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Facilitating patient-oncologist communication in advanced treatment-resistant cancer: development and feasibility testing of a question prompt list

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Abstract

Background Patients' expectations regarding medical information in advanced stages of cancer are still poorly understood. Tailoring information to advanced cancer patients is a subtle task. We developed a question prompt list (QPL) that serves as a patient-oncologist communication aid in France.

Methods A four-step sequential mixed method involving patients with luminal B/triple-negative metastatic breast cancer or metastatic uveal melanoma ($N=110$) and patients' partners, oncologists, and researchers ($N=18$) was used. In-depth interviews and questionnaires focused on the information needed at the disclosure of metastasis or resistance to treatment (step 1), the formulation of questions and procedures for use in oncology visits (steps 2 and 3), and the acceptability of the final tool (stage 4).

Results The initial version of the QPL consists of 17 questions covering 5 themes (disease, current treatment, other options, living with cancer, prognosis). In step 2, 13 questions were added, 2 were merged, and 5 were deleted; a short form (4 questions) and recommendations for clinical use were proposed. In step 3, 2 questions were merged, and 6 were deleted. Four oncologists (27% of the target population) took part in step 4, and the QPL was discussed with 20 patients, revealing a positive appraisal.

Conclusion We provide a rigorously developed, relevant, concise, and acceptable question prompt list for clinical application in the advanced cancer care setting in France. Further research needs to assess whether this tool actually facilitates oncologist-patient communication and improves satisfaction with care and health outcomes.

Trial registration The study is listed on ClinicalTrials.gov (NCT04118062) and registered under identification n° IRRID "International Registered Report Identifier": DERR1-10.2196/26414.

Keywords Question prompt list, Metastatic, Uveal melanoma, Breast cancer, Prognosis, Patient-oncologist communication

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Key message regarding feasibility

1. What uncertainties exist regarding feasibility?

- The use of communication aid in the form of a question prompt list in advanced cancer-stage oncology consultations in France is uncertain.
- A culturally tailored, relevant, concise QPL rigorously co-designed with patients, oncologists, and patient partners should be acceptable and feasible for use by patients and clinicians.

2. What are the key feasibility findings?

- The final version of the QPL proved to be acceptable and satisfactory. It was used in two-thirds of the consultations where it was made available and was perceived as useful and easy to use by both oncologists and patient participants.

3. What are the implications of the feasibility findings for the design of the main study?

- The developed QPL comprises a comprehensive and concise list of questions to facilitate communication between patients and their oncologists in the specific context when the disease becomes metastatic or resistant to treatment.
- The use of this QPL procedure (e.g., availability on an intranet, provided by an oncologist, at initial consultations, in its long or short form to facilitate a progressive discussion about the disease prognosis, computerized warning system) is suggested.

Background

Informing patients about the metastatic status, progression, or resistance of their cancer is a sensitive and challenging task for oncologists. This crucial discussion involves imparting information about the incurability of the disease, available treatment options, potential side effects, and the effectiveness of these treatments in terms of symptom relief or survival. Most patients are eager to receive this information [1]. At this illness stage, patient-oncologist communication encompasses many sources of uncertainty that need to be addressed, especially since it could serve to uphold the patient's sense of hope, which is crucial for their overall well-being and coping mechanisms [2]. Moreover, studies have shown that discussing prognosis does not appear to negatively impact the patient-oncologist relationship or the emotional state of the patient [3]. However, during these conversations, oncologists often grapple with the fear of exacerbating a patient's anxiety or taking away their sense of hope. Additionally, many oncologists feel ill-prepared to answer questions about prognosis [4]. They may believe that patients will express their need for information if desired, while patients often expect oncologists to provide important information without the need for explicit requests

[5]. Interestingly, some patients prefer to avoid discussions about dying and palliative care altogether and only desire this information if they directly ask for it [6]. It can be challenging for oncologists to gauge the specific type and extent of an individual patient's information needs [7]. Furthermore, it should be noted that addressing treatment resistance or metastatic disease entails a high volume of complex information on various treatment options and prognostic consequences; this requires particular communication skills to tailor the communication approach to patients' needs. Consequently, many patients do not receive the crucial information they require to actively participate in treatment decisions and prepare for their future, or they receive it at the wrong time [1, 8].

To overcome patient-clinician communication difficulties, tools such as question prompt lists (QPLs) are provided so that the patient can select and express his/her own questions during the oncology consultation [9, 10]. This approach facilitates the identification of the patient's individual concerns to adapt the content of the information provided. These communication aids have proven to be inexpensive and easy to use in the limited clinical time of oncologists without increasing the length of consultations [10, 11]. Most of these tools were developed for the early stages of cancer or at the end of life [12]. For example, our team demonstrated the beneficial effects of a list of questions designed to facilitate end-of-life discussions during palliative care consultations [11]. Patients in the experimental group expressed questions more frequently without experiencing additional anxiety. This list, developed for the end-of-life phase of the disease trajectory, was found to be inappropriate for the period surrounding the diagnosis of metastatic cancer or resistance to cancer treatment, which provides many opportunities for discussion between patients and oncologists about disease status, prognosis, and therapeutic alternatives [13, 14].

Methods

The study took place at a specialist oncology center (Institut Curie, Paris, France). Details of the protocol have been published [12]. Ethics approval was received in July 2019 (research project no.: 19.06.21.64751; MS4 RIPH2 HPS N° ID RCB: 2019-A01713-54).

Written informed consent was obtained from all participants at each step of the project.

This study aimed to develop a QPL for the early advanced cancer care period, i.e., the diagnosis of metastatic disease or disease progression. Moreover, as little is known about patients' expectations regarding medical information in this particular medical context in France [15], the development of this tool was based on iterative exploratory interviews. It involved potential users

(patients and oncologists) to ensure that the resulting tool would be acceptable and usable in routine care.

