

The Markers of Constipation in Palliative Care Cancer Patients: A Multicenter Cohort Study

Tomasz Dzierżanowski (✉ tomasz@adiutus.pl)

Laboratory of Palliative Medicine, Department of Social Medicine and Public Health, Medical University of Warsaw, Poland

Research article

Keywords: constipation, palliative care, cancer, laxatives

Posted Date: April 1st, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-20306/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background

There is no widely approved definition of constipation in palliative care, and short life expectancy allows only for a short time of observation before diagnosis. Apart from the patient's subjective perception, it should include the objective (measurable) symptoms, as a significant portion of patients is unable to express their subjective assessment. The aim of this study was to verify what is the correlation between the objective and subjective symptoms of constipation and what values are diagnostic to constipation in adult palliative care cancer patients.

Methods

A multicenter cohort study was performed.

Results

547 adult cancer patients were routinely assessed by physicians in 12 in-patient, home, and ambulatory palliative care centers. 369 patients met the inclusion criteria. The time since the last spontaneous bowel movements and their frequency were correlated with the subjective measures: the difficulty of defecation, the Bowel Function Index, and the necessity to use laxatives. The difficulty of defecation was moderate to the extreme when the time since the last spontaneous bowel movements was ≥ 2 days or a frequency of spontaneous bowel movements was < 4 per week.

Conclusions

Constipation should be diagnosed optimally based on a combination of objective and subjective metrics. At least one of the diagnostic markers should be present: the difficulty of defecation of ≥ 2 in [0-4] scale (moderately difficult to extremely difficult); the necessity of laxatives to induce bowel movements; time since the last spontaneous bowel movements ≥ 2 days; frequency of spontaneous bowel movements < 4 per week.

Background

The prevalence rate of constipation varies from 40% to 90% of palliative care patients [1]. This range is even broader, as it is highly dependent on the definition of constipation, its objective and subjective metrics, and the discriminating cut-off values used [2–4]. The problem with the definition of constipation comes down to two aspects: 1) objective (measurable) symptoms, such as the frequency of defecation, and 2) the patient's subjective perception, which reflects the level of their discomfort and changes in bowel movements (BM) pattern. In one multi-center study, constipation varied even 6-fold, from 7%, if diagnosed medically only, to 43%, when patient's reporting was also considered [2]. In other research studies, constipation was diagnosed as a judgment of a clinician, without specific diagnostic criteria, or diagnosed without its clear definition. Definitions used in research are diverse and incompatible with each

other [4]. Apart from that, 50% of patients understand constipation in a different way from their physicians, and the physician ought to ensure that this misunderstanding is avoided [5, 6].

In one study, 42.4% of patients at the time of referral to palliative care had disturbed bowel scores over zero value in a numeric rating scale (NRS) [0-10] [7]. The values 1-3 usually refer to constipation of mild intensity [8]. However, not all deviations from zero may automatically mean constipation, particularly if the scale is based on unidimensional judgment. It is necessary to find a discriminating cut-off value. Otherwise, constipation would be overdiagnosed. For instance, the Bowel Function Index [0-100] (BFI) discriminates constipated from non-constipated patients at ≥ 28.8 value with 95% confidence [9]. With this cut-off value, constipation was diagnosed in 66.3% of patients at admission [3].

Any deviation, even mild, from the patient's normal pattern of bowel movements, may lead to but does not necessarily mean constipation. Constipation is difficult to treat in palliative care patients, and once it develops, it deteriorates health-related quality of life and the effectiveness of symptomatic therapy and is associated with incremental costs, and that is why if the intensity of the patient-reported perception of the symptom is moderate or higher, a diagnosis is sure, and a clinician should undertake appropriate measures [10, 11].

There is no widely accepted definition of constipation in palliative care patients despite its high prevalence. The review of the definitions of constipation used in the research revealed that there is no single set of diagnostic criteria, and different combinations of patient-reported and objective measures were identified instead [4]. What's more, only one out of 20 identified definitions of constipation in that review included a patient's self-assessment as the main reason to diagnose constipation, which stands in contrast with the subjective nature of the symptom [4]. Bearing in mind that quality of life is the main aim of palliative care, the patient-reported assessment should be superior to the frequency of bowel movements, or at least equally important, as it reflects a patient's health-related quality of life.

