***Supplement***

1. **Materials and methods**

***1.1 Study design and randomization***

A four-arm (2x2 design) single-blind randomized controlled trial was conducted at daycare nursing wards on two locations of a Dutch general hospital. Patients were randomized to one of four groups (see Figure 1) using a random number generator (1:1:1:1 allocation rate) via sequentially numbered sealed envelopes, independently generated and opened by a secretary. For each group, daycare ward nurses manipulated their communication, while keeping their standard medical practice constant.

***1.2 Participants and recruitment***

Eligible patients were adult (>18 years) patients, scheduled for tonsillectomy in daycare, who could speak/understand Dutch and had no mental incapacity (as observed by the clinical team during the consultation) were informed about the study while discussing their operation with their ENT doctor, and during preoperative screening with the anesthesiology clinician. Interested patients were then contacted by the research team who explained the study in more detail and asked the patient to return the Informed Consent (IC) form. Following a protocol amendment to increase recruitment numbers, patients were given the opportunity during the pre-operation examination to provide consent. Patients already scheduled in for an operation at study start were contacted by the anesthesiology team to be informed about the study, before being contacted by the research team.

During the study, participants were excluded if they experienced a post-operative bleeding or for other urgent medical reasons (e.g. if patients were not discharged on the day of operation). Participants were free to withdraw their participation in the study. Data collected until drop-out was used, unless the patient objected to this.

***1.3 Analgesia protocol***

A standard peri-operative analgesia protocol was developed by the involved clinicians (led by MBG) and consisted of day 1: pre-operative paracetamol (1000 mg); peroperative metamizol (2 gr) and morphine (5-10 mg); postanaesthesia care unit (PACU) cold application and morphine titration (2.5 mg, bolus) until satisfactory pain relief combined with tramadol (300 mg), paracetamol (2600 mg) and ibuprofen (1800 mg) at the daycare ward. The advice for day 2-3 was: tramadol (300 mg), paracetamol (2600 mg) and ibuprofen (1800 mg).

***1.4 Intervention***

The intervention consisted of a protocolled communication manipulation on top of the standard analgesic treatment protocol and daily routine care of the hospital. The intervention was delivered during the patients’ stay at the daycare ward (pre- and post-operation, day 1) and during the telephone consultation between nurses and patients on the day post-discharge (day 2). One patient per room was included at any time point. All nurses were trained in the delivery of the intervention using a half-day training course and several booster-sessions. The research team was available onsite and offsite to provide assistance and feedback, information-posters were displayed in the communal spaces, and pocket cards with examples of the manipulations were available to enhance standardized delivery of the intervention (documents, including training videos, available upon request from the authors).

Despite manipulating communication, norms and values of acceptable behavior were not crossed. Nurse-patient interactions are often interrupted (e.g. by telephone calls, other clinicians), impacting time and attention spent to patients’ in pain([1](#_ENREF_1)). Variations in communication seem thus inherent to the clinical encounter, which was confirmed by field observations of the research team before study start. The training materials were tested in a pilot study to ensure they were realistic and not trespassing ethical boundaries, and finalized in collaboration with involved clinicians. More detailed information about the intervention and methods than displayed here can be found in the published study protocol([2](#_ENREF_2)).

*1.4.1 Expectancy manipulation*

In the standard condition no expectation that the pain medication would work very well was created, using sentences such as: “This is your pain medication”, “This is your medication” (without mentioning pain), “The medications attempt to reduce your pain ever so slightly”, or by given the pain medication in silence.

In the enhanced condition an expectation that the pain medication would work very well was created, using sentences such as: “The medications I am giving you now will lead to a strong decrease of your pain”, “This pain medication is known for working very well”, “With these medications your pain will decrease rapidly”, or “The medication you are receiving is a strong pain killer”([3-5](#_ENREF_3)).

*1.4.2 Empathy manipulation*

In the standard condition a standard (non)verbal empathic atmosphere was created, using behaviors like reacting with standard empathy to patients’ cues and concerns, keep standing when communicating, not exploring concerns in detail, not expressing extra interest in the patient as a person, not paying extra attention to not interrupting patients, and not making extra eye contact.