Study design

A mixed qualitative and quantitative method was used [16]. The tool was built in four steps on the basis of data collected successively [17]. Based on a constructivist grounded theory approach, the aim of the first step consisted of interviews to explore information needs from the patient's perspective and to generate a comprehensive list of questions covering these concepts. Then, we formulated questions likely to be addressed by patients during oncology consultations when cancer metastasis or resistance to treatment is identified. The second step involved oncologists, researchers, and patient partners in focus groups to review the content of this list and the questions' specific wording and to propose modalities for using the tool in clinical practice. Step 3 involved the same participants as step 2, using an online survey, and aimed to select the essential questions for a short, concise, and feasible tool in practice and to review their wording, the QPL introduction, the format, and structure. Step 4 assessed the perceived QPL acceptability in clinical practice through patients' and oncologists' self-assessments.

Step 1—self-administered open question and interviews

Inclusion criteria and patient selection

Eligible patients were 18 years of age or older and had either metastatic triple-negative or luminal B breast cancer, or metastatic uveal melanoma for which the metastatic diagnosis or resistance to treatment was announced less than 3 months prior to the study. These cancer types were chosen because, although they are difficult to treat, specific oncological treatment options can still be offered for several months or even years; however, their prognosis remains poor [18–20].

Procedure

A sample of 80 consecutive patients ($N=40$ per tumor site) was selected from medical oncology consultation lists from January 2021 to January 2022. They were asked to participate in the study by their oncologist and were invited to complete a self-administered questionnaire. Additionally, some of them, selected by chance ($N=20$ per tumor site to ensure data saturation [21]), took part in an interview conducted by a research psychologist (AR) following the oncology consultation, either in person at the hospital, by telephone, or videoconference.

Self-administered open question

One question from the European Organization for Research and Cancer (EORTC) QLQ-INFO25 [22] was

addressed: “*Would you like to receive more medical information and, if so, on which subjects?*”.

Semistructured interview

A semi-structured interview based on a guide developed from the literature [23–27] explored information needs in the period during which metastatic or treatment-resistant cancer was diagnosed.

Analysis

The answers to the self-administered questions were collected, and the interviews were recorded and transcribed verbatim. A thematic analysis of the textual data was carried out on the basis of a grid developed in two phases [28]: (1) from the interview guide and free comments in response to the self-administered question and (2) from an independent analysis of 10 interviews by two researchers (AR et JT). Intercoder reliability was tested and revealed an 87% agreement rate and a Cohen's kappa coefficient of 0.85. The coding grid, initially developed by considering the two tumor sites separately, turned out to be similar; therefore, it was applied to all interviews ($N=40$). Iterative reading of interviews made it possible to generate recurring themes and idiomatic formulations. Iterative discussions within the research team (AR, JT, SD, AB) helped establish a consensus on the meaning of the codes. A count of the code frequency was carried out, and these quantitative and qualitative data were integrated with the information garnered in the following steps.

Step 2: focus groups

Participants

Participants in two successive focus groups were selected among the institution's oncologists, oncology researchers, and patients' partners with an equal distribution among these three categories of stakeholders. They were contacted by an email that included a study information note. Fifteen subjects, 7 and 8 per group and 5 per type (oncologist, researcher, or patient partner), participated [29].

Procedure

Group interviews were conducted by a research psychologist (AR) accompanied by one observer per group (AB and SD). The interviews were recorded and transcribed verbatim. This step involved videoconference.

The initial list of questions from step 1 was sent to the participants beforehand. During group interviews, participants were invited to discuss the relevance of the questions, possible omission of themes, clarity and appropriateness of wording (questions, instructions), format and structure of the tool, and to suggest modalities

for maximizing the use of the tool in clinical practice and minimizing implementation obstacles.

Analysis

Group interviews were recorded and transcribed verbatim. Their analysis consisted of listing and categorizing all the comments. Redundant, too specific, potentially disturbing, or unclear questions were deleted, merged, or reworded based on criteria discussed within the research team (AR, JT, SD, AB). When a consensus was not reached between participants on deleting a question from the list, it was decided to keep that question.

Step 3: survey

Participants

We approached 15 participants who participated in focus groups and 10 additional participants, including 5 oncologists, 2 researchers, and 3 patient partners.

Procedure

An online survey was conducted using REDCap software [30]. As the conciseness and clarity of the tool (and thus the number of possible issues to discuss during the consultation) was considered a prerequisite for its use in everyday practice [31], the aim was to retain the essential overarching questions. Therefore, in addition to free comments, opinions were sought regarding the degree of importance of each general question on a 5-point Likert scale ranging from 1 = not at all to 5 = completely. Any sub-questions could be added as examples.

Analysis

A quantitative analysis (frequency, mean, and standard deviation) of the importance of overarching questions was performed to obtain a list that covered all the themes in a comprehensive and acceptable manner while remaining concise to facilitate its use in clinical practice [32]. A 75% rate of “important” and “very important” responses and a score of 4 or more per question statement for the overall sample were determined to retain this question [33]. Qualitative comments on rewording or redundancy were taken into account. In the case of disagreement between quantitative and qualitative information, it was decided to keep the question.

Step 4: QPL acceptability in routine practice

Inclusion criteria

Step 4 included patients who met the same inclusion criteria as those in step 1.

Procedure

All oncologists treating metastatic triple-negative and luminal B breast cancer and metastatic uveal melanoma

at our institution ($n=15$) were contacted. The QPL was provided by the oncologist to consecutive patients meeting the eligibility criteria ($n=30$) during an oncology consultation to announce the metastatic diagnosis or resistance to treatment. Patients were invited to read the list at home, identify their own questions, and address them, if they wished, at a subsequent consultation. The oncologist was invited to remind the patient about the possibility of using the QPL during that consultation.

Questionnaire

On a five-point Likert scale ranging from 1 “strongly disagree” to 5 “strongly agree”, patients and oncologists appraised the QPL referring to the consultation where the QPL was discussed on a five-point Likert scale on the following items: “this document is easy to use” (1); for the patient, “this document helped me ask my oncologist questions” (2a); “this document helped me ask questions about subjects that are important to me and that had not been discussed with my oncologist” (3a); “I plan to use this document for my next consultations with my oncologist” (4a); and “my oncologist encouraged me to ask the questions I had selected in this document” (5a); and for the oncologist, “this document has helped me in my communication with my patient” (2b), “I plan to use this document with other patients” (3b), “I have encouraged my patient to ask me the questions he selected in this document” (4b) and “using this document has increased the time of the consultation” (5b).