Opioid-induced constipation (OIC) is a frequent problem in palliative care. The Rome Criteria IV definition of OIC was not validated among the palliative care patients and might be used only in patients with a long expectancy of life, as it requires the observation of several acts of defecation [12]. Most of the definitions of constipation used in palliative care refer to a reasonably shorter period of observation (7 or 14 days).

Taking all the above into consideration, there is a need for some tangible metrics that would be helpful in the decision-making process on laxative intervention or augmentation of preventive measures. The tool should be easy to use, fast, based on short history (i.e., recent 7 days), and include a patient's assessment if possible, as to allow for a quick clinical reaction. Not only the diagnosis of constipation but also the severity of its symptoms should be comprised.

A significant portion of palliative care patients (e.g., dementia, low consciousness) are unable to express their subjective assessment, and thus in such cases, only objective criteria can be assessed by a care-provider. However, they do not express the real patient's suffering. The knowledge of both at which

frequency of BM and at what intensity of the difficulty of defecation would give a clear guide on whether to intensify the laxative management.

This study aims to verify the following clinical questions:

1. In adult palliative care cancer patients, what is the correlation between the objective criteria of constipation (frequency of SBM, days since the last SBM) and the patient-reported assessment of constipation (difficulty of defecation, the necessity of laxatives)?
2. What values of the objective criteria are diagnostic to constipation defined as moderately to severely disturbed ease of defecation in adult palliative care cancer patients?

Methods

Data

The data come from two multi-center observational cohort studies that were performed in adult palliative care patients in 2010-11 (Study 1) [13] and 2018-19 (Study 2) [14]. The same structured questionnaire and the same methodology of data collection were used in both studies to allow for combined analysis and attain a balanced representation of in-patient and out-patient patients.

The questionnaires in both studies included the same items:

1. Demographic data.
2. ECOG performance status.
3. Bowel symptoms in the last 7 days; assessed by a patient with the aid of a caregiver:
 - a. days since the last defecation [days],
 - b. the frequency of spontaneous bowel movements (SBM) [days with SBM],
 - c. the difficulty of defecation (or disturbed ease of defecation) in [0-4] scale, where 0 – no difficulty (“normal defecation”), 1 – mild (“rather normal”), 2 – moderate, 3 – significant/often, 4 – extreme difficulty/always (assessed by a patient only),
 - d. too small stools in [0-4] scale, where 0 – normal stools, 1 – from time to time (mild intensity), 2 – quite often (moderate intensity), 3 – very often, 4 – always,
 - e. too hard stools in [0-4] scale (see above),
 - f. the feeling of incomplete bowel movement in [0-4] scale, where 0 – no symptom, 1 – mild intensity/sometimes, 2 – moderate intensity/quite often, 3 – significant intensity/very often, 4 – extreme intensity/always (assessed by a patient only),
 - g. straining or squeezing to try to pass bowel movements, in [0-4] scale (see above),
 - h. the necessity of laxatives use in [0-4] scale, where 0 – no laxatives used, 1 – from time to time (occasionally), 2 – often used, 3 – the bowel movements only after the use of regular laxatives, 4 – the bowel movements only after the enema or manual stool evacuation,

- i. The modified BFI [9] and PAC-SYM [15] questionnaires – only in Study 1. The modified BFI consists of three questions assessed in [0-10] scale:
 1. ease of defecation (0 = easy/no difficulty; 10 = severe difficulty),
 2. feeling of incomplete bowel evacuation (0 = not at all; 100 = very strong),
 3. personal judgement of patient regarding constipation (0 = not at all; 10 = very strong) during the last seven days according to the patient's assessment. The modified PAC-SYM tool consists of 12 symptoms (Figure 1) assessed in [0-4 scale].
5. The medications used in the last 7 days.

For any symptom/metrics, an intensity value of ≥ 2 (moderate or higher) was regarded as pathognomonic (diagnostic).

Eligibility criteria

For the analysis there were qualified palliative care patients aged ≥ 18 years with malignancy, excluding colostomy, diarrhea, bowel obstruction, and the use of prokinetics or peripherally acting mu-opioid receptor antagonists used before or during the observation period.

Statistical analysis

Frequency analysis was performed using the Chi-square exact test. For non-parametric data, the Mann-Whitney U test was applied. The correlation between non-parametric (ordinal numeric) measures was tested with Spearman's rank coefficient. P values less than 0.05 were considered statistically significant. Whenever possible, the exact P-value has been presented.

The analysis was performed in Statistica 13.3 (TIBCO Software Inc.).

Results

Structured data sets were collected from 547 patients (286 from Study 1 and 261 from Study 2) in 12 centers across Poland. 369 patients were eligible for further analysis.

