Assessment of the effectiveness of pain management among trauma patients in the emergency department

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Abstract

Background:

In the emergency department (ED), pain is the most common complaint, especially among trauma patients. However, two-thirds of trauma patients are discharged from EDs with moderate to severe pain. Therefore, pain management is an important part of care in ED's trauma patients.

Aim:

To assess the effectiveness of pain management among trauma patients in the ED.

Method:

A retrospective cohort study that was conducted on adult trauma patients who attended the ED at King Abdulaziz medical city (KAMC) in Jeddah from the period (June 2016 to July 2018). The pain was measured twice, one before the intervention and one after intervention using a numeric pain scale. Data were collected from health information system (Best care®) and analyzed using SPSS version 24.

Results:

The Mean difference between pain scores before and after pain management was one on a numeric pain scale with a P-Value 0.001. Initial pain assessment occurred only in 69% of our population, while assessment after intervention happened in 71% of patients. Patients who received appropriate medication were 36.7%. 35% of patients received opioids as an initial drug of pain management; only 8.8% of patients had pain scores more than 7 initially. The median between the time of arrival and the time of Initial Assessment is 19 mins.

Conclusion:

Pain management in ED needs improvement. Timeliness of pain management should be addressed. Evaluation and re-evaluation of pain before and after the intervention is insufficient. Trauma Patients don't receive effective pain management in the ED.

Introduction:

The main complaint of patients referred to hospitals is pain, which represents almost 80% among all the causes for referral to the emergency department (ED) [1]. The main complaint of trauma patients is pain, and it is reported by 91% in EDs and 70% of patients in pre-hospital settings [2–4]. In Europe, almost 38 million individuals visit hospital ED annually due to injuries, with 5.3 million of them admitted for further treatment [5]. According to the World Health Organization, injury is the leading cause of death in both genders, with an age range of 15–44 years old, and the third cause of death and disability in other age groups [6].

Pain management of traumatic patients by health care professionals in the emergency department and pre-hospital settings is a crucial element of care [7]. Inadequate relief of trauma pain is a problem that was commonly reported by patients in the European Union and other regions [8]. Trauma patients report low satisfaction with their pain management [9]. A multicenter study from Canada and the United States showed that 74% of patients discharged from ED with moderate or severe pain [10]. Patients discharged from ED from Europe reported moderate to severe pain complaints [11].

There are several pain assessment tools, which are reliable and valid; however, the verbal rating scale and numeric rating scale (NRS) are simple and quick tools for measuring pain in the ED [12–14]. Scoring of pain is advocated within interventions in order to improve pain management and measure improvements of pain with documentation [14–16]. Suboptimal assessment and management of the pain of trauma patients were reported by emergency medical services in pre-hospital settings [3, 17]. The lack of effective pain management has an impact on the patient and emergency settings of the health care professionals, and in turn, it affects the resources [4], where studies showed that patients who primarily well managed for pain and treated in ED reported higher overall satisfaction with the hospital services [18–20]. However, there is a global agreement that pain isn't adequately managed in the ED [21, 22]. This study was conducted to assess the effectiveness of pain management among trauma patients in the ED.

Subjects And Methods:

This is a retrospective cohort study that was conducted on all adult patients of trauma and attended the emergency department at KAMC in Jeddah from the period between June 2016 to July 2018. There were 403 files of patients reviewed, and the sample size was calculated based on the number of trauma patients presented to the emergency department. Patients included were those with acute trauma, with an age of 18 years and above, whereas patients who were excluded were patients with Glasgow coma score (GCS) level less than 13, having chronic pain, have critical, unstable vital signs, less than 90 systolic pressure, and intoxicated patients, so we included 332 patients. The pain was assessed before and after intervention using a numeric pain scale. Data were collected from health information system (Best care ®), the data collected included gender, age, trauma description, pain assessment at different stages, and triage score Canadian triage acuity scale (C-TAS), drug information. Ethical considerations have been noted including access to the information system of the hospital to obtain the data of patients; code numbers were used instead of file number or names of the patients, investigators only were able to access the data. SPSS program version24 was used to analyze data. The relationship between pain and other variables was performed using the Chi-square test.