Analysis

Score means and standard deviations were calculated for patients’ and oncologists’ item responses. The item 5 score for oncologists was inverted so that all items with a high score indicated favorable judgment.

Results

Step 1

Sample description

Seventy-eight of 80 patients took part in stage 1, 39 by tumor site. The mean age was 62.1 years (standard deviation = 11.6) and 52 patients were women (Table 1). Two patients were lost to follow-up. Of the 40 patients who participated in the interviews, the average age was 61.4 years (standard deviation = 12.2), and 29 were women.

List of issues

For the self-administered question, 50 (64%) patients expressed the wish to receive more information about the following areas: current treatment ($n=22$), prognosis ($n=15$), current medical situation ($n=6$), “living with the disease” ($n=6$) and other treatment options ($n=5$). Data

Table 1 Sociodemographic and clinical patient characteristics in Step 1 and Step 4^a

	Step 1 N=78	Step 4 N=20
Mean age (SD)	62.14 (11.58)	64.47 (11.40)
Gender, n (%)		
Female	52 (66.7%)	14 (70.0%)
Male	26 (33.3%)	6 (30.0%)
Education level, n (%)		
No diploma	6 (7.8%)	2 (11.7)
Higher education	21 (27.2%)	2 (11.7)
Bachelor (BA/BS)	26 (33.7%)	7 (41.2)
Master's degree or above	24 (31.2%)	6 (35.3)
Missing data	1	3
Tumor type		
MBC luminal B	35 (44.9%)	6 (30.0%)
MBC triple negative	4 (5.1%)	0
MUM	39 (50%)	14 (70.0%)
Time between patient's inclusion and evidence of metastatic disease, in days median [range]	402 [4–2919]	0 [0–2024]
Number of lines of metastatic treatment, n (%)		
1st	42 (53.9%)	19 (95.0%)
2nd	16 (20.5%)	0
3rd	20 (25.6%)	1 (5.0%)

MBC Metastatic breast cancer, MUM Metastatic uveal melanoma

^a 2 patients lost to follow-up in step 1; in step 4, 7 patients were not provided with the QPL, 1 excluded as having participated in step 1, and 2 did not provide responses to the appraisal questionnaire

saturation was obtained after 18 and 17 in-depth interviews for patients with metastatic triple-negative and luminal B breast cancer and with metastatic uveal melanoma, respectively, raising information needs on these same themes: current treatment ($n=12$ and 12), prognosis ($n=9$ and 8), current medical situation ($n=10$ and 6), other possible treatments ($n=4$ and 6), and living with the disease ($n=6$ and 2).

Analysis of the interviews by tumor site did not reveal differences in terms of the revealed general themes; as a result, we chose to develop a single QPL.

With respect to patients' idiomatic formulations, 41 questions, including 7 general questions and 34 specific sub-questions, were developed.

Step 2—Focus group

Sample

Among the participants in the focus groups, the mean (standard deviation) age was 54.7 (11.9) years, and 12 were women. The interviews lasted 70 and 74 min per group.

Initial QPL revision

Among the modifications made to the initial QPL (see Table 2), 13 questions were added, 5 were deleted, and two questions were merged, resulting in 48 questions. A two-tier QPL structure comprising general and specific questions (in italics) was proposed to lighten the tool's visual aspect while providing a maximum number of suggested questions. Summary instructions and a diagram explaining how to use the tool (i.e., provided at initial consultations, read at home, and referred to at a subsequent consultation depending on the timing of the patient's information needs) are provided. Figure 1 shows a snapshot of the first and last page of the final QPL. During focus groups, a short version of the tool was suggested in the form of 4 questions considered essential (i.e., the objective and duration of treatment, side effects, and curability of the disease). This would allow oncologists to gradually address more delicate questions about prognosis during subsequent consultations.

Step 3—Survey

Sample

Eighteen of the 25 subjects approached took part in step 3, including 8 oncologists, 3 researchers, and 7 patient partners, with an average age of 51.3 years (standard deviation = 12), and 14 women.

QPL revision from step 2

Comments from participants ($N=118$, with an average of 4 per question) led to reformulations and to the deletion of 6 of the 48 questions resulting from step 2 (see Table 2). The degree of importance of the 15 general questions and 26 sub-questions resulting from step 3 is high, with an average ranging from 3.89 to 4.89 (Table 3).

Step 4—QPL acceptability in clinical practice

Sample

Four out of 15 oncologists (27%) agreed to participate in step 4 and included 30 consecutive patients in total over the period July to November 2022. Oncologists did not provide the list of questions to 7 of the 30 patients included, either because it was forgotten ($N=6$) or because he/she considered the patient to be psychologically unable due to denial of the severity of the cancer ($N=1$). Discussion with oncologists about the QPL was carried out for 20 (67%) of the included 30 patients during a subsequent consultation, on average 3 months later (range 1 to 10 months). The QPL was not discussed either because the patient forgot to read it ($N=1$) or because

Table 2 The QPL main questions or sub-questions added, deleted, or modified after step 2 (focus groups) and step 3 (online survey)