Demographics

The demographic data are presented in Table 1. The mean age was 68 years (range 26-94), with equal representation of men and women. 42% were hospice, 31% - home care, and 26% - ambulatory patients. Most of them (80%) had non-gastrointestinal (most common: lung 25.7%, breast 11.4%, prostate 7.6%), 6.5% – colorectal, and 12% – other gastrointestinal cancer diagnosed.

The study groups did not differ from each other regarding age, sex, and primary site of the tumor. In Study 1, most of the patients were in-patient, while in Study 2, most were home care patients, which catered for a balanced representation of these subpopulations. Patients in in-patient hospices were

statistically in worse performance status than those at-home care or in palliative ambulatory patients ($p < 0.05$).

There was a positive correlation between ECOG performance status and age. The older the patient, the worse status was.

61% of all patients received strong opioids, and the mean oral morphine equivalent of opioids (OME) was 99 mg/day. The differences between the study groups were statistically significant. 56% of patients in Study 1 received strong opioids, and the mean OME was 87 mg/day (median 60), while 71% of patients in Study 2 were treated with opioids, and the mean OME was 113 mg/day (median 95), $p = 0.004$.

Diet modification to ease bowel movements was implemented in approximately 45% of patients. The same proportion of patients had used oral laxatives in the last seven days. 29% used suppositories (bisacodyl, glycerol, or both). Referring to interventional procedures, 12% of patients received an enema, and in 5% of patients, manual stool evacuation was performed.

The symptoms of constipation

Figure 1 presents the mean values of symptoms of constipation, with the twelve items composing the PAC-SYM tool. Some items, like cramps, rectal burning, or rectal bleeding, were reported relatively rarely. On the other hand, incomplete BM, too hard or too small stools, and straining are frequently observed by patients.

The frequency of SBM was negatively correlated with ECOG. The worse the performance status, the less frequency of SBM was observed ($p < 0.05$).

The correlation between the objective criteria of constipation and the patient's assessment of constipation

The two objective measures: the last SBM and frequency of SBM, and the two patient-reported measures: the difficulty of defecation and BFI, were well correlated positively or negatively with each other ($p < 0.05$) with logical direction (Table 2). The higher frequency of SBM, the less difficult defecation, and lower BFI were. On the opposite, the more days from the last SBM, the more difficult defecation and higher BFI were. The patient-reported criteria, i.e., the difficulty of defecation and BFI, were correlated with each other, with Spearman's rank coefficient $r = 0.94$ ($p < 0.05$). Their relation is linear. The mild difficulty of defecation (the mean score 1 in [0-4] scale) corresponds to the mean BFI 2 in [0-10] scale, and moderate (the mean score 2) corresponds to the mean BFI 4.5.

The cut-offs for objective criteria for moderate to the severe difficulty of defecation

There is a linear relationship between the difficulty of defecation and mean frequency of SBM, days since last SBM, and the necessity of laxatives (Figure 2). On average, patients assessed the difficulty of defecation as moderately disturbed when the time since the last SBM was 2 days. A frequency of SBM 3

per week was associated with the mild to moderate difficulty of defecation, and if it was <3 per week, the difficulty of defecation became severe (mean > 2.71 (95% CI 2.62-2.81)).

Any necessity of laxatives was associated with the worsening of ease of defecation. When laxatives were used often (2 in [0-4] scale), the difficulty of defecation ranged from moderate to significant.

Opioid-induced constipation

There were no statistically significant differences for any results between subgroups of patients treated with opioid analgesics and not taking the opioids.

Discussion

Main findings/results of the study

The study was performed in 12 centers in all forms of palliative care: out-patient palliative clinics, home care, and in-patient hospices. Thus, a balanced representation of end-stage cancer patients regarding sex, age, primary tumor diagnosis, and performance status was attained. After scrupulous data quality checks, 178 (33%) cases were withdrawn.

In both study groups, patients were treated with laxatives in a similar way. What is interesting, in Study 2, which was conducted roughly eight years later than Study 1, more patients (71% vs. 56%) were treated with strong opioids, and the mean dose was higher. This likely reflects the tendency of improving access to opioid analgesics in Poland [16].

