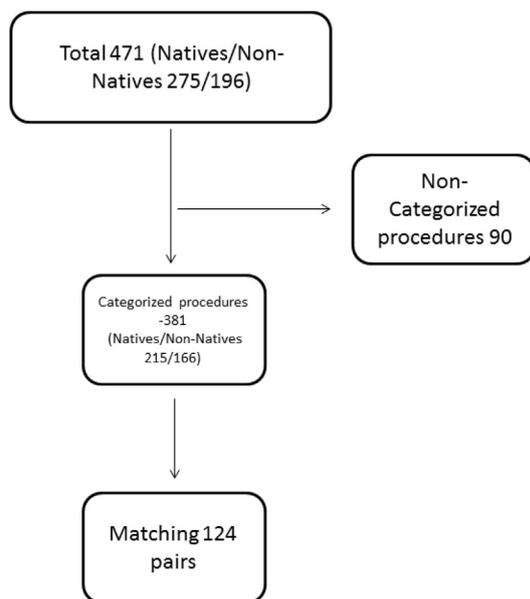


Figure 1. Study flowchart. The process of patient selection for paired comparison.

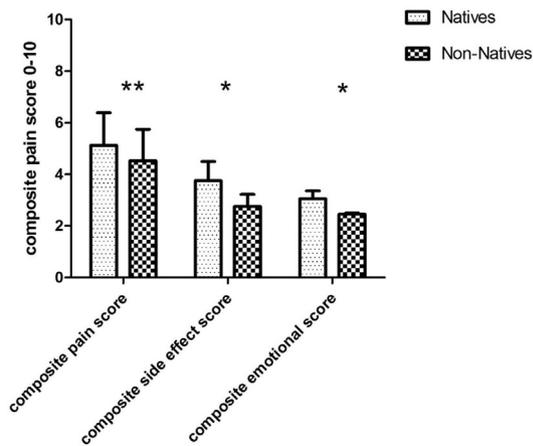


Figure 2. Composite scores. Composite pain, side effect, and emotional scores for the native and non-native patient groups. \* $P < .05$ , \*\* $P < .01$ .

natives ( $2.6 \pm 0.2$  vs  $2.1 \pm 0.2$ ,  $P = .13$ ), and more pain-related interference with in-bed activities compared with non-natives ( $6.16 \pm 0.3$  vs  $5.47 \pm 0.3$ ,  $P > .05$ ). All these trends, however, were not statistically significant.

Rothaug et al<sup>18</sup> have suggested that because these three parameters are highly correlated with each other, they should be combined as an average and transformed into a single parameter they termed “composite pain score.” Indeed, under this scoring, natives had significantly higher composite pain scores compared with non-natives ( $5.12 \pm 1.26$  vs  $4.52 \pm 1.22$ ,  $P = .0084$ ; Figure 2). In accordance, although the percentage of time during the first 24 hours after surgery in which patients felt significant pain relief did not differ between the groups ( $0.42 \pm 0.05$  and  $0.47 \pm 0.05$ ,  $P < .05$ ), the percentage of time dur-

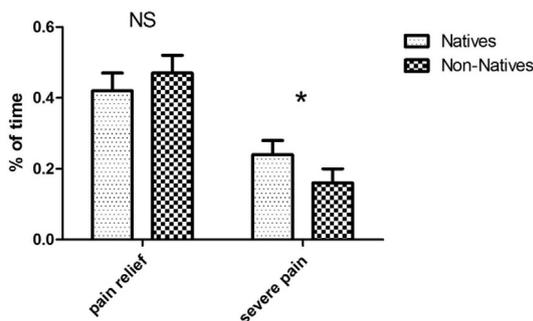


Figure 3. Time experienced in complete pain relief and in severe pain, expressed as % of the day. \* $P < .05$ ; NS = not significant.

ing which severe pain was experienced was significantly higher in the native group than in the non-native group ( $0.24 \pm 0.04$  vs  $0.16 \pm 0.04$ ,  $P = .0084$ ; Figure 3).

### Emotional Distress

Although both groups described comparable anxiety levels, helplessness was rated significantly higher in natives compared with non-natives ( $3.6 \pm 0.3$  vs  $2.5 \pm 0.3$ ,  $P < .01$ ). Similarly, combining these score averages into a single “composite emotional stress score” revealed that natives experienced significantly worse emotional distress in response to pain than non-natives ( $3.05 \pm 0.31$  vs  $2.45 \pm 0.05$ ;  $P < .05$ ; Figure 2).

### Composite Side Effect Score

Three side effects (dizziness, drowsiness, and nausea) were measured and combined into a composite side effect score. These scores were significantly higher among natives than among non-natives ( $3.75 \pm 0.75$  vs  $2.75 \pm 0.47$ ,  $P < .05$ ; Figure 2).

### Patients' Perception of Care

Three parameters (receiving good information regarding analgesic treatment options, desire for additional analgesic treatment, and patient satisfaction) were used to determine participants' perception of analgesic care. The first two parameters were not significantly different between the native and non-native groups (McNemar's  $P$  values for the first and second parameter variables were .35 and .76, respectively). However, non-natives did tend to describe higher satisfaction rates compared with natives ( $7.1 \pm 0.3$  vs  $7.4 \pm 0.3$ ,  $P > .05$ ).

### Discussion

Patient-related, provider-related, and pharmacy-related barriers to effective pain management have previously been shown to adversely affect the care of minority groups, including immigrants. The purpose of the present study, therefore, was to explore the assumption that non-native citizens receive inferior analgesic care compared with native citizens in a cohort of Israeli patients. Because previous research in this area focused on pain management in the ER setting, our aim

was to test whether this assumption applies to postoperative pain management. Suboptimal postoperative pain management is considered a major factor in patient discomfort, prolonged recovery, high morbidity, and increased health care costs. It may also result in long-term complications, including “chronification” of postoperative pain and other adverse outcomes.<sup>19,20</sup> Moreover, it has been suggested that most patients, in general, receive inadequate postoperative pain relief,<sup>21-23</sup> and so it was our assumption that this might be even more so among the minority group of non-native patients.