	Question ^a	Reasons
After focus groups (N = 15) Addition	<p>Can I ask for a second opinion?</p> <p>How to identify treatment side effects?</p> <p>What are the most frequent side effects?</p> <p>To whom and when do I need to report them?</p> <p>Can I come to the visit by reimbursed taxi?</p> <p>Can I continue to work?</p> <p>Can I plan a pregnancy?</p> <p>What can be done to manage this pain and/or fatigue?</p> <p>Can I continue with my usual (chronic) treatments?</p> <p>Are there supportive resources to help me?</p> <p>Can I use supportive care?</p> <p>Can I contact a patient association?</p> <p>Can I use alternative care approaches (e.g., complementary, alternative medicine)?</p> <p>Is the treatment well tolerated by other patients?</p>	<p>Important/frequent patient concerns, often overlooked</p> <p>Important/frequent patient concern</p> <p>Important patient concern</p> <p>Important patient concern, often overlooked</p> <p>Important to some patients, may introduce other unspoken concerns</p> <p>Important/frequent patient concern</p> <p>Important/frequent patient concerns, often overlooked</p> <p>Important/frequent patient concern; acknowledge patient-centered global care</p>
Suppression	<p>Does this treatment increase life expectancy?</p> <p>What effects does it have on the body (e.g., the liver)?</p> <p>Is surgery an option?</p> <p>Am I in a palliative situation?</p> <p>Are there any recommendations or contraindications (e.g., physical activity, diet, massage, tincture, exposure to the sun) to be followed when taking this treatment?</p>	<p>Important: concern that patients do not dare to address</p> <p>Treatment tolerance may differ between individuals, difficult to provide overall information</p> <p>Redundant with another QPL statement 'How long can I expect to live?'</p> <p>Too specific, depending on the cancer site</p> <p>Too specific</p>
Merging	<p>What is the current course of my disease (e.g., recurrence, metastasis)? = ></p> <p>What is the current course of the disease (e.g., recurrence, metastasis)?</p> <p>Is this progression linked to the primary diagnosis? = ></p> <p>Is this disease progression/recurrence/metastasis linked to the first cancer diagnosis?</p> <p>Why this progression = ></p> <p>What are the causes of this disease progression?</p> <p>Could I have avoided it (i.e., the disease progressions)? = ></p> <p>Could the disease progression have been avoided?</p> <p>Can the disease stabilize, regress, or disappear with treatment? = ></p> <p>To what extent can the disease stabilize, regress, or disappear thanks to treatment?</p> <p>How effective is the treatment (percentage/chance of survival)? = ></p> <p>How effective can I expect this treatment to be (e.g., reduction in symptoms, improvement in blood tests)?</p>	<p>Too vague; the word "palliative" is perceived as an anxiety-inducing term</p> <p>Merging of "Are there any recommendations or contraindications (e.g., physical activity, diet, massage, tincture) to be followed when taking this treatment?" And "Can I go out in the sun?"</p> <p>"my" replaced by "the" to differentiate the patient from the disease</p> <p>More precise wording</p> <p>More precise wording</p> <p>Avoid making people feel guilty about a possible lack of recourse to medical consultations or examinations</p> <p>Reformulation for a non-dichotomous (yes/no), open response</p>
Rewording		<p>Efficacy expressed in figures (%) on survival is considered disturbing because it creates difficulties for both the oncologist, who is faced with uncertainty around the figures, and the patient, whose question remains unanswered</p>

Table 2 (continued)

	Question ^a	Reasons
After survey (N = 18) Suppression	Is it possible to enter a new protocol? => Is there a clinical trial underway in my situation?	Addition of a clause to reflect the fact that an available clinical trial may not be suitable for the individual situation
	Why can't I benefit from it at the moment? => Can I take part?	More general wording
	Is pain management more complicated because of the damage to my liver? => Will I feel more pain and/or fatigue?	Questions deemed disturbing were reworded to address this delicate subject in a way that is acceptable to as many people as possible
	How long do I have to live? => Can you tell me about the prognosis of the disease? How long can I expect to live?	More focused wording
	Is there an urgent need to take certain measures? => Are there any special arrangements to be made?	Unclear < 75% importance threshold (12/18) Confusing < 75% importance threshold (11/18)
	Is it severe? How does the treatment work (e.g., on cancer cells, metastases)? How do you choose it? How effective can I expect this treatment to be (e.g., reduction in symptoms, improvement in blood tests)?	Difficult to provide precise information < 75% importance threshold (12/18)
	How long do you have to wait before you see its effectiveness? Will future treatments be more difficult to tolerate?	Merging of "Is there a clinical trial underway in my situation?" and "Can I take part in a clinical trial?"
	Is there a clinical trial underway in my situation that I can take part in?	Clarify the name of the disease
	Is this disease progression/recurrence/metastasis linked to the first pathology? => Is this disease progression/recurrence/metastasis linked to the initial cancer?	More adequate wording
	Can the disease be cured? => Can I be cured of this disease?	More adequate wording
Can I come by taxi under the agreement? => Can I benefit from paid transport? Can my treatment interfere with my sex life? => Can I have access to supportive care (e.g., pain management, nutritional, psychological, social)?	Broader formulation	
What are the next steps => What are the next steps in the care process?	Clarify the notion of steps in the treatment trajectory	
Are there any special arrangements to be made? => Are there any special arrangements to be made (e.g., advance directives, trusted support person)?	Clarify the notion of dispositions	

^a Rough translation of statements from French to English. The final questions are in bold