The main finding of this study is that patient-reported and objective criteria of constipation are highly correlated with each other and equally indicate constipation. In our opinion, subjective judgment (i.e., the difficulty of defecation, BFI) is more important than the objective metrics (frequency of SBM, days since the last defecation), as they impact a patient's quality of life. However, in patients with dementia or impaired ability to communicate, patient-reported symptoms cannot be attained. In such cases, the only way is to base decisions on objective criteria, such as frequency of SBM or days from the last defecation. Moderate difficulty of bowel movements appears when the frequency of SBM is <4 per week. However, if the mean frequency of SBM was <3 per week, it was associated with the severe difficulty of defecation. Thus, it suggests that constipation should be diagnosed at the frequency of SBM of 3 per week.

Constipation should also be diagnosed if 2 days have passed since the last SBM and if the pattern of bowel movements changed.

With the assumption that the intensity of a symptom of constipation scored 2 (moderate) or higher is diagnostic, a clinician should diagnose constipation and implement appropriate modifications of the laxative management in any of the following cases:

1. the difficulty of defecation of ≥ 2 in [0-4] scale (moderate to extreme),

2. any use of laxatives reported by a patient as necessary to induce bowel movements,
3. last SBM ≥ 2 days,
4. frequency of SBM ≤ 3 per week.

All the PAC-SYM items correlated well with the frequency of SBM, last SBM, and difficulty of defecation, although some of them seem to be more important. It is not feasible to use complex tools like PAC-SYM on a daily basis. However, such symptoms like incomplete BM, too hard stools, too small stools, and straining should be asked about during the examination.

Study 1 aimed to validate the Bowel Function Index to the Polish language, but a simple validation failed at the translation phase. The questions on the difficulty of defecation and the patient's personal judgment of constipation were perceived in Polish translation as very similar and difficult to distinguish. The other problem was with the translation of "ease of defecation" as more natural to the Polish language is "difficulty of defecation" [13]. In the light of that fact and the results of this study, a simple question on the difficulty of defecation alone seems sufficient for the assessment of subjective aspects of constipation and equally effective to BFI with high certainty. Another observation during a pilot phase of Study 1 was that the numeric analog scale [0-100] for BFI was too difficult to understand for many patients. Simplifying it to a numeric rating scale [0-10] improved their ability to respond, which was reported in other review papers as well [17]. In conclusion, simpler Likert-style scales, like [0-4] with definitions assigned to the numbers (i.e., 0 – no symptom, 1 – mild, 2 – moderate, 3 – severe/often, 4 – extreme/always) should be used in everyday practice. And such an approach was applied in further research and in this study. Apart from that, I believe that the metrics used in research should be easy to use, repetitive, and useful in daily practice. Both PAC-SYM and BFI appeared too complex or too time-consuming for practitioners involved in the study, and none of the assessing physicians continued using these on a regular basis after the study.

Strengths and weaknesses/limitations of the study

The strength of this study is a large number of patients and a balanced representation of in-patient, home, and ambulatory palliative care patients, which allowed for statistically significant conclusions. The assessing physicians did not participate in research, and all questionnaires were filled-in as a part of a clinician's job, so the potential bias is negligible. The failure in the validation of BFI should also be regarded as a limitation of the study, although it revealed the real importance of its particular elements. The ECOG scale for the assessment of general status was used instead of a more precise one, i.e., Palliative Performance Status, or Karnofsky Score, but they are not validated for the Polish language yet.

Conclusions

A definition of constipation in palliative care should consist of both objective and patient-reported measures, based on a reasonably short period of observation, i.e., 7 days; however, if at least one of them reaches or overpasses the cut-off value, constipation should be diagnosed, and the laxative treatment

modified. An algorithm for the diagnosis of constipation in palliative care patients for further validation is presented in Figure 3.

Declarations

Funding

The study was performed without external funding.

Conflict of interest/Competing interests

The Author declares that there is no conflict of interests.

Ethics approval

The Ethical Committee of the Maria Skłodowska-Curie Institute – Oncology Center in Warsaw (84/2009) and the Ethical Committee of the Medical University in Lodz (RNN/280/18/KE).

Consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and material

Combined data in .csf or .xlsx files can be obtained upon direct request to the corresponding author for verification process or academic purposes.

Code availability

Statistica 13.3 (TIBCO Software Inc.)

Authors contribution

Not applicable (Tomasz Dzierzanowski is the only author who planned and conducted the studies, calculated statistics, reviewed references, and formulated the conclusions.)