Results:

This study included 332 trauma patients who were admitted to the emergency department. The median between the time of arrival and time of initial assessment was 19 minutes, and a mean ± SD of 125.54 ± 254.56 minutes (almost 2 hours). Regarding the patients who received initial pain score, there were 222(69%) of patients were assessed for pain, whereas 100(31%) weren't assessed for pain. After the

intervention, there were 229(71%) of patients were re-assessed for pain, whereas 93(29%) only weren't re-assessed for pain. The mean ± standard deviation (SD) of pain score before intervention was3.36 ± 1.845, Fig. 1, whereas the mean ± SD of pain score after the intervention was 2.29 ± 1.662, Fig. 2.The mean ± SD of the difference between pain before and after was 1.069 ± 1.894, there was a significant difference between pain score before and after pain management (P = 0.001); however, it wasn't clinically significant as the minimum clinically significant difference should be ≥ 2. Regarding gender, there was no significant difference between males and females in pain score (P 0.6).

Regarding medication, there were 45% of patients took medication in ED; however, only 36.7% get the appropriate drug, whereas 63.3% administrated inappropriate drug, Fig. 3. The most administrated drug was Morphine (45.3%), followed by Acetaminophen (30.7%), followed by Fentanyl (17.3%), whereas other drugs represented the fewest percents; including diclofenac (3.4%), tramadol (2.2%), meperidine (0.6%), and ketorolac (0.6%), Fig. 4. There were 81 patients administrated Morphine, with 6 of them scored 7 and above, whereas 31 of patients administrated Fentanyl, and 3of them recorded pain score of 7 or above.

The correlation between C-TAS and time of initial assessment is shown in Fig. 5, showing a negative correlation.

The improvement of the pain score is shown in Fig. 6.

Discussion:

In the present study, there was a mean long duration taken for initial assessment of pain, where the meantime between the time of arrival and time of initial assessment was 125 minutes (almost 2 hours). The percent of patients who received an initial assessment was moderate 69%, whereas 31% weren't assessed for pain at all. Regarding the re-assessment of pain, there was 71%performed re-assessment.

The current study showed that the mean pain score before the intervention was 3.36, whereas the mean pain score after the intervention was 2.29. Although there was a statistically significant difference between the mean of pain score before and after the intervention, this wasn't clinically significant, as according to the clinical practice guidelines of KAMC, the clinical significance should be ≥ 2.

In the currents study, the gender had no impact on pain score, where males and females showed no significant difference in pain score (P 0.6). In a previous study [23], it was found that gender alone wasn't a significant predictor of change in pain for patients attending ED with the pain-related complaint.

The primary basis for pain relief is the administration of systematic analgesic agents or non-steroidal anti-inflammatory drugs (NSAIDs) [24–26]. In one study from a low-income country, it was found that less than half of patients with documented pain received medication for pain at ED; also, it was stated that high-income countries suffer improper management of pain in traumatic patients [27].

Although Saudi Arabia has a good income, in this study, only 45% of patients administrated medication in ED, and only 36.7% of them obtained the appropriate medication. The most commonly used

medications for pain management were Morphine, Acetaminophen, and Fentanyl. Among 81 patients who administrated Morphine, there were 6 had a pain score of 7 or above, whereas among 31 patients administrated Fentanyl, there were 3 had a pain score of 7 or above. The curve between pain score difference and pain score improvement showed the greatest improvement in the pain score at zero degrees.

Ina review article, it was reported that NASIDs and Acetaminophen were commonly used in the treatment of acute pain; however, the relief of moderate to severe acute pain usually required opioid agents, and regarding the restrictions for using opioids, then analgesic can be helpful for better management [28].

The original C-TAS was an adult-center classification that provided guidelines as to what presentations would fit in a given tirage level [29]. The C-TAS involves five levels; level one is known as resuscitation, level two, emergent, level three urgent, level four less urgent, and level five non-urgent [30]. The current study revealed that there was a poor negative correlation between C-TAS and the time of initial assessment.