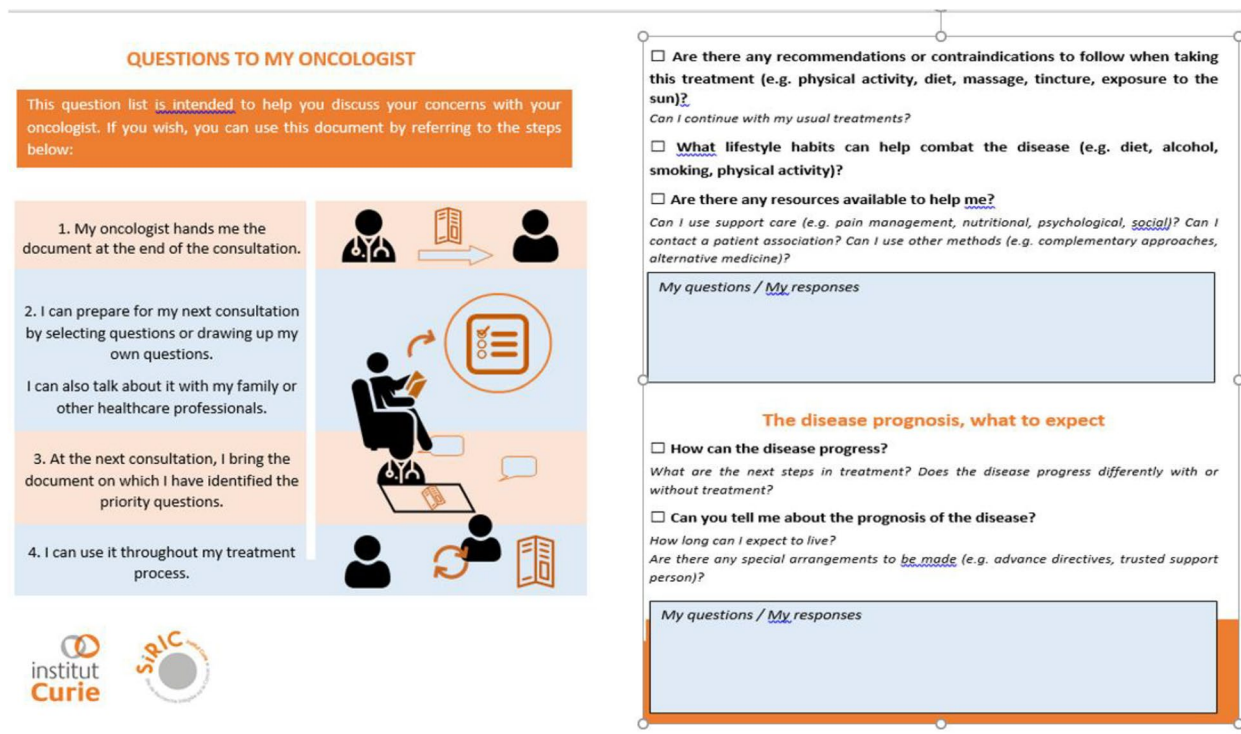


Fig. 1 QPL format, first and last page*

the oncologist forgot to refer to it during the consultation ($N=2$).

QPL appraisal

The QPL appraisal was based on its use during 4 to 5 consultations, depending on the oncologist and patient. One patient was excluded because he had participated in step 1, and two patients did not return their answers.

The mean appraisal scores ranged from 3.61 (helps to ask questions not raised during the consultation) to 4.56 (easy to use) for the patients and from 2.00 (longer consultation time) to 4.29 (easy to use; helped to encourage the patient to ask questions) for the oncologists (Table 4).

Discussion

A communication aid in the form of a question prompt list (QPL) was co-designed with patients affected by cancer with a severe prognosis, patients' partners, oncologists, and oncology researchers. It comprises a comprehensive and concise list of questions to facilitate communication between patients and their oncologists when the disease becomes metastatic or resistant to treatment. This tool is original in specifically targeting patients' information needs at a particular time when oncological treatments, which are potentially effective in terms of survival, can still be offered, even though the disease is currently incurable [14]. Adequate

patient-oncologist communication is of utmost importance, especially at this stage of the disease trajectory, when addressing the uncertainties related to care, treatment options, and prognosis can have a profound psychological impact on patients navigating the complexities of advanced cancer care [2].

Throughout the study's steps, particular attention was given to the tool's clarity and comprehensiveness of content, its format and structure, and the delicate process in which it is expected to be used in clinical practice. The final version of the QPL proved to be acceptable and satisfactory. It was used in two-thirds of the consultations where it was made available and was perceived as useful and easy to use by both oncologists and patient participants, which is promising for systematic implementation in everyday practice. Moreover, only one patient out of 30 was identified by their oncologist as potentially psychologically unable to use the QPL. This low incidence emphasizes the tool's potential to bridge communication gaps effectively and suggests a high degree of patient readiness and receptiveness, ultimately enhancing its overall acceptability and utility in clinical practice.

This tool validates patients' various concerns and reminds them to discuss subjects they perceive as important, even though they may seem trivial (e.g., the continuation of non-oncological treatments), inadequate (e.g., a planned pregnancy), or embarrassing

Table 3 Frequency of information questions in step 1 and estimated importance per general question in step 3

Questions ^c (overall, by breast cancer and uveal melanoma frequency in step 1) ^a	Importance (step 3) (N = 18)	
	Frequency of importance judgment ^b N (%)	Degree of importance Mean (SD)
Understanding my cancer and its treatment (N = 16, 10, and 16)		
What is the current stage of the disease (e.g., recurrence, metastasis)? <i>Is this progression/recurrence/metastasis related to the initial cancer? What are the causes of this progression? Could it have been avoided? Can metastases spread to other organs?</i>	16 (88.9%)	4.61 (0.70)
What is the aim of the treatment ^d ? <i>To what extent can the disease stabilize, regress, or disappear thanks to treatment?</i>	18 (100%)	4.89 (0.32)
How long will I be under treatment ^d ?	16 (88.9%)	4.5 (0.70)
Can I be cured of this disease ^d ?	15 (83.3%)	4.39 (0.78)
Current treatment (N = 22, 12, and 12)		
What are the treatment side effects ^d ? <i>How shall I recognize them? Which are the most common? What can I do if I have side effects? To whom and when should I report them? How long do they last?</i>	18 (100%)	4.83 (0.38)
How long does this new treatment last? <i>Is it possible to make adjustments, take breaks, or interrupt it? How often will examinations, blood tests, and oncology consultations take place? Will transport costs be covered?</i>	14 (77.8%)	4.06 (1.16)
Possible other treatment (N = 5, 4, and 6)		
What are the different treatment options available? <i>Can I ask for a second opinion?</i>	15 (83.3%)	4.28 (0.90)
Is there a clinical trial underway in my situation that I can take part in?	16 (88.9%)	4.44 (0.71)
Living with cancer (N = 6, 6, and 2)		
What impact can the disease and its treatment have on my daily life? <i>Can I continue to work? Will my treatment interfere with my sex life? Can I plan a pregnancy?</i>	17 (94.4%)	4.67 (0.59)
Will I feel more pain and/or fatigue? <i>What can I do to manage this pain and/or fatigue?</i>	14 (77.8%)	4.17 (1.20)
Are there any recommendations or contraindications for taking this treatment (e.g., physical activity, diet, massage, tincture, exposure to the sun)? <i>Can I continue with my usual treatments?</i>	15 (83.3%)	4.28 (0.90)
What lifestyle habits can help combat the disease (e.g., diet, alcohol, smoking, physical activity)?	12 (66.7%)	3.89 (1.02)
Are there any resources available to help me? <i>Can I use support care (e.g., pain management, nutritional, psychological, social)? Can I contact a patient association? Can I use other methods (e.g., complementary approaches, alternative medicine)?</i>	14 (77.8%)	4 (1.03)
Prognosis, what to expect (N = 15, 9, and 8)		
How can the disease progress? <i>What are the next steps in treatment? Does the disease progress differently with or without treatment?</i>	15 (83.3%)	4.33 (0.77)
Can you tell me about the prognosis of the disease? <i>How long can I expect to live? Are there any special arrangements to be made (e.g., advance directives, trusted support person)?</i>	14 (77.8%)	4.11 (0.76)

^a On 50 patients who mentioned a need for information and 20 patients who participated in interviews by cancer site (metastatic triple-negative or luminal B breast cancer and metastatic uveal melanoma)

^b Responses "Important" and "Very important"

^c Rough translation of statements from French to English; secondary questions are in italics

^d Items in the short QPL version

(e.g., the request for a second medical opinion; the use of complementary medicine). Particular care was taken in formulating questions about the prognosis to ensure that they were acceptable not only to the patient but also to the oncologist, who is often uncomfortable communicating on this issue.