In the enhanced condition an extra warm and friendly atmosphere was created, using behaviors like proper introductions, sitting while communicating with patients, reacting extra empathically to patients’ verbal/nonverbal cues and concerns and taking their concerns seriously, showing extra interest in the patient as a person, not interrupting the patient, and making adequate eye contact([6-14](#_ENREF_6)).

*1.4.3 Standardization*

All other clinicians (i.e. from the Ear, Nose and Throat (ENT) and anesthesiology department, operation theater, and the Post-anesthesia care unit (PACU) were instructed to standardize their communication (via personal communication and information leaflets). This included not providing extra empathy or raising extra expectations about pain.

*1.4.4 Adherence*

All nurse-patient interactions were audio-recorded and evaluated by a research assistant to determine adherence to the protocol, and 10% of audio-recordings were independently rated by two coders (as comparably done by Kaptchuk et al([15](#_ENREF_15))). We originally planned to only code 10% of audio-recordings, but amended this to 100% in order to gather more thorough insight into the fidelity of the intervention.

***1.5 Blinding***

Patients were blind for specific study aims, but informed that the study focused on the effect of communication and that communication would be manipulated. At study end, they received a debriefing letter explaining the study aims and their treatment allocation. Involved health care professionals were not blinded, but either manipulated communication or standardized their communication. The research team analyzing the data was not blind to study allocation.

***1.6 Sample Size***

Sample size was based on of the primary outcome, i.e. patients’ perceived pain, using data from a previous study([3](#_ENREF_3)) in which an open versus hidden administration of analgesic showed a difference of 1.2 and a total variance of 2.18. Based on a power of .80 and alpha of .05, and including an interaction-effect (with a within variance of 1.92), this results in a needed sample size of 32 patients per arm and 4x32=128 patients in total.

***1.7 Outcomes***

*1.7.1 Background measures*

Pre-operation (via patient questionnaire) we measured the following background characteristics: sociodemographics (in case of missing data, this was assessed via the medical record) and functional health status (COOP-WONCA)([16](#_ENREF_16), [17](#_ENREF_17))). Moreover, patients’ i) general benefit/expectations/objections against medications (0-10 self-created Visual Analogue Scale (VAS), ‘not at all’-‘very much’); ii) general reporting of pain (0-10 self-created VAS, ‘never’-‘always’), and; iii) attitudes (dreading/anxiety) towards the operation (0-10 self-created VAS, ‘not at all’-‘very much’) were assessed as we hypothesized they might influence pain perceptions([18-20](#_ENREF_18)). Background characteristics of the participating nurses were assessed.

*1.7.2 Main outcome*

Perceived pain was assessed (0-10 Numeric Rating Scale (NRS), ‘no pain’-‘worst imaginable pain’([21](#_ENREF_21), [22](#_ENREF_22)) at several time-points. On day 1; pre-operatively at daycare ward, post-operatively at PACU, post-operatively at daycare ward (following routine care); Day 2: via telephone contact nurses, via patient questionnaire. Day 3: via patient questionnaire. Maximum levels of pain on day 1 and day 2 were used for all analyses (as comparably done by([23](#_ENREF_23))).

*1.7.3 Secondary outcomes*

*1.7.3.1 Pain related outcomes*

Patients’ post-operative pain expectations (0-10 self-created VAS, ‘no pain’-‘most intense pain imaginable’, adapted from([24](#_ENREF_24))), and pain improvement expectations following medication (0-10 self-created VAS, ‘0% improvement’-‘100% improvement’, adapted from the Credibility and Expectancy Questionnaire([25](#_ENREF_25))) were assessed at day 1, post-operatively. Analgesic dosage was assessed during hospital stay (medical record) and at day 2 and day 3 (patient questionnaire). Whether post-operative pain has been better or worse than expected (self-created 0-10 VAS, ‘much worse than expected’-‘much better than expected’, recoded into ‘much better than expected’-‘much worse than expected’ for all analyses) was assessed at day 3 (patient questionnaire).