In the present study, there was improper management of pain, and this can return to several factors such as age, race, underlying illness, physician awareness, the ability of the patient to express pain, and fear of complications [28]. It was revealed that pain scoring might not accurately reflect the experience of the patient [31]. It was reported that adequate pain management in trauma patients require several factors including, determining the adequate analgesic to relieve moderate and severe pain, adequate assessment of age-specific pharmacologic pain management, identification of serious adverse effects of pain medications, with regular re-assessment of patient re-evaluation of the pain management regimen [32]. So, further investigations are recommended to understand the factors that affected proper pain management.

Conclusion And Recommendation:

Pain management in the ED requires improvement. Timeliness of pain management should be addressed. A further study about the correlation between pain scores and/or scales and the proper medications for each score and/or scale is recommended, to achieve better care among trauma patients in the ED. Assessment and re-assessment of pain before and after the intervention is insufficient. The time length to receive pain management has a huge impact of patients' recovery over all thus pain management should be addressed as a priority after managing the ABCs. Trauma patients didn’t receive effective pain management in the ED. We need to study what are the reasons behind this inadequacy among pain control and to initiate an improvement towards patients’ care in ED.

Abbreviations

ED
Emergency department

KAMC
King Abdulaziz medical city
NRS
numeric rating scale
GCS
Glasgow coma score
C-TAS
Canadian triage acuity scale
SD
standard deviation
NSAIDs
non-steroidal anti-inflammatory drugs
ABCs
Airway, breathing, circulation

Declarations

Ethics approval and consent to participate: IRB approval is obtained by the number **RSS18/035/J in 29/7/2018**