The suggested procedure of this QPL (i.e., provided by the oncologist, at initial consultations, in its long or short form as the oncologist feels is appropriate, patients' invitation to read it at home and to select questions they wish to discuss at a subsequent consultation) was designed to encourage patients to address questions of interest to

Table 4 Mean (SD) response to the QPL acceptability assessment^a (N = 20 patients; N = 4 oncologists)

	Patients (N = 20)	Oncologists (N = 4)
1. Easy to use	4.56 (0.59)	4.29 (0.82)
2a. Help to ask questions	4.06 (0.73)	–
3a. Help to ask important questions not raised in the consultation	3.61 (0.99)	–
4a. Will use the question list in the next consultations with an oncologist	3.88 (1.21)	–
5a. The oncologist helped by asking selected questions	4.29 (0.83)	–
2b. Helped communicate with a patient	–	3.71 (1.18)
3b. Will use the question list with other patients	–	4.14 (0.73)
4b. Encouraged patients to ask selected questions	–	4.29 (1.02)
5b. Lengthened consultation time	–	2.00 (0.86)

^a Five-point Likert scale from “totally disagree” to “totally agree”; score reverse for each oncologist’s 5b item so that higher scores indicate more favorable opinions

them personally and in the time frame suiting their needs [34, 35]. To facilitate its use in real life, the QPL is now available on the institution’s intranet portal, and oncologists are regularly informed or reminded of its existence. In conjunction with our IT, we also plan a computerized warning system when an oncology consultation is planned to announce treatment resistance. The provision of the QPL is considered a medical act that is tracked in the patient’s medical record for quality assurance. Short training sessions could also be offered to help oncologists address sensitive communication issues such as prognostication in early advanced cancer care [36].

Oncologists’ preferences for informing patients about a severe disease prognosis and resulting treatment alternatives vary according to culture [37, 38]. This communication task is difficult for any oncologist, requiring sensitivity to both individual and cultural factors (coping attitudes, communication skills, etc.) [39]. Therefore, in this study, we adapted the QPL content and administration modality as follows. The participants suggested that the oncologist propose the QPL at initial consultations instead of providing it via open access. This approach limits its accessibility; however, it was found to be important that the purpose of the QPL be first explained by the oncologist, who encourages the patient to ask questions at subsequent consultations [10]. With this approach, oncologists show personal commitment to QPL use, and they can also assess patients’ ability to address upsetting issues. When patients are given bad news, they are particularly vulnerable; therefore, information must be delivered gradually and sensitively [40, 41]. This modality of QPL use is a cultural adaptation to France; it was meant to avoid discouraging its use in clinical practice. The QPL short form allowed us to take into account the timeframe of patient needs when discussing disease prognosis.

Among the few studies showing QPL cultural adaptation, Walczak et al. [42] reported the need to reformulate US English with respect to Australian English

to allow idiomatic expressions and to place questions on prognosis at the end of the document. For Italy, the formulation of questions originally developed in Australia [43] was revised to be less direct, preferring, e.g., the term “disease” rather than “cancer”. The Norwegian adaptation of the same QPL [44] emphasized the importance of the general practitioner as a source of information [45].

The present QPL covers questions about the current disease status, disease curability, treatment purpose, disease duration, side effects, options including participation in a clinical trial, impact on daily life, lifestyle recommendations, sources of support, and disease prognosis. This content includes some questions similar to those developed for end-of-life cancer care [8, 46–48], although these questions may be given less emphasis. This phase differs from the early cancer diagnostic phase [44, 49], which includes questions relating to diagnostic tests and the specific diagnosis of cancer, and from the end-of-life phase, which raises questions about multidisciplinary and palliative care and the involvement of relatives [13, 47]. With respect to disease prognosis, patient-oncologist communication about advance care planning is particularly important for future end-of-life care decisions [50]. The QPL addresses this topic despite divergent opinions among participants in this study who worried that it would be raised too early at this point in the patient’s initial disease progression.

At the end-of-life phase, our team showed that patients did not discuss the disease prognosis more often using a QPL [11]. According to the literature [51], the interviews in this study highlighted the importance of raising the prognostic issue, even if the oncologist is afraid to do so because of the uncertainty about the figures involved. Patients are often unaware of poor prognoses [52]. However, being informed and able to participate in medical decision-making confers psychological resources to the patient [53, 54].

A specific QPL per tumor site was initially considered, but the similar content identified during patients' interviews led to the development of a single tool. The nature of the disease seems to have less of an impact on information needs than the specificity of the time of treatment, whereas in this case, needs were particularly acute around questions about the stage of the disease and how it develops over time, irrespective of the type of cancer.

Limitations of this study include single-center participation, selected cancer sites, and likely participants' interest in cancer care communication. More participants among the patient partners than among the oncologists and researchers at each step of the study could have given more voice to the patient perspective; however, we were limited by the number of patient partners available. Only 25% of the targeted oncologist population agreed to participate in the study. However, this figure is in line with preliminary data on new intervention implementation [55], and the QPL was raised by the patient or the oncologist during at least two-thirds of the consultations following the initial consultation where the QPL had been handed (Supplementary file 1).

Conclusion

With the use of a rigorous co-design approach, we provide a relevant and simple tool to aid patient-oncologist communication in the advanced cancer care setting in France. Consensual recommendations for the application of this tool in routine clinical practice are also given. Further testing of this QPL is needed to determine its clinical benefits. The obstacles to its use, such as institutional opportunities (e.g., availability of communication training; facilitating change in clinical habits) and personal characteristics (e.g., motivation) [32], should also be addressed.