*1.7.3.2 Psychological outcomes*

Anxiety (STAI-state([26](#_ENREF_26)), range 10-40), positive/negative mood (PANAS([27](#_ENREF_27)), 10-50) were assessed at baseline and day 3 (patient questionnaires). Cronbach’s alpha’s for the STAI at baseline and day 3 was .93 and .88, respectively. Reliability for the PANAS positive mood was .89 and .86, and for the negative mood .89 and .85, respectively. Difference scores between baseline and day 3 were used in all analyses. Satisfaction with provided care by day care nurses (0-10 self-created VAS, ‘not at all’-‘very much’) was assessed at day 3.

*1.7.4 Other outcomes*

An overall indication of the benefit of analgesia care (including pain, itch, nausea) (OBAS([28](#_ENREF_28)), range 0-28) was assessed at day 2 and 3 (patient questionnaire). Reliability was .59 and .68, respectively. Patients’ rated quality of provided hospital care and the likelihood of recommending this hospital to other tonsillectomy patients was assessed (using two adapted items of the Consumer Quality Index (CQ-index)([29](#_ENREF_29)), 0-10 scale) at day 3. Success of the manipulations – perceived empathy of nurses (adapted version of CARE([30](#_ENREF_30)), range 10-50) and perceived induced expectation of effectiveness pain medication by nurses (0-10 self-created VAS, ‘no effect at all’-‘a lot of effect’) – were assessed at day 3.

*1.7.5 Adherence to communication protocol*

For all audio-recordings a coding scheme was used to rate the occurrence of the (verbal) features of the manipulation to determine to which condition the audio-recording belonged to. For 10% of audio-recordings this was independently done by two raters. Interrater reliability of the conditions was 0.64 (Cohen’s kappa), which is considered good([31](#_ENREF_31), [32](#_ENREF_32)). Based on the audio-ratings of nurse-patient interactions, 82% of the expectancy- and 68% of the empathy-manipulations were successfully displayed. More specifically, standard expectancy (88%) and standard empathy (80%) were more successfully displayed than enhanced expectancy (77%) and enhanced empathy (56%). Overall, 56% of interactions were being rated as standard expectancies, and 62% as standard empathy.

***1.8 Statistical Analysis***

First, the four groups were checked on equality for background measures using χ2 tests or analyses of variance (ANOVA).

Second, for variables that differed between the groups their effects on patients’ maximum pain day 1 were assessed using regression analyses and t-tests. This included the effect of patients’ general benefit/expectations/objections, general reporting of pain, and attitudes towards the operation, as these variables might influence pain perceptions. Variables that influenced pain were entered as (centered) covariates in step four and further.

Third, the manipulation successes were determined.

Fourth, the effect of expectancy and empathy on patients’ pain scores (maximum pain day 1 and day 2, pain day 3) was determined. Using ANCOVA, main and interaction effects were assessed (interaction effects were eliminated from the model when not significant). We also assessed whether the received analgesia per day varied between the conditions (using ANOVA) to help interpret our findings.

Fifth, the effect of expectancy and empathy on patients’ secondary outcomes was determined. Using ANCOVA, main and interaction effects were assessed (interaction effects were eliminated from the model when not significant).

All data were analyzed using STATA 14.0 with two-sided significance testing at p<0.05 and using an intention to treat principle. If there was < 20% missing data on the questionnaires (STAI, PANAS, CARE, OBAS), these data were imputed with the mean of the remaining scores (as comparable done by([23](#_ENREF_23))). Multiple imputation was not used as data might not have been missed at random. All other missing data was not imputed and participant data was not included for those specific analyses.

**2. Results**

***2.1 Participant Flow***

We enrolled patients between August 2016 and April 2018. Of the 639 assessed patients, 128 were included and randomized. Attrition on day 1 (n=15) was due to post-operative bleeding and complications for which patients were not discharged on day 1. Pain scores were available and analyzed for 125 patients on day 1, 99 on day 2 and 76 on day 3. See Figure 2 for details.

***2.2 Background measures***

Patients’ background characteristics are displayed in Table 2. The four groups differed on marital status (p<0.01) and age (p=0.03). Nurses’ background characteristics are displayed in Table 3.