Acknowledgments

The author thanks to Dr. Magdalena Badian, Dr. Edyta Białach, Dr. Maria Ciok-Chachaj, Dr. Anna Ciszewska, Dr. Aleksandra Drechna-Musiałowicz, Dr. Marta Klimek-Lewandowska, Mrs. Katarzyna Łuniewska, Dr. Dariusz Myrcik, Dr. Andrzej Stachowiak, Dr. Marta Szostakiewicz, Dr. Katarzyna Tomczuk, Dr. Ewelina Zasik-Zarzycka for their effort in collecting data.

References

1. Larkin PJ, Cherny NI, La Carpia D, et al (2018) Diagnosis, assessment and management of constipation in advanced cancer: ESMO Clinical Practice Guidelines†. *Ann Oncol* 29:iv111–iv125. <https://doi.org/10.1093/annonc/mdy148>
2. Erichsén E, Milberg A, Jaarsma T, Friedrichsen MJ (2015) Constipation in Specialized Palliative Care: Prevalence, Definition, and Patient-Perceived Symptom Distress. *J Palliat Med* 18:585–592. <https://doi.org/10.1089/jpm.2014.0414>
3. Mercadante S, Masedu F, Maltoni M, et al (2018) The prevalence of constipation at admission and after 1 week of palliative care: a multi-center study. *Curr Med Res Opin* 34:1187–1192. <https://doi.org/10.1080/03007995.2017.1358702>
4. Clark K, Currow DC (2013) Constipation in Palliative Care: What Do We Use as Definitions and Outcome Measures? *J Pain Symptom Manage* 45:753–762. <https://doi.org/10.1016/j.jpainsymman.2012.03.016>
5. Herz MJ, Kahan E, Zalevski S, et al (1996) Constipation: a different entity for patients and doctors. *Fam Pract* 13:156–159. <https://doi.org/10.1093/fampra/13.2.156>
6. Dimidi E, Cox C, Grant R, et al (2019) Perceptions of Constipation Among the General Public and People With Constipation Differ Strikingly From Those of General and Specialist Doctors and the Rome IV Criteria. *Am J Gastroenterol* 114:1116–1129. <https://doi.org/10.14309/ajg.0000000000000267>
7. Clark K, Smith JM, Currow DC (2012) The Prevalence of Bowel Problems Reported in a Palliative Care Population. *J Pain Symptom Manage* 43:993–1000. <https://doi.org/10.1016/j.jpainsymman.2011.07.015>
8. The Edmonton Symptom Assessment System 25 Years Later: Past, Present and Future Developments. <https://doi.org/10.1016/j.jpainsymman.2016.10.370>
9. Ueberall M, Müller-Lissner S, Buschmann-Kramm C, Bosse B (2011) The Bowel Function Index for Evaluating Constipation in Pain Patients: Definition of a Reference Range for a Non-Constipated Population of Pain Patients. *J Int Med Res* 39:41–50. <https://doi.org/10.1177/147323001103900106>
10. Larkin P, Sykes N, Centeno C, et al (2008) The management of constipation in palliative care: clinical practice recommendations. *Palliat Med* 22:796–807. <https://doi.org/10.1177/0269216308096908>
11. Fine PG, Chen Y-W, Wittbrodt E, Datto C (2019) Impact of opioid-induced constipation on healthcare resource utilization and costs for cancer pain patients receiving continuous opioid therapy. *Support Care Cancer* 27:687–696. <https://doi.org/10.1007/s00520-018-4366-z>
12. Lacy BE, Mearin F, Chang L, et al (2016) Bowel Disorders. *Gastroenterology* 150:1393-1407.e5. <https://doi.org/10.1053/j.gastro.2016.02.031>
13. Dzierżanowski T, Ciałkowska-Rysz A, Jarosz J (2010) The assessment of the diagnostic tools for constipation in palliative care patients. *Med Paliatywna/Palliative Med* 2:81–91

14. Dzierżanowski T, Kozłowski M (2019) Itopride increases the effectiveness of the management of opioid-induced constipation in palliative care patients: an observational non-interventional study. *Arch Med Sci* 11:e0161399. <https://doi.org/10.5114/aoms.2019.85943>
15. Slappendel R, Simpson K, Dubois D, Keininger DL (2006) Validation of the PAC-SYM questionnaire for opioid-induced constipation in patients with chronic low back pain. *Eur J Pain* 10:209–209. <https://doi.org/10.1016/j.ejpain.2005.03.008>
16. Dzierżanowski T, Ciałkowska-Rysz A (2017) Accessibility of opioid analgesics and barriers to optimal chronic pain treatment in Poland in 2000–2015. *Support Care Cancer* 25:775–781. <https://doi.org/10.1007/s00520-016-3460-3>
17. Hjermstad MJ, Fayers PM, Haugen DF, et al (2011) Studies Comparing Numerical Rating Scales, Verbal Rating Scales, and Visual Analogue Scales for Assessment of Pain Intensity in Adults: A Systematic Literature Review. *J Pain Symptom Manage* 41:1073–1093. <https://doi.org/10.1016/j.jpainsymman.2010.08.016>