Abbreviations

QPL	Question Prompt List
QPLs	Question Prompt Lists
REDCap	Research Electronic Data Capture
EORTC	European Organization for Research and Cancer

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40814-024-01543-y>.

Supplementary Material 1: Supplementary file 1. Standards for reporting qualitative research (SRQR)

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Research reporting guidelines

The SRQR checklist for qualitative studies.

Mixed Methods Appraisal Tool (MMAT), 2018.

Authors' contributions

AR, SD, JT, and AB designed the project; AR, JT, PC, SPN, MR, and PV collected the data; and AR, SD, JT, CB, and AB analyzed and interpreted the data and drafted the work. All authors revised and provided final approval of the version to be published.

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Availability of data and materials

The study material is available upon request to the corresponding author.

Declarations

Ethics approval and consent to participate

Reference no for ethical approval: ID-RCB: 2019-A01713-54). All patients provided signed informed consent. The study, for which the acronym is helping patients communicate with oncologists when cancer treatment resistance occurs (HECTOR), is registered as NCT04118062 in ClinicalTrials.gov.

Consent for publication

All participants (patients and clinicians) signed an informed consent for study participation and any communication or report of the study results.

Competing interests

The authors declare that they have no competing interests.

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References

- Epstein RM, Duberstein PR, Fenton JJ, Fiscella K, Hoerger M, Tancredi DJ, et al. Effect of a patient-centered communication intervention on oncologist-patient communication, quality of life, and health care utilization in advanced cancer: the VOICE randomized clinical trial. *JAMA Oncol*. 2017;3(1):92–100.
- Libert Y, Peternelj L, Bragard I, Lienard A, Merckaert I, Reynaert C, et al. Communication about uncertainty and hope: A randomized controlled trial assessing the efficacy of a communication skills training program for physicians caring for cancer patients. *BMC Cancer*. 2017;17(1):476.
- Enzinger AC, Zhang B, Schrag D, Prigerson HG. Outcomes of prognostic disclosure: associations with prognostic understanding, distress, and relationship with physician among patients with advanced cancer. *J Clin Oncol*. 2015;33(32):3809.
- Mack JW, Smith TJ. Reasons why physicians do not have discussions about poor prognosis, why it matters, and what can be improved. *J Clin Oncol*. 2012;30(22):2715–7.
- Back AL, Arnold RM, Baile WF, Tulsy JA, Fryer-Edwards K. Approaching difficult communication tasks in oncology 1. *CA Cancer J Clin*. 2005;55(3):164–77.