However, when exploring different parameters that assess the quality of postoperative analgesic care in the context of the unique composition of the Israeli population, we did not find that native citizens received superior postoperative pain management compared with non-native citizens.

In contrast to what would be expected based on the previous literature,<sup>3,5,6,8</sup> opiate consumption was comparable between the two groups. Surprisingly, in this study, we found that composite pain scores were actually significantly better in non-natives compared with natives, as were their composite emotional scores. Notably, feelings of helplessness in reaction to pain, which are an important contributor to pain catastrophizing, were also significantly worse among native patients. In addition, composite side effect scores were significantly better among non-native compared with native patients.

To radically suggest that natives’ pain is undertreated compared with that of non-natives is unreasonable. Rather, a more plausible explanation is that these differences in composite pain scores between the groups stem from differences in patient expectations, which are undoubtedly a universally major factor to the efficacy of any analgesic care.<sup>24</sup> Previous works have demonstrated that differences in patients’ expectations for pain control exist between different ethnic groups<sup>25</sup> and that the degree to which the patients are informed regarding analgesic treatment options influences their pain management.<sup>5</sup> Most of the non-natives came from countries in which health care indicators have long lagged behind those of developed countries<sup>26</sup> and medical knowledge is lacking. Because a lack in knowl-

edge regarding the options for pain control necessarily leads to lower expectations,<sup>27</sup> immigrants might have outdated perceptions regarding pain and believe it is inherent within the surgical process and unavoidable and thus also under-report it.<sup>7</sup> Native patients, in contrast, expect more and ask for more treatment, as expressed in higher opiate consumption in previous studies (which was not the case in the present study). The fact that natives expected effective and targeted pain management may also account for the observation that they were more troubled by side effects than non-natives, as manifested by higher composite side effect scores. Thus, higher expectations from the medical care they received on the part of native patients might explain their worse outcome, and vice versa. This raises the question of whether improved health care, as is the case in Western societies, with all its obvious advantages, may have an unexpected side to it, leading paradoxically to inferior patient satisfaction in the face of growing expectations.

The results of this study may also reflect recent progress in the field of postoperative pain management. For example, strict pain management guidelines supported by established algorithms and training of health care providers in recognizing and treating pain are now becoming routine in many Western health care facilities, including our institution. In our hospital, for example, consultation with a pain specialist nurse or physician regarding in-house patients is readily available (in person or on the phone) and results in a customized treatment plan for each patient. Thus, pain management is not solely in the hands of the treating ward, and the responsibility is divided between the ward and a specialized pain management team, and especially a rotating nurse specializing in pain management. This team has tools at its disposal to bypass obstacles and barriers to treating pain such as language and cultural approaches. This may also account for the fact that non-natives in this study felt they had received adequate information regarding their pain management, which was unexpected relative to previous findings regarding the communication of medical information to patients from minority groups (including when language barriers are not present<sup>28-30</sup>). In this way, patients can readily receive pain relief, even if their personal

background is such that does not encourage them to ask for it, because the specialized team will independently approach patients to evaluate their pain management needs.

Another possible explanation for the conflicting findings between our research and those that were conducted in emergency settings is the difference in the environment, that is, the nature of acute pain management in the ER setting is completely different than that on the surgical wards.<sup>31</sup> Some of the major reasons are the fact that the encounter between the patient and the staff in the ER is often brief and intense,<sup>32</sup> communication errors are common, and there is often unappreciated cultural differences in pain reporting by patients and interpretation of pain reporting by providers,<sup>33</sup> the variety and quantity of patients is high, and the workload is much heavier compared with that which exists in the surgical wards. Moreover, in the surgical wards pain is anticipated and is perceived by the staff as an integral part of managing the surgical process. Such an approach might outweigh any communication obstacles that exist between the staff and the patient, and result in the initiation of early and intensive pain treatments. Finally, the fact that in the ER the diagnostic process is usually still ongoing may deter physicians from providing analgesia, and especially opioid analgesia, as there is a widespread notion that analgesia may interfere with patient workup and diagnosis, despite evidence to the contrary.<sup>34</sup>

There are several limitations to this study. First, it is difficult to establish a clear definition of who is an

immigrant, and the number of years since immigration after which one can be considered as native is unclear. This is the reason why we used the term non-natives rather than “immigrants.” Of note, we focused only on native versus non-native citizens, as opposed to immigrants who are not citizens. Therefore, these results cannot be extrapolated to the treatment of noncitizen immigrants, in whom many other legal, social, and economic considerations apply.<sup>32,35</sup> Second, it is difficult to draw universal conclusions from one society and its health care system and practices. The Israeli health care system has an extremely rich, varied, and long-standing experience in treating immigrants from many nationalities and thus might differ from those less accustomed to treating persons of different languages and customs on a routine basis. Finally, another drawback of this study is that it defines “postoperative” strictly as the first 24 hours after surgery.

## Conclusions

Despite previous assumptions that non-natives receive inferior analgesic treatment compared with natives, this was not the case in this cohort of postsurgical Israeli patients. Rather, it seems that patients’ expectation and perceptions regarding the pain management they receive and the side effects they may experience determine treatment efficacy more than immigration status with its accompanying social, economic, and communication barriers. This might be especially so when a dedicated team of pain management specialist is involved in the care of in-house patients.

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