Tables

Table 1. Patient Demographics and Baseline Characteristics

	Study 1	Study 2	<i>p</i>	Total
Number, n	248	121		369
Age, yrs, mean (95% CI)	68.0 (66.5-69.6)	69.1 (67.0-71.3)	0.280	68.4 (67.1-69.6)
Women, n (%)	47.2%	56.8%	0.086	50.3%
Palliative care entity n (%)				
In-patient hospice	128 (51.6%)	28 (23.1%)	-	156 (42.3%)
Home care	40 (16.1%)	76 (62.8%)	-	116 (31.4%)
Ambulatory	78 (31.4%)	17 (14.0%)	-	95 (25.7%)
Unspecified	2 (0.8%)	-	-	2 (0.5%)
ECOG, mean (95% CI)	2.6 (2.5-2.7)	2.3 (2.0-2.5)	0.022	2.5 (2.4-2.6)
The primary site of the tumor, n (%)				
Colorectal	10 (4.0%)	14 (11.6%)	0.240	24 (6.5%)
Other gastrointestinal	32 (12.9%)	13 (10.7%)	0.737	45 (12.2%)
Non-GI cancer	206 (83.0%)	90 (74.4%)	0.176	296 (80.2%)
Unspecified	-	4 (3.3%)	0.606	4 (1.1%)
Strong opioids, patients n (%)	139 (56.0%)	86 (71.1%)	-	225 (61.0%)
OME, mg (95% CI)	86.8 (72.3-101.3)	112.7 (93.6-131.7)	0.004	98.9 (87.6-110.3)
Laxative treatment, % (95% CI)				
diet modification	42.3 (36.1-48.5)	44.6 (35.6-53.6)	0.721	43.0 (38.0-48.2)
oral	42.3 (36.1-48.5)	44.6 (35.6-53.6)	0.535	45.3 (40.2-50.4)
suppositories	28.6 (23.0-34.3)	29.8 (21.5-38.0)	0.861	29.0 (24.3-33.6)
enema	11.3 (7.3-15.3)	11.6 (5.8-17.4)	0.966	11.4 (8.1-14.6)
manual	6.0 (3.0-9.0)	4.1 (0.5-7.7)	0.765	5.4 (3.1-7.7)

Table 2. Spearman rank-order correlations (bold italics when $p < 0.05$)

	Last SBM	Frequency of SBM	Difficulty of defecation	BFI
Age	-0.02	0.01	-0.05	-0.17
Sex	-0.01	0.00	0.05	-0.02
ECOG	0.21	-0.15	0.10	0.07
Last SBM		-0.76	0.53	0.55
Frequency of SBM	-0.76		-0.61	-0.67
Difficulty of defecation	0.53	-0.61		0.94
BFI	0.55	-0.67	0.94	
Discomfort	0.38	-0.46	0.52	0.57
Abdominal pain	0.30	-0.33	0.31	0.39
Bloating	0.31	-0.39	0.45	0.51
Cramps	0.27	-0.30	0.27	0.34
Painful Bowel Movements	0.30	-0.36	0.40	0.44
Rectal burning	0.28	-0.29	0.25	0.30
Rectal bleeding	0.13	-0.14	0.20	0.22
Incomplete	0.37	-0.41	0.57	0.66
Too hard	0.46	-0.50	0.64	0.61
Too small	0.37	-0.42	0.55	0.58
Straining or squeezing	0.44	-0.49	0.66	0.64
"False alarm"	0.21	-0.36	0.54	0.57
necessity of laxatives	0.14	-0.20	0.37	-