6. Hagerty R, Butow PN, Ellis P, Dimitry S, Tattersall M. Communicating prognosis in cancer care: a systematic review of the literature. *Ann Oncol*. 2005;16(7):1005–53.
7. Malmström A, Åkesson L, Milos P, Mudaisi M, Bruhn H, Strandeus M, et al. "Do I want to know it all?" A qualitative study of glioma patients' perspectives on receiving information about their diagnosis and prognosis. *Support Care Cancer*. 2021;29:3339–46.
8. Walczak A, Butow PN, Tattersall MH, Davidson PM, Young J, Epstein RM, et al. Encouraging early discussion of life expectancy and end-of-life care: a randomised controlled trial of a nurse-led communication support program for patients and caregivers. *Int J Nurs Stud*. 2017;67:31–40.
9. Keinki C, Momberg A, Clauß K, Bozkurt G, Hertel E, Freuding M, et al. Effect of question prompt lists for cancer patients on communication and mental health outcomes- systematic review. *Patient Educ Couns*. 2021;104(6):1335–46.
10. Licqurish SM, Cook OY, Pattuwage LP, Saunders C, Jefford M, Koczwara B, et al. Tools to facilitate communication during physician-patient consultations in cancer care: An overview of systematic reviews. *CA Cancer J Clin*. 2019;69(6):497–520.
11. Bouleuc C, Savignoni A, Chevrier M, Renault-Tessier E, Burnod A, Chvetzoff G, et al. A question prompt list for advanced cancer patients promoting advance care planning: a French randomized trial. *J Pain Symptom Manage*. 2021;61(2):331–41.e8.
12. Brédart A, Rault A, Terrasson J, Seigneur E, De Koning L, Hess E, et al. Helping patients communicate with oncologists when cancer treatment resistance occurs to develop, test, and implement a patient communication aid: sequential collaborative mixed methods study. *JMIR Res Protoc*. 2022;11(1):e26414.
13. Walczak A, Mazer B, Butow PN, Tattersall MH, Clayton JM, Davidson PM, et al. A question prompt list for patients with advanced cancer in the final year of life: development and cross-cultural evaluation. *Palliat Med*. 2013;27(8):779–88.
14. Henselmans I, Brugel SD, de Haes H, Wolvetang KJA, de Vries LM, Pieterse AH, et al. Promoting shared decision making in advanced cancer: development and piloting of a patient communication aid. *Patient Educ Couns*. 2019;102(5):916–23.
15. Mancini J, Butow PN, Julian-Reynier C, Dring R, Festy P, Fenaux P, et al. Question prompt list responds to information needs of myelodysplastic syndromes patients and caregivers. *Leuk Res*. 2015;39(6):599–605.
16. Hong QN, Pluye P, Fàbregues S, Bartlett G, Boardman F, Cargo M, et al. Mixed methods appraisal tool (MMAT), version 2018. Registration of copyright. 2018;34(4):285–9.
17. Fetters MD, Curry LA, Creswell JW. Achieving integration in mixed methods designs—principles and practices. *Health Serv Res*. 2013;48(6pt2):2134–56.
18. Landry I, Sumbly V, Vest M. Advancements in the Treatment of Triple-Negative Breast Cancer: A Narrative Review of the Literature. *Cureus*. 2022;14(2):e21970.
19. Rantala ES, Hernberg MM, Piperno-Neumann S, Grossniklaus HE, Kivellä TT. Metastatic uveal melanoma: the final frontier. *Prog Retin Eye Res*. 2022;90:101041.
20. Grinda T, Antoine A, Jacot W, Blaye C, Cottu PH, Diéras V, et al. Evolution of overall survival and receipt of new therapies by subtype among 20 446 metastatic breast cancer patients in the 2008–2017 ESMO cohort. *ESMO Open*. 2021;6(3):100114.
21. Guest G, Namey E, Chen M. A simple method to assess and report thematic saturation in qualitative research. *PLoS ONE*. 2020;15(5):e0232076.
22. Arraras JI, Greimel E, Sezer O, Chie WC, Bergenmar M, Costantini A, et al. An international validation study of the EORTC QLQ-INFO25 questionnaire: an instrument to assess the information given to cancer patients. *Eur J Cancer*. 2010;46(15):2726–38.
23. Rutten LJ, Arora NK, Bakos AD, Aziz N, Rowland J. Information needs and sources of information among cancer patients: a systematic review of research (1980–2003). *Patient Educ Couns*. 2005;57(3):250–61.
24. Matsuyama RK, Kuhn LA, Molisani A, Wilson-Genderson MC. Cancer patients' information needs the first nine months after diagnosis. *Patient Educ Couns*. 2013;90(1):96–102.
25. Walczak A, Henselmans I, Tattersall MH, Clayton JM, Davidson PM, Young J, et al. A qualitative analysis of responses to a question prompt list and prognosis and end-of-life care discussion prompts delivered in a communication support program. *Psychooncology*. 2015;24(3):287–93.
26. Wang T, Molassiotis A, Chung BPM, Tan JY. Unmet care needs of advanced cancer patients and their informal caregivers: a systematic review. *BMC Palliat Care*. 2018;17(1):96.
27. Tran Y, Lamprell K, Nic Giolla Easpai B, Arnolda G, Braithwaite J. What information do patients want across their cancer journeys? A network analysis of cancer patients' information needs. *Cancer Med*. 2019;8(1):155–64.
28. De Boek, Louvain-la-Neuve, Belgique Français. Traduit de l'anglais par Catherine DE BACKER et Vivian LAMONGE. 1991:480.
29. Guest G, Namey E, McKenna K. How many focus groups are enough? Building an evidence base for nonprobability sample sizes. *Field Methods*. 2017;29(1):3–22.
30. Wright A. REDCap: a tool for the electronic capture of research data. *Journal of Electronic Resources in Medical Libraries*. 2016;13(4):197–201.
31. Moloczij N, Krishnasamy M, Butow P, Hack TF, Stafford L, Jefford M, et al. Barriers and facilitators to the implementation of audio-recordings and question prompt lists in cancer care consultations: A qualitative study. *Patient Educ Couns*. 2017;100(6):1083–91.
32. Dhanani S, Ramlakhan JU, Berta WB, Gagliardi AR. Optimizing the design and implementation of question prompt lists to support person-centred care: a scoping review. *Health Expect*. 2023;26(4):1404–17.
33. Röscher P, Naidoo K, Milios JE, van Wyk JM. A modified elphi study to identify screening items to assess neglected sexual side-effects following prostate cancer treatment. *BMC Urol*. 2022;22(1):1–13.
34. Malmström A, Åkesson L, Milos P, Mudaisi M, Bruhn H, Strandeus M, et al. "Do I want to know it all?" A qualitative study of glioma patients' perspectives on receiving information about their diagnosis and prognosis. *Support Care Cancer*. 2021;29(6):3339–46.
35. Blödt S, Kaiser M, Adam Y, Adami S, Schultze M, Müller-Nordhorn J, et al. Understanding the role of health information in patients' experiences: secondary analysis of qualitative narrative interviews with people diagnosed with cancer in Germany. *BMJ Open*. 2018;8(3):e019576.
36. Butow PN, Clayton JM, Epstein RM. Prognostic awareness in adult oncology and palliative care. *J Clin Oncol*. 2020;38(9):877–84.
37. Mead EL, Doorenbos AZ, Javid SH, Haozous EA, Alvord LA, Flum DR, et al. Shared decision-making for cancer care among racial and ethnic minorities: a systematic review. *Am J Public Health*. 2013;103(12):e15–29.
38. Gan Y, Zheng L, Yu NX, Zhou G, Miao M, Lu Q. Why do oncologists hide the truth? Disclosure of cancer diagnoses to patients in China: A multisource assessment using mixed methods. *Psychooncology*. 2018;27(5):1457–63.
39. Lelorain S. Discussing prognosis with empathy to cancer patients. *Curr Oncol Rep*. 2021;23(4):42.
40. Bousquet G, Orri M, Winterman S, Brugiere C, Verneuil L, Revah-Levy A. Breaking bad news in oncology: a metasynthesis. *J Clin Oncol*. 2015;33(22):2437–43.
41. Westendorp J, Evers AWM, Stouthard JML, Budding J, van der Wall E, Plum NMF, et al. Mind your words: oncologists' communication that potentially harms patients with advanced cancer: a survey on patient perspectives. *Cancer*. 2022;128(5):1133–40.
42. Walczak A, Butow PN, Davidson PM, Bellemore FA, Tattersall MH, Clayton JM, et al. Patient perspectives regarding communication about prognosis and end-of-life issues: how can it be optimised? *Patient Educ Couns*. 2013;90(3):307–14.
43. Dimoska A, Butow PN, Dent E, Arnold B, Brown RF, Tattersall MH. An examination of the initial cancer consultation of medical and radiation oncologists using the ancode interaction analysis system. *Br J Cancer*. 2008;98(9):1508–14.
44. Dimoska A, Tattersall MH, Butow PN, Shepherd H, Kinnersley P. Can a "prompt list" empower cancer patients to ask relevant questions? *Cancer*. 2008;113(2):225–37.
45. Amundsen A, Ervik B, Butow P, Tattersall MH, Bergvik S, Sorlie T, et al. Adapting an Australian question prompt list in oncology to a Norwegian setting—a combined method approach. *Support Care Cancer*. 2017;25(1):51–8.
46. Shirai Y, Fujimori M, Ogawa A, Yamada Y, Nishiwaki Y, Ohtsu A, et al. Patients' perception of the usefulness of a question prompt sheet for advanced cancer patients when deciding the initial treatment: a randomized, controlled trial. *Psychooncology*. 2012;21(7):706–13.

47. Arthur J, Yennurajalingam S, Williams J, Tanco K, Liu D, Stephen S, et al. Development of a question prompt sheet for cancer patients receiving outpatient palliative care. *J Palliat Med