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Figures

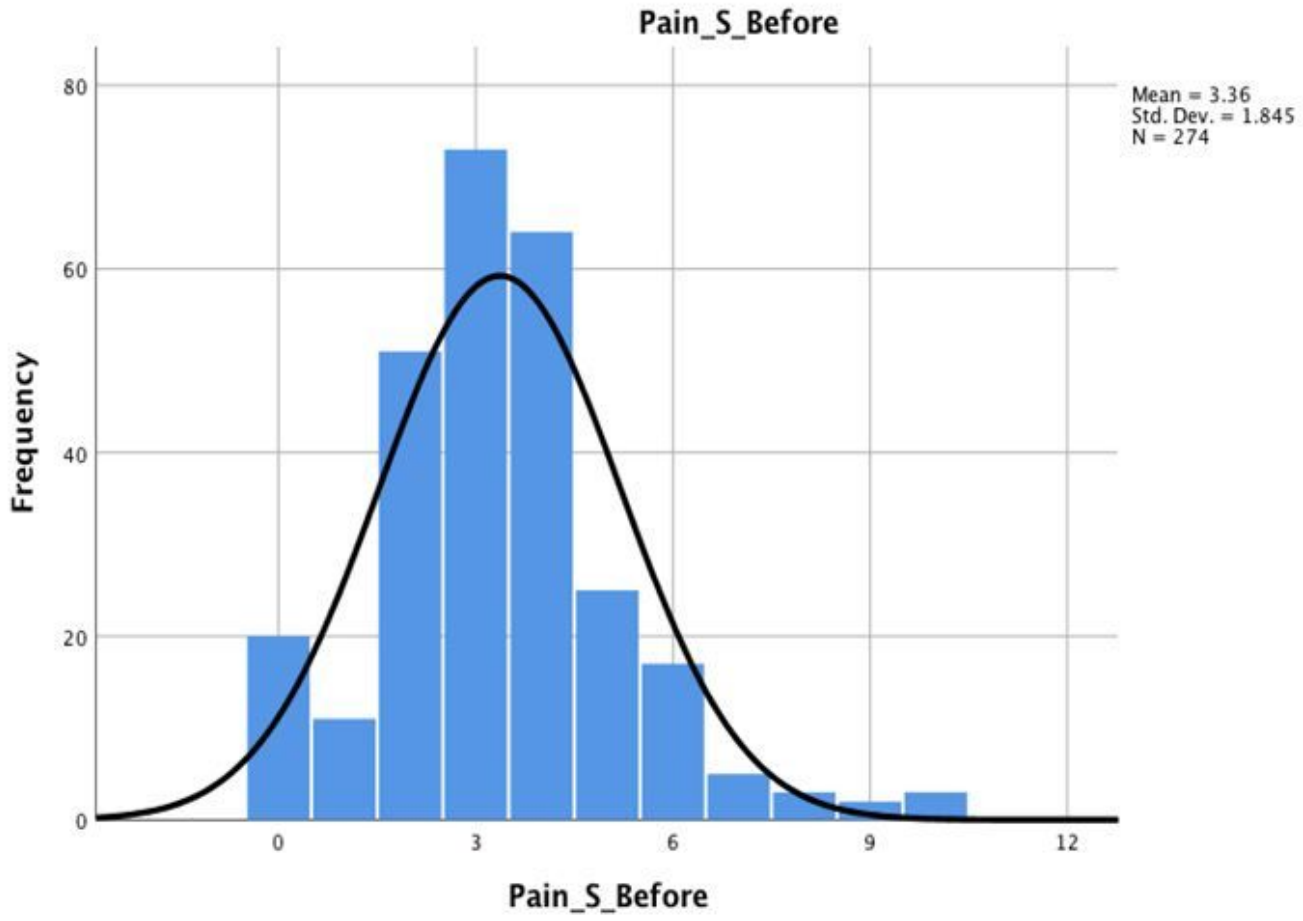

Figure 1

Pain score before intervention

