

Knowledge of pain treatment						
1. Do you understand the impact of cancer pain?					Yes	No
2. Did you know that pain must be treated as early as possible?					Yes	No
3. Do you know how to assess pain?					Yes	No
4. Do you know how to deal with breakthrough pain?					Yes	No
5. Do you understand the aims of pain control?					Yes	No
Knowledge of pain medications						
6. Do you know the names of the pain medicines you are taking?					Yes	No
7. Are you afraid of developing an addiction?					Yes	No
8. Did you know that you should consult a healthcare professional before taking other drugs?					Yes	No
9. Did you know that sustained-release tablets should not be broken, chewed, or crushed; or that the fentanyl patch should not be punctured or cut?					Yes	No
10. Did you know that long-acting opioids should be taken regularly?					Yes	No
11. Did you know that you should not increase the dosage or frequency without first consulting a healthcare professional?					Yes	No
12. Indicate the opioid-related adverse reactions of which you are aware:						
<input type="checkbox"/> Nausea and vomiting	<input type="checkbox"/> Constipation	<input type="checkbox"/> Somnolence	<input type="checkbox"/> Delirium	<input type="checkbox"/> Dry mouth		
<input type="checkbox"/> Urinary retention	<input type="checkbox"/> Pruritus	<input type="checkbox"/> Excessive sedation	<input type="checkbox"/> Other	<input type="checkbox"/> None		
13. Indicate the opioid-related adverse reactions that you know how to treat:						
<input type="checkbox"/> Nausea and vomiting	<input type="checkbox"/> Constipation	<input type="checkbox"/> Somnolence	<input type="checkbox"/> Delirium	<input type="checkbox"/> Dry mouth		
<input type="checkbox"/> Urinary retention	<input type="checkbox"/> Pruritus	<input type="checkbox"/> Excessive sedation	<input type="checkbox"/> Other	<input type="checkbox"/> None		
14. Indicate which of the following medication-related situations require immediate medical attention:						
<input type="checkbox"/> Respiratory rate <10 breaths per minute	<input type="checkbox"/> The pupil becomes smaller	<input type="checkbox"/> Unconsciousness	<input type="checkbox"/> None			

Figure S1 Custom-designed questionnaire to assess the patients’ knowledge about cancer pain and pain medications. Scoring of questions 1–11: a “yes” response was scored as 1 and a “no” response was scored 0; scoring of questions 12–13: “none” was scored as 0, and each other item was scored 0.1; scoring of question 14: “none” was scored as 0, and each other item was scored 0.3.

Table S1 Ethics committee approvals

Research centers	Names of the ethics committees	Approval numbers	Approval date
Zhejiang Cancer Hospital	Ethics committee of Zhejiang Cancer Hospital (master)	IRB-2018-15	Jan.15, 2018
Jiangsu Cancer Hospital	Ethics committee of Jiangsu Cancer Hospital	2018-026	Mar. 29, 2018
Shandong Cancer Hospital and Institute	Ethics committee of Shandong Cancer Hospital and Institute	SDZLEL2018-009-02	Aug. 3, 2018
Fudan University Shanghai Cancer Center	Ethics committee of Fudan University Shanghai Cancer Center	1801180-9	Feb. 7, 2018
Anhui Provincial Cancer Hospital	Ethics committee of Anhui Provincial Cancer Hospital	2018-13	Mar. 6, 2018
Fujian Cancer Hospital	Ethics committee of Fujian Cancer Hospital	2018-023-01	Jun. 13, 2018

Table S2 Assessment of the appropriateness of analgesic regimens

Question	Answer
Inappropriate opioid selection (e.g., no reason to choose fentanyl patch)	Yes/no
Excessive dosage of opioid analgesics	Yes/no
Insufficient dosage of opioid analgesics	Yes/no
Inappropriate use of adjuvant analgesics (e.g., exceeding dose limits of NSAIDs)	Yes/no
Inappropriate drug combinations (e.g., combinations of WHO-II and WHO-III opioids, two different NSAIDs)	Yes/no
There is a specific contraindication	Yes/no

Scoring: if all answers were “no”, the analgesic regimen was considered appropriate; otherwise, it was considered inappropriate. NSAIDs, non-steroidal anti-inflammatory drugs; WHO, World Health Organization.

Table S3 Comparison of the potential barriers to cancer pain management between baseline and week 4

Potential barrier	Control group		Intervention group	
	Baseline (n=57)	At week 4 (n=51)	Baseline (n=60)	At week 4 (n=51)
Insufficient knowledge of pain treatment				
Did not understand the impact of pain on the primary disease	6 (10.5)	4 (7.8)	10 (16.7)	1 (2.0)
Did not know that pain must be treated as early as possible	3 (5.3)	1 (2)	8 (13.3)	0 (0.0)
Did not know how to deal with breakthrough pain	49 (86.0)	37 (72.5)	52 (86.7)	10 (19.6)
Did not know how to assess pain	37 (64.9)	27 (52.9)	40 (66.7)	8 (15.7)
Did not understand the aims of pain control	38 (66.7)	27 (52.9)	60 (100.0)	6 (11.8)
Insufficient knowledge of pain medications				
Did not know the names of the pain medicines taken	9 (15.8)	3 (5.9)	15 (25.0)	3 (5.9)
Fear of addiction	33 (57.9)	29 (56.9)	37 (61.7)	8 (15.7)
Did not know to consult a healthcare professional before taking other drugs	22 (38.6)	17 (33.3)	20 (33.3)	3 (5.9)
Did not know that sustained-release tablets should not be broken, chewed, or crushed; or that the fentanyl patch should not be punctured or cut	13 (22.8)	5 (9.8)	19 (31.7)	0 (0.0)
Did not know that long-acting opioids should be taken regularly	10 (17.5)	6 (11.8)	8 (13.3)	0 (0.0)
Did not know to consult a healthcare professional before increasing dosage or frequency	23 (40.4)	16 (31.4)	24 (40.0)	1 (2.0)
Insufficient knowledge about treating opioid-related adverse reactions				
Did not know how to treat nausea and vomiting	46 (80.7)	37 (72.5)	40 (66.7)	23 (45.1)
Did not know how to treat constipation	25 (43.9)	10 (19.6)	23 (38.3)	4 (7.8)
Did not know how to treat respiratory depression	53 (93)	40 (78.4)	49 (81.7)	14 (27.5)
Inadequate medication adherence				
Forgot to take medicine	NA	NA	7 (11.7)	3 (5.9)
Did not take medicine on time	NA	NA	15 (25.0)	5 (9.8)
Did not take the prescribed dose	NA	NA	6 (10.0)	0 (0.0)
Inappropriate prescription				
Inadequate opioid dose	NA	NA	19 (16.7)	0 (0.0)
Inappropriate opioid choice	NA	NA	2 (3.3)	0 (0.0)
Lack of adjuvant analgesic	NA	NA	1 (1.7)	0 (0.0)

Values are reported as n (%). NA, not applicable.