***2.3 Main outcome: pain***

Patients’ experienced levels of pain on day 1-3 are displayed in Table 4 for the different conditions. ANCOVA analyses (Table 1, Letter) showed no significant main and interaction effects of the manipulations on patients’ perceived pain. As also mentioned in the letter, nurses’ enhanced expression of pain medications’ effectiveness did not lower pain levels on day 1 (p=0.43), day 2 (p=0.96) nor day 3 (p=0.33). Nurses’ enhanced expression of empathy did not lower pain levels on day 1 (p=0.34), day 2 (p=0.57) nor day 3 (p=0.23). Interestingly, the covariate anxiety towards the operation kept an independent relation with pain throughout the days: day 1 (F=6.36, p=0.01), day 2 (F=8.81, p<0.01), and day 3 (F=11.89, p<0.01).

**3. References**

1. Manias E, Botti M, Bucknall T. Observation of pain assessment and management− the complexities of clinical practice. J Clin Nurg. 2002;11(6):724-733.

2. van Vliet LM, van Dulmen S, Thiel B, van Deelen GW, Immerzeel S, Godfried MB, et al. Examining the effects of enhanced provider-patient communication on postoperative tonsillectomy pain: protocol of a randomised controlled trial performed by nurses in daily clinical care. BMJ Open. 2017;7(11):e015505.

3. Benedetti F, Maggi G, Lopiano L, Lanotte M, Rainero I, Vighetti S, et al. Open versus hidden medical treatments: The patient's knowledge about a therapy affects the therapy outcome. Prevention & Treatment. 2003;6(1):1a.

4. Colloca L, Lopiano L, Lanotte M, Benedetti F. Overt versus covert treatment for pain, anxiety, and Parkinson's disease. Lancet Neurol. 2004;3(11):679-684.

5. Amanzio M, Pollo A, Maggi G, Benedetti F. Response variability to analgesics: a role for non-specific activation of endogenous opioids. PAIN. 2001;90(3):205-215.

6. Mazzi MA, Bensing J, Rimondini M, Fletcher I, van Vliet L, Zimmermann C, et al. How do lay people assess the quality of physicians’ communicative responses to patients’ emotional cues and concerns? An international multicentre study based on videotaped medical consultations. Patient Educ Couns. 2013;90(3):347-353.

7. Hillen M, de Haes H, Stalpers L, Klinkenbijl J, Eddes E, Butow P, et al. How can communication by oncologists enhance patients' trust? An experimental study. Ann Oncol. 2014;25(4):896-901.

8. Bensing JM, Deveugele M, Moretti F, Fletcher I, van Vliet L, Van Bogaert M, et al. How to make the medical consultation more successful from a patient's perspective? Tips for doctors and patients from lay people in the United Kingdom, Italy, Belgium and the Netherlands. Patient Educ Couns. 2011;84(3):287-293.

9. Marvel MK, Epstein RM, Flowers K, Beckman HB. Soliciting the patient's agenda: have we improved? JAMA. 1999;281(3):283-287.

10. Mast MS. On the importance of nonverbal communication in the physician–patient interaction. Patient Educ Couns. 2007;67(3):315-318.

11. Bensing J. Doctor-patient communication and the quality of care. Soc Scie Med. 1991;32(11):1301-1310.

12. Bensing JM, Kerssens JJ, van der Pasch M. Patient-directed gaze as a tool for discovering and handling psychosocial problems in general practice. J Nonverbal Behav. 1995;19(4):223-242.

13. Swayden KJ, Anderson KK, Connelly LM, Moran JS, McMahon JK, Arnold PM. Effect of sitting vs. standing on perception of provider time at bedside: a pilot study. Patient Educ Couns. 2012;86(2):166-171.

14. Strasser F, Palmer JL, Willey J, Shen L, Shin K, Sivesind D, et al. Impact of physician sitting versus standing during inpatient oncology consultations: patients' preference and perception of compassion and duration. A randomized controlled trial. J Pain Symptom Manage. 2005;29(5):489-497.

15. Kaptchuk TJ, Kelley JM, Conboy LA, Davis RB, Kerr CE, Jacobson EE, et al. Components of placebo effect: randomised controlled trial in patients with irritable bowel syndrome. BMJ. 2008;336(7651):999-1003.