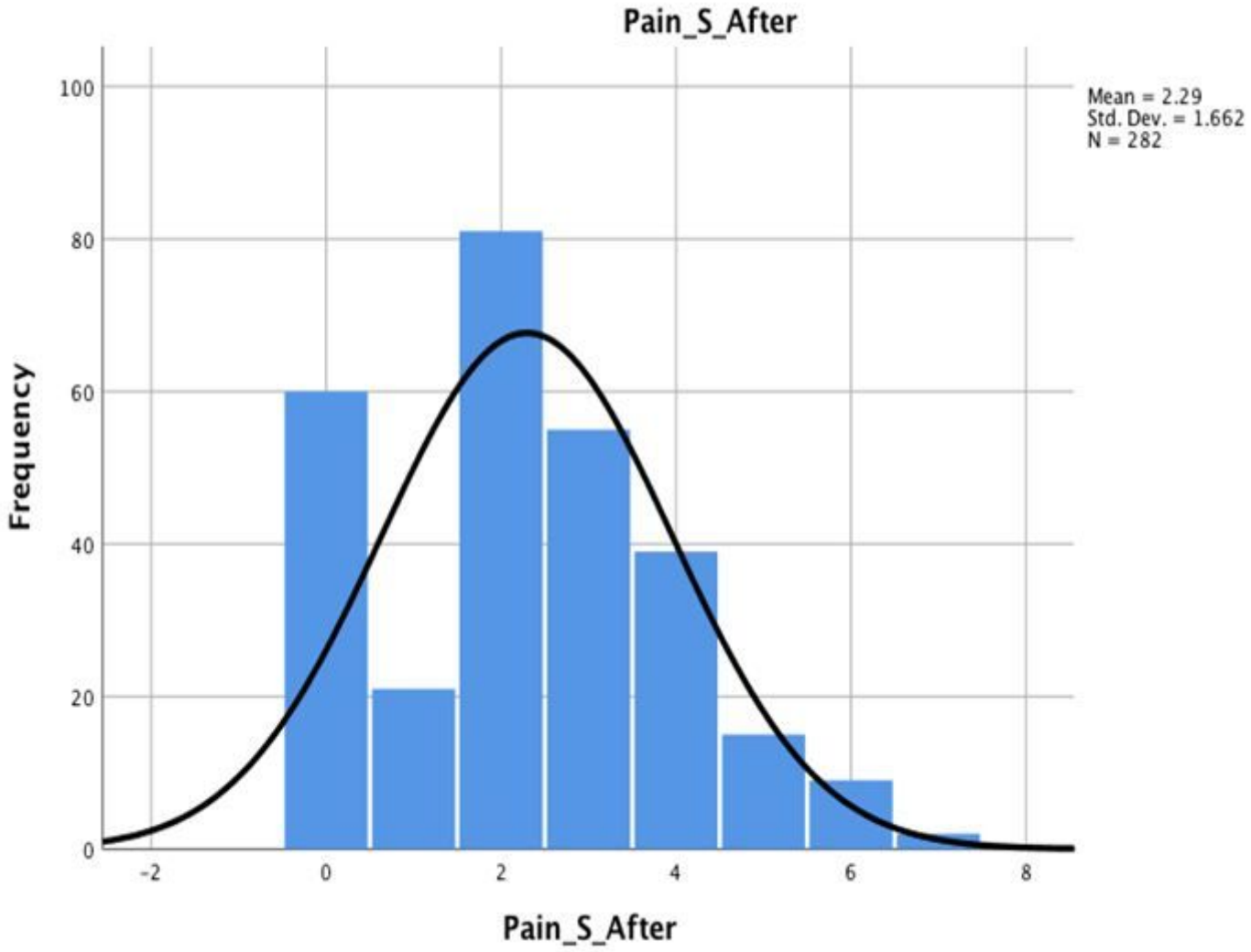

Figure 2

Pain score after intervention

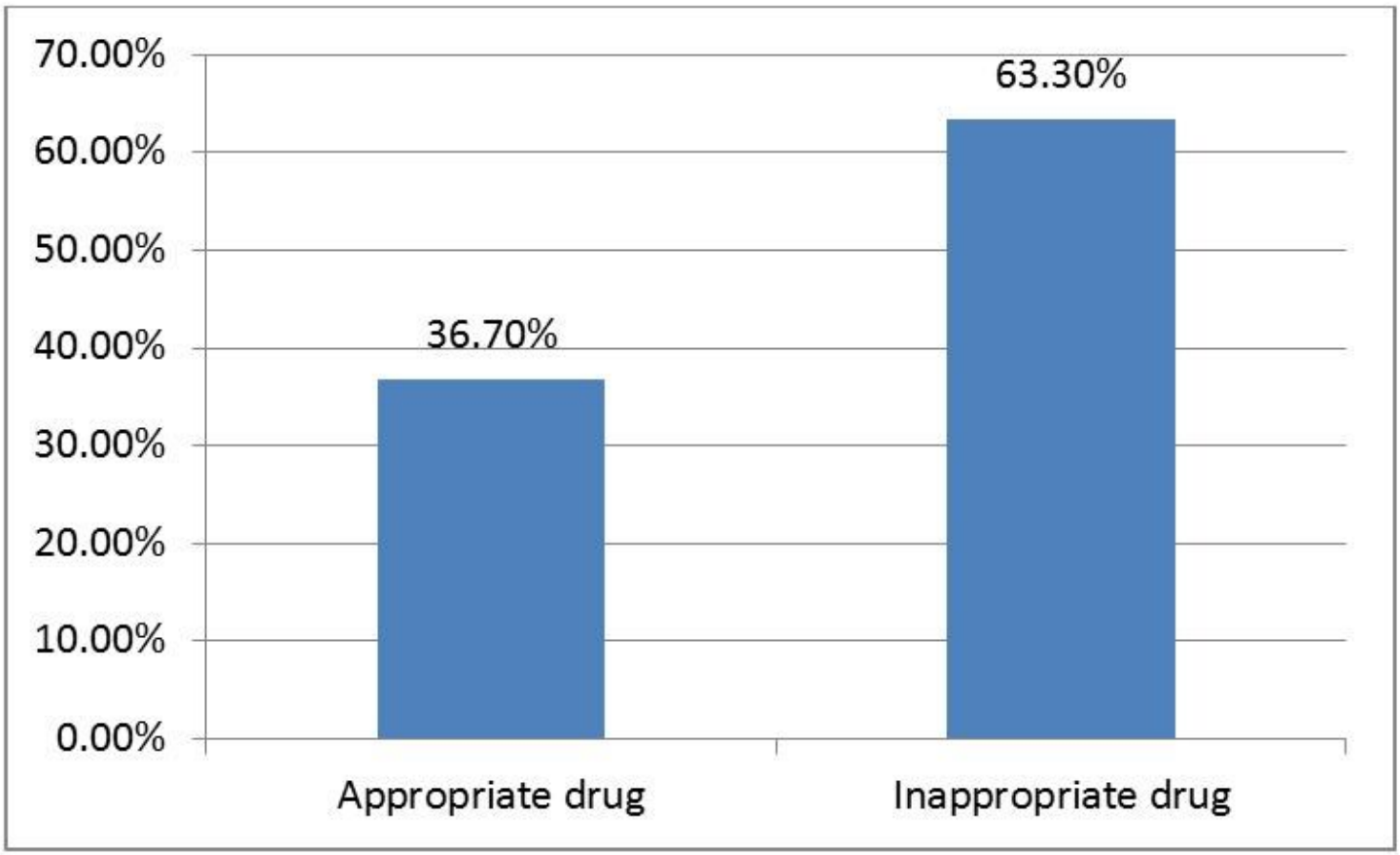