Figures

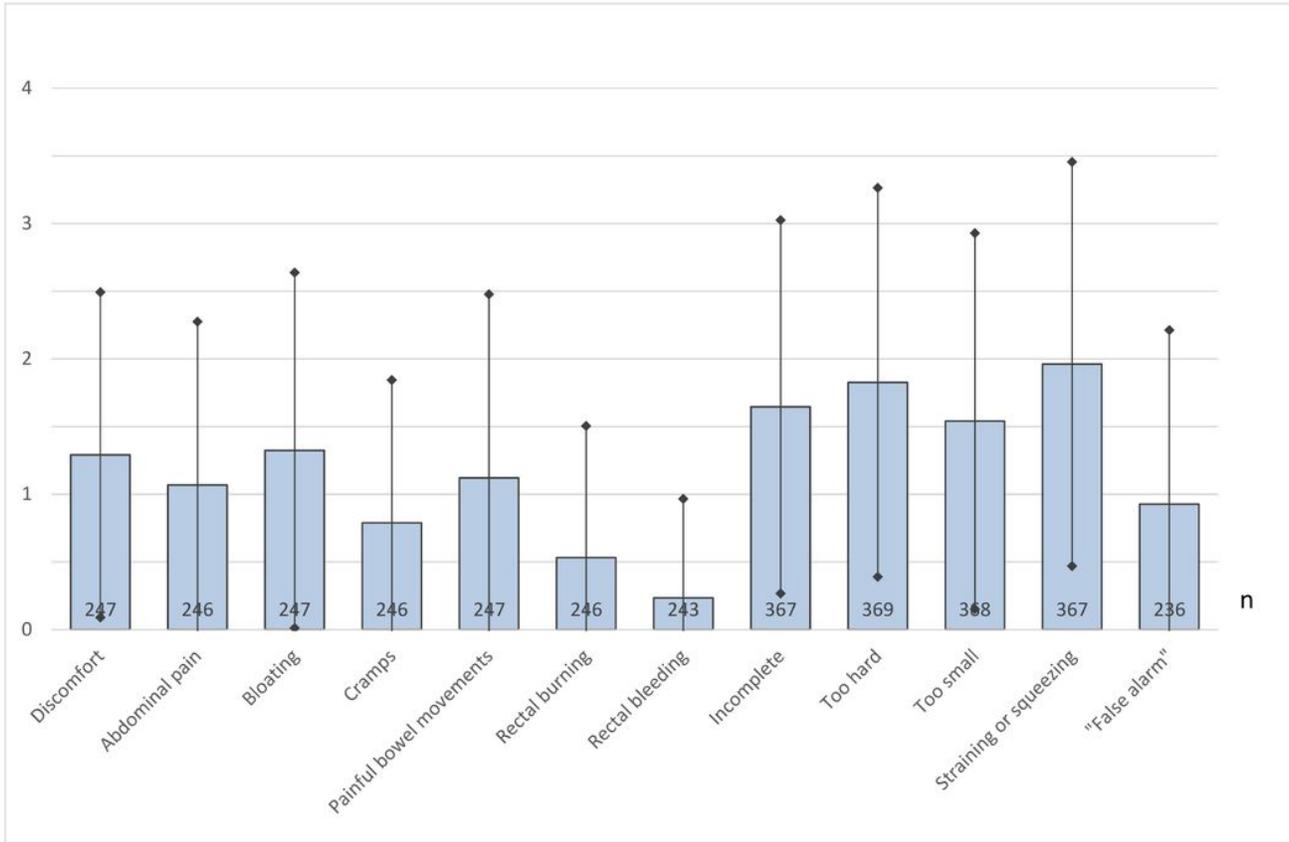


Figure 1

Mean values of symptoms of constipation (\pm SD)