16. Van Weel C. Functional status in primary care: COOP/WONCA charts. Disabil Rehabil. 1993;15(2):96-101.

17. Van Weel C, Konig-Zahn C, Touw-Otten F, van Duijn N, Meyboom-de Jong B. Measuring functional status with the COOP/WONCA Charts. A manual. Groningen, the Netherlands: Noordelijk Centrum voor GEzondheidsvraagstukken (NCG)/Northern Centre of Health Care Research (NCH), 2012.

18. Sommer M, Geurts JW, Stessel B, Kessels AG, Peters ML, Patijn J, et al. Prevalence and predictors of postoperative pain after ear, nose, and throat surgery. Arch Otolaryngol Head Neck Surg. 2009;135(2):124-130.

19. Gramke H-F, de Rijke JM, van Kleef M, Kessels AG, Peters ML, Sommer M, et al. Predictive factors of postoperative pain after day-case surgery. Clin J Pain. 2009;25(6):455-460.

20. Lunn TH, Gaarn-Larsen L, Kehlet H. Prediction of postoperative pain by preoperative pain response to heat stimulation in total knee arthroplasty. PAIN. 2013;154(9):1878-85.

21. Breivik H, Borchgrevink P, Allen S, Rosseland L, Romundstad L, Hals EB, et al. Assessment of pain. Br J Anaesth. 2008;101(1):17-24.

22. Dutch Association for Anaesthesiology. Guideline for postoperative pain [Richtlijn Postoperatieve pijn]. Utrecht, the Netherlands, 2012

23. Sipila RM, Haasio L, Meretoja TJ, Ripatti S, Estlander AM, Kalso EA. Does expecting more pain make it more intense? Factors associated with the first week pain trajectories after breast cancer surgery. PAIN. 2017;158(5):922-930.

24. Petersen GL, Finnerup NB, Grosen K, Pilegaard HK, Tracey I, Benedetti F, et al. Expectations and positive emotional feelings accompany reductions in ongoing and evoked neuropathic pain following placebo interventions. PAIN. 2014;155(12):2687-2698.

25. Devilly GJ, Borkovec TD. Psychometric properties of the credibility/expectancy questionnaire. J Behav Ther Exp Psychiatry. 2000;31(2):73-86.

26. Spielberger CD, Gorsuch RL, Lushene R, et al. State-trait anxiety inventory for adults: sampler set: manual, test, scoring key. Palo Alto, CA: Mind Garden Consulting Psychologists Press, 1983.

27. Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: the PANAS scales. J Pers Soc Psychol. 1988;54(6):1063-1070.

28. Lehmann N, Joshi G, Dirkmann D, Weiss M, Gulur P, Peters J, et al. Development and longitudinal validation of the overall benefit of analgesia score: a simple multi-dimensional quality assessment instrument. Br J Anaesth. 2010;105(4):511-518.

29. van Kessel P, Hendriks M, van der Hoek L, et al. CQ Index Chronisch Hartfalen. Ontwikkeling van de vragenlijst en de ervaringen van mensen met chronisch hartfalen met de ziekenhuiszorg[CQ Index Chronic heart failure. Development of the questionnaire and the experiences of chronic heart failure patients with hospital care]. Utrecht, the Netherlands: NIVEL, 2015

30. Mercer SW, Maxwell M, Heaney D, Watt GC. The consultation and relational empathy (CARE) measure: development and preliminary validation and reliability of an empathy-based consultation process measure. Fam Pract.. 2004;21(6):699-705.

31. Sim J, Wright CC. The kappa statistic in reliability studies: use, interpretation, and sample size requirements. Phys Ther. 2005;85(3):257-268.

32. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics. 1977:159-174

**Figures**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Expectancy** | |
|  |  | enhanced | Standard |
| **Empathy** | enhanced | Group 1 | Group 2 |
|  | standard | Group 3 | Group 4 |

Figure 1 - Study design



Fig. 2. Flowchart

**Tables**

**Table 2 – Background characteristics participants**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Completed by nr of patients** | **Total**  **(n=128)** | **Expectations +**  **Empathy +**  **(n=32)** | **Expectations –Empathy +**  **(n=32)** | **Expectations + Empathy - (n=32)** | **Expectations - Empathy - (n=32)** |  |
|  |  | M (SD) | M (SD) | M (SD) | M (SD) | M (SD) | p |
| **Age** | 128 | 28.01 (7.44) | 28.69 (6.30) | 30.91 (9.98) | 26.34 (6.42) | 26.09 (5.49) | **0.03 (F(3,124)=3.10)** |
| **Health status 1** | 112 | 13.69 (5.07) | 14.00 (5.14) | 13.13 (4.62) | 13.07 (4.68) | 14.56 (5.85) | 0.64 (F(3,108)=0.57) |
| **General benefit from medications2** | 106 | 6.39 (2.68) | 6.47 (3.33) | 6.66 (1.94) | 6.63 (2.89) | 5.84 (2.49) | 0.64 (F(3,102)=0.56) |
| **General positive expectations of effect medications** 2 | 106 | 7.04 (1.93) | 7.04 (2.60) | 6.80 (2.09) | 7.15 (1.63) | 7.13 (1.42) | 0.91 (F(3,102)=0.19) |
| **General objections against taking medications** 2 | 106 | 2.99 (2.63) | 3.14 (2.38) | 2.99 (2.55) | 2.76 (2.69) | 3.10 (2.93) | 0.95 (F(3,102)=0.11) |
| **General inclination to report pain3** | 106 | 6.31 (2.38) | 6.66 (2.06) | 5.97 (2.81) | 6.66 (2.07) | 5.97 (2.52) | 0.53 (F(3,102)=0.73) |
| **Attitude: dreading of operation2** | 105 | 5.03 (3.03) | 5.54 (3.32) | 5.40 (3.10) | 4.73 (3.13) | 4.58 (2.64) | 0.59 (F(3,101)=0.64) |
| **Attitude: Afraid of operation2** | 105 | 3.98 (3.03) | 3.93 (3.53) | 4.17 (2.96) | 4.22 (2.79) | 3.60 (3.03) | 0.88 (F(3,101)=0.23) |
|  |  |  |  |  |  |  |  |
|  |  | N (%) | N (%) | N (%) | N (%) | N (%) |  |
| **Marital status** | 112 |  |  |  |  |  | **<0.01 (X=12.55)** |
| Married |  | 16 (14) | 8 (30) | 6 (23) | 1 (3) | 1 (3) |  |
| Single (incl divorced, widowed) |  | 96 (86) | 19 (70) | 20 (77) | 29 (97) | 28 (97) |  |
| **Gender** | 128 |  |  |  |  |  | 0.49 (X=2.41) |
| Male |  | 42 (33) | 8 (25) | 13 (41) | 9 (28) | 12 (38) |  |
| Female |  | 86 (67) | 24 (75) | 19 (59) | 23 (72) | 20 (63) |  |
| **Highest Education4** | 112 |  |  |  |  |  | 0.21 (X=8.37) |
| Low |  | - | - | - | - | - |  |
| Intermediate-1 |  | 9 (8) | 1 (4) | 1 (4) | 4 (13) | 3 (10) |  |
| Intermediate-2 |  | 33 (29) | 7 (26) | 5 (19) | 13 (43) | 8 (28) |  |
| High |  | 70 (63) | 19 (70) | 20 (77) | 13 (43) | 18 (62) |  |
| **Occupation** | 111 |  |  |  |  |  | 0.84 (X=0.84) |
| Paid job |  | 77 (69) | 19 (70) | 19 (76) | 20 (67) | 19 (66) |  |
| No paid job (incl unemployed, housewife, student) |  | 34 (31) | 8 (30) | 6 (24) | 10 (33) | 10 (34) |  |
| **Ethnicity** | 112 |  |  |  |  |  | 0.49 (X=5.43) |
| Dutch |  | 69 (62) | 19 (70) | 13 (50) | 18 (60) | 19 (66) |  |
| Western Immigrants |  | 10 (9) | 3 (11) | 4 (15) | 1 (3) | 2 (7) |  |
| Non-Western Immigrant |  | 33 (29) | 5 (19) | 9 (35) | 11 (37) | 8 (28) |  |