Figure 3

The percent of appropriate and inappropriate drug used

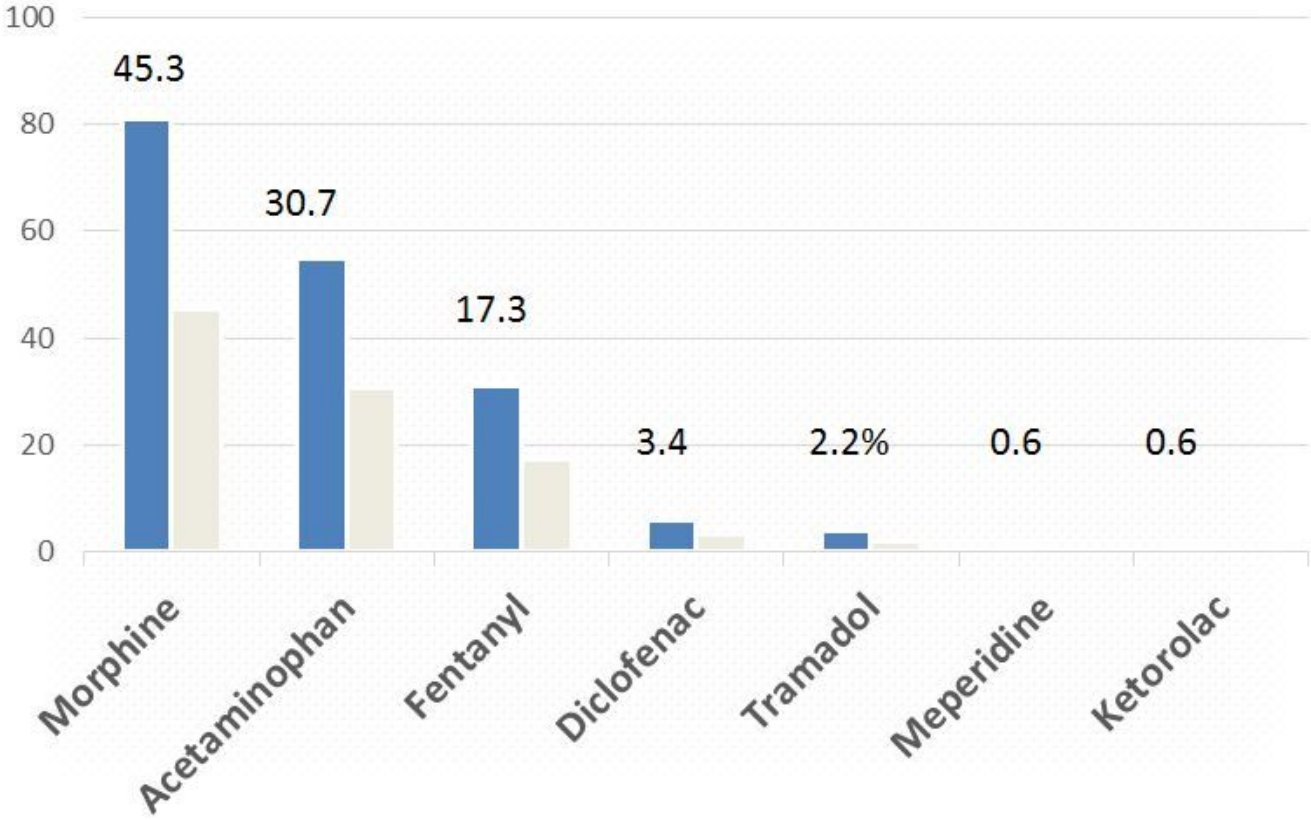

Figure 4