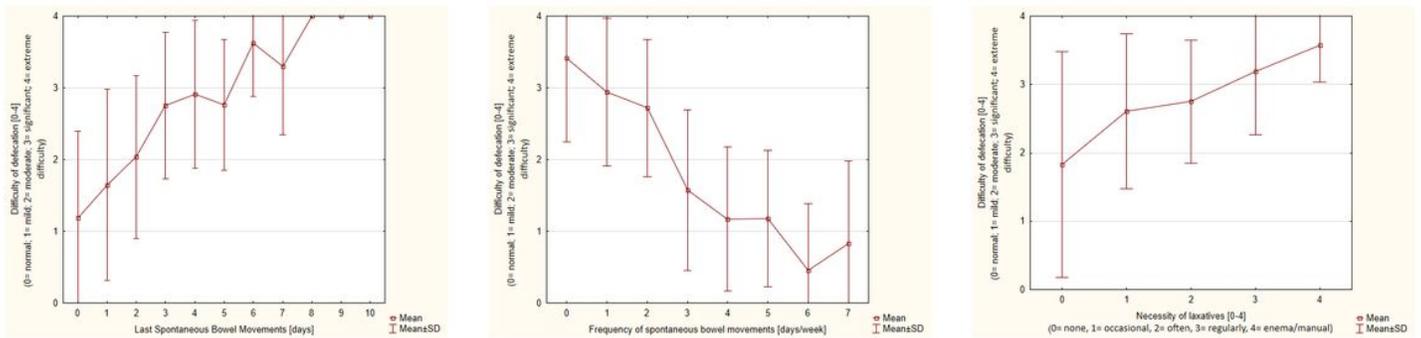


Figure 2

The difficulty of defecation versus A. last SBM, B. frequency of SBM, C. necessity of laxatives (SBM – spontaneous bowel movements).

Constipation in palliative care patients:

a decreased frequency of spontaneous bowel movements (SBM) or laxatives necessary to induce bowel movements (BM) or patient-reported symptoms such as difficulty of defecation, too hard stools, too small stools, or sensation of incomplete defecation.

At least one of the following criteria met within the past 7 days:

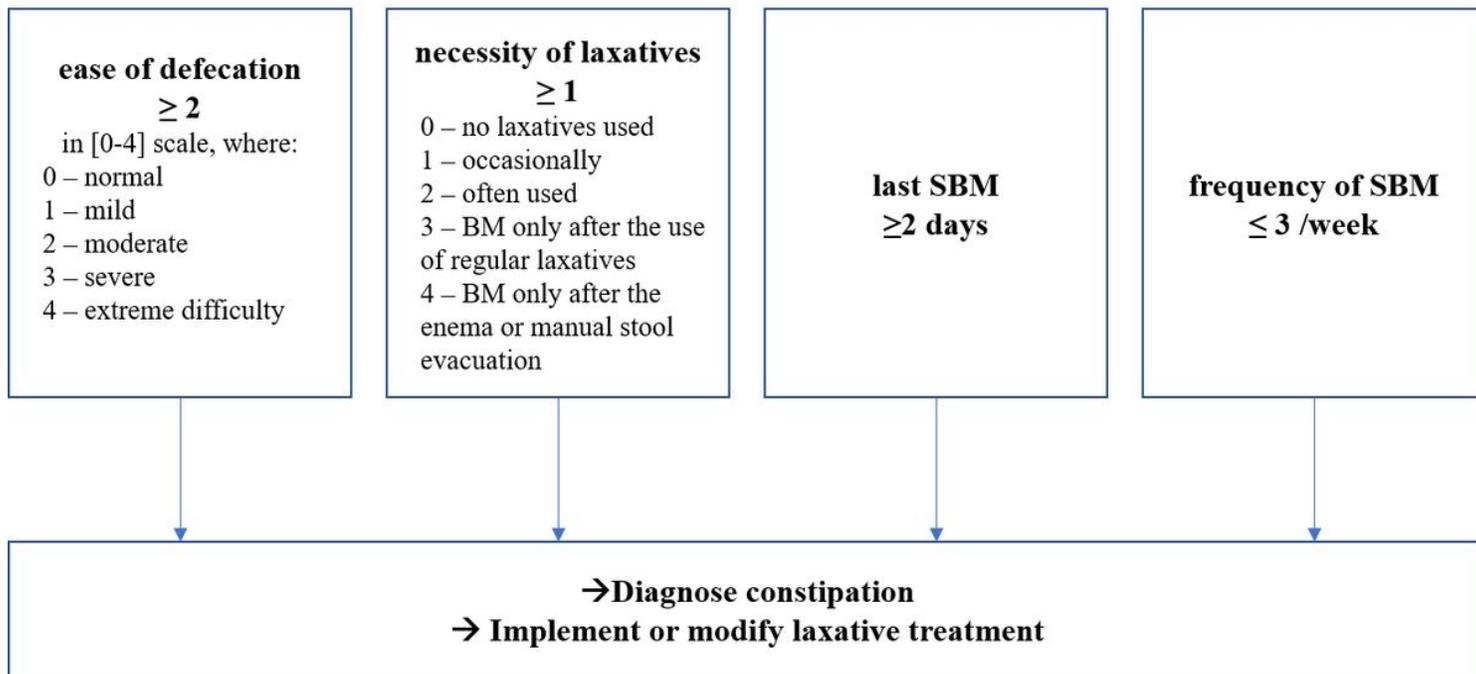


Figure 3

The proposed algorithm for the diagnosing of constipation.