¹ *Scores range from 7-35 (higher is poorer)*

*2 Score range from 0-10 (ranging from not at all to very much)  
3 Score range from 0-10 (ranging from never to always)*

*4.Low = primary education or less*

*Intermediate-1 = lower secondary*

*Intermediate-2 = upper secondary*

*High = tertiary*

Please note, due to rounding, nog all percentages add up to 100

**Table 3 – background characteristics nurses**

|  |  |
| --- | --- |
|  | **N=23** |
|  | M (SD) |
| **Age** | 47.83 (11.05) |
|  | N (%) |
| **Gender** |  |
| Male | 2 (9) |
| Female | 21 (91) |
| **Type of nurse** |  |
| Regular nurse | 16 (70) |
| Specialised nurse (e.g. children, dialysis, pain assistant) | 7 (30) |

**Table 4 Description of outcomes within the four conditions**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | **Completed by number of patients** | | | **Expectancy +**  **Empathy +**  **(n=32)** | **Expectancy - Empathy +**  **(n=32)** | **Expectancy +**  **Empathy –**  **(n=32)** | **Expectancy -Empathy –**  **(n=32)** |
|  | | |  | | | M (SD) | M (SD) | M (SD) | M (SD) |
| **Pain primary** | | |  | | |  |  |  |  |
| Max pain day 1¹ | | | 125 | | | 4.77 (1.91) | 5.06 (1.54) | 4.50 (1.93) | 4.47 (1.93) |
| Max pain day 2¹ | | | 99 | | | 5.04 (1.86) | 4.85 (1.91) | 4.86 (1.78) | 5.04 (2.08) |
| Pain day 3¹ | | | 76 | | | 5.00 (2.00) | 5.53 (1.84) | 5.21 (1.78) | 5.61 (2.17) |
| **Pain secondary** | | |  | | |  |  |  |  |
| Pain expectation day 1¹ | | | 104 | | | 5.97 (1.06) | 5.76 (1.81)) | 6.41 (1.96 | 6.07 (1.76) |
| Pain improvement expectation day 12 | | | 103 | | | 71.64 (14.95) | 64.38 (18.09) | 68.57 (15.67) | 63.48 (21.63) |
| Pain evaluation day 33 | | | 76 | | | 4.63 (2.13) | 5.36 (2.46) | 3.76 (1.57) | 5.28 (2.35) |
| **Psychological** | | |  | | |  |  |  |  |
| Anxiety4 | | | 64 | | | -1.63 (7.97) | -2.6 (6.74) | -0.64 (6.66) | 2.8 (6.27) |
| Positive mood4 | | | 62 | | | -8.60 (7.05) | -8.4 (9.26) | -8.96 (6.34) | -9.07 (8.05) |
| Negative mood4 | | | 62 | | | -0.2 (8.28) | -3.00 (7.90) | -0.94 (5.47) | -2.00(6.48) |
| Satisfaction5 | | | 71 | | | 8.44 (1.68) | 8.52 (0.93) | 8.63 (1.27) | 7.90 (2.23) |
| **Other outcomes** | | |  | | |  |  |  |  |
| OBAS day 26 | | | 84 | | | 8.85 (4.83) | 8.50 (4.29) | 7.67 (3.48) | 8.83 (4.31) |
| OBAS day 36 | | | 76 | | | 8.36 (3.92) | 8.59 (4.17) | 5.68 (4.36) | 8.61 (4.02) |
| General quality1 | 68 | | | 8.74 (0.99) | | | 8.33 (0.98) | 8.79 (1.03) | 8.20 (1.26) |
| Recommendation1 | | 68 | | | 8.58 (1.39) | | 8.27 (1.28) | 9.00 (1.15) | 8.13 (1.55) |

*All analyses were controlled for (centered) effects of anxiety towards the operation*¹ *Scores range from 0-10 (ranging from low to high).*2 *Scores range from 0-100 (ranging from low to high).*