The drugs administrated by patients

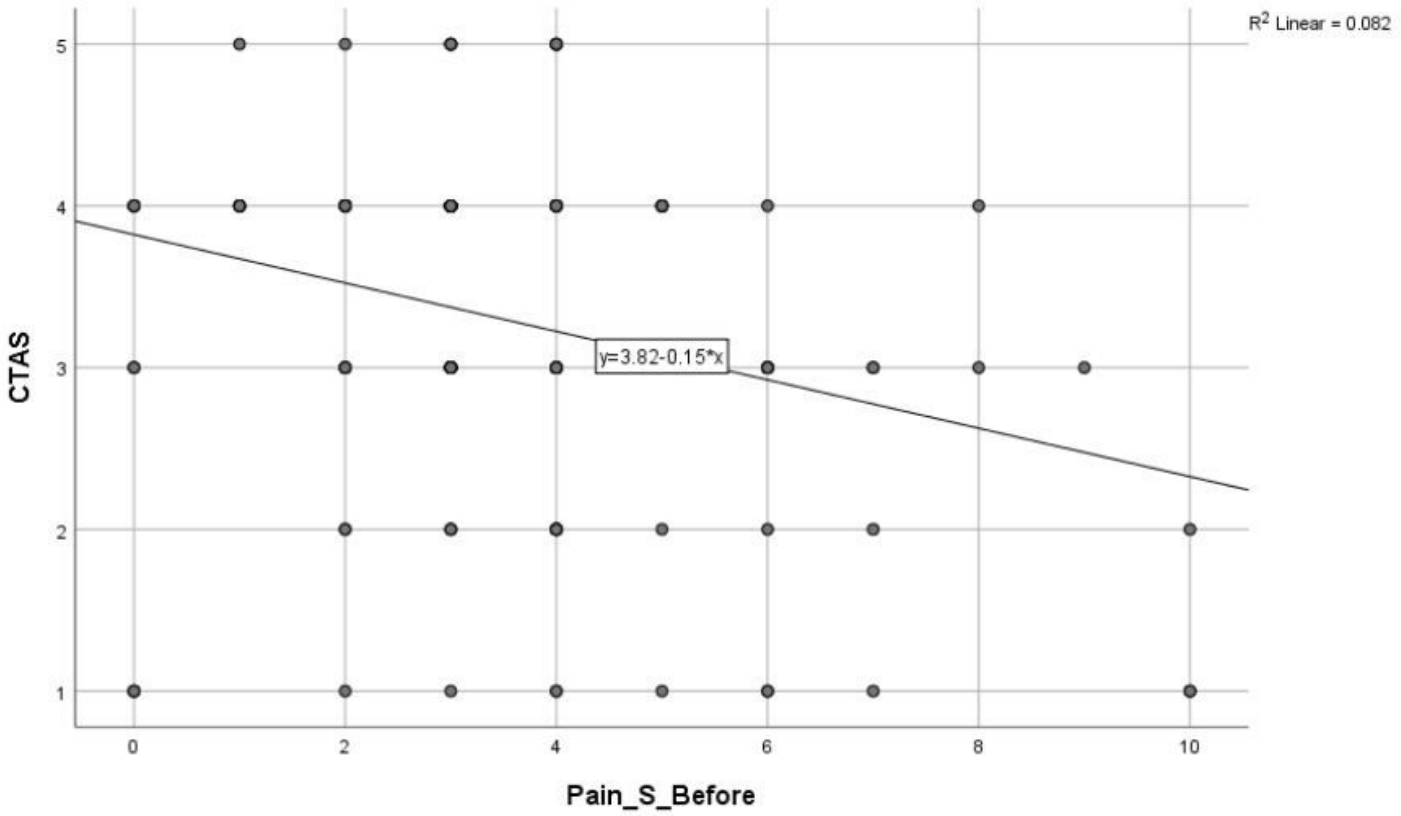

Figure 5

Correlation between initial pain score and C-TAS

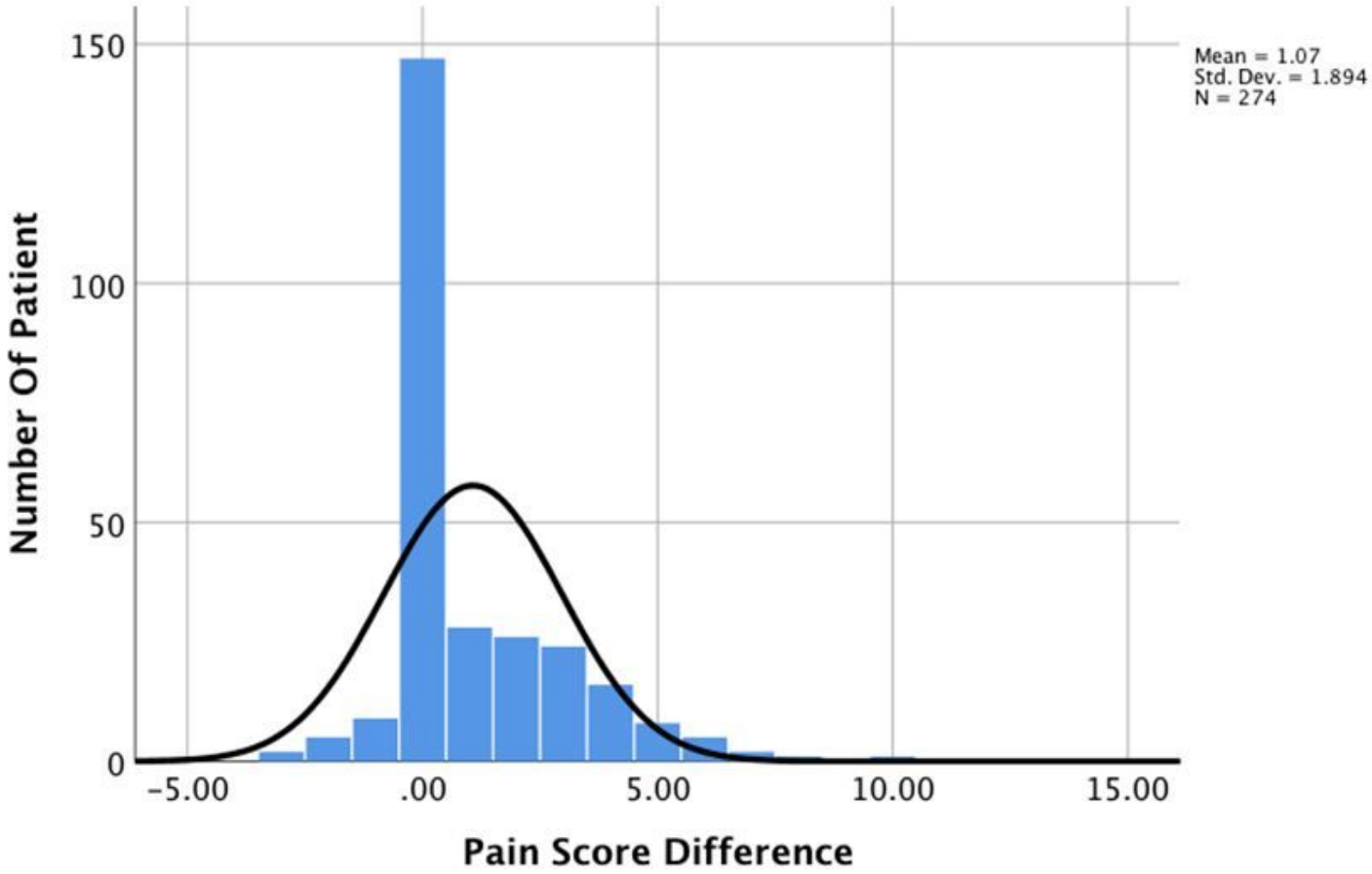

Figure 6

The improvement of pain score.

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