*3Score range from 0-10 (ranging from better to worse)*

*4Difference score (pre and post hospitalization)*

*5Score range from 0-10 (ranging from not at all to very much)*

*6Score ranged from 0-28 (ranging from high to low benefit)*

**Table 5– Pain medication within the four conditions**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Number of patients reported receiving med** | **Expectations +**  **Empathy + (n=32)** | **Expectations – Empathy +**  **(n=32)** | **Expectations + Empathy - (n=32)** | **Expectations -**  **Empathy - (n=32)** |  |
|  |  | M  (SD) | M  (SD) | M   (SD) | M (SD) | p |
| **Day 1  - Perioperative** |  |  |  |  |  |  |
| Morphine | 118 | 7.80 (4.26) | 7.77 (4.48) | 8.88 (3.32) | 8.44 (4.48) | 0.66 (F=0.53) |
| Paracetamol | 127 | 1000.00 (254.00) | 1031.25 (176.78) | 1031.25 (176.78) | 1062.50 (245.93) | 0.72 (F=0.44) |
| Ibuprofen | 4 | - | 18.75 (106.01) | 18.75 (106.01) | 37.5 (147.56) | 0.57 (F=0.68) |
| Metamizol | 116 | 1750.00 (567.96) | 1781.25 (608.24) | 1625.00 (793.12) | 1906.25 (390.15) | 0.33 (F=1.16) |
| **Pain protocol deviations peri-operative** | |  |  |  |  |  |
| Naproxen | 2 | - | 15.63 (88.39) | - | 15.63 (88.39) |  |
| Diclofenac | 1 | 2.34 (13.26) | - | - | - |  |
| **Day 1 – post-operative daycare** | |  |  |  |  |  |
| Tramadol | 91 | 57.81 (36.72) | 63.28 (37.02) | 46.88 (35.64) | 46.09 (36.54) | 0.17 (F=1.71) |
| Paracetamol | 91 | 487.50 (330.20) | 570.31 (352.15) | 437.50 (377.33) | 510.94 (427.81) | 0.56 (F=0.70) |
| Ibuprofen | 60 | 318.75 (304.20) | 262.50 (338.64) | 318.75 (340.24) | 262.50 (302.41) | 0.33 (F=0.81) |
| **Pain protocol deviations post-operative** | |  |  |  |  |  |
| Naproxen | 3 | - | - | 15.63 (88.39) | 31.25 (122.97) |  |
| Oxycodon | 3 | - | 0.47 (2.65) | 0.16 (0.88) | 0.16 (0.88) |  |
| **Day 2** |  |  |  |  |  |  |
| Tramadol | 69 | 284.21 (81.31) | 251.79 (64.02) | 219.23 (92.93) | 222.66 (103.80) | >0.10 (F=2.15) |
| Paracetamol | 72 | 2561.90 (631.84) | 2358.33 (695.22) | 2192.86 (984.22) | 2292.19 (930.00) | 0.56 (F=0.69) |
| Ibuprofen | 61 | 1750.00 (464.76) | 1482.35 (565.95) | 1714.29 (616.26) | 1928.57 (1083.04) | 0.38 (F=1.05) |
| **Pain protocol deviations day 2** | |  |  |  |  |  |
| Diclofenac | 1 | - | - | - | 50.00 |  |
| Oxycodon | 1 | 5.00 | - | - | - |  |
| **Day 3** |  |  |  |  |  |  |
| Tramadol | 55 | 275.00 (67.48) | 266.07 (71.80) | 252.27 (100.75) | 217.50 (82.89) | 0.23 (F=1.48) |
| Paracetamol | 59 | 2430.56 (576.79) | 2396.43 (694.61) | 2545.83 (932.06) | 1885.00 (718.37) | **0.08 (F=2.39)** |
| Ibuprofen | 53 | 1569.23 (303.82) | 1909.09 (1059.67) | 1671.43 (347.36) | 1480.00 (549.29) | 0.34 (F=1.13) |
| **Pain protocol deviations day 3** | |  |  |  |  |  |
| Diclofenac | 1 | - | 150.00 | - | - |  |

*All measurements are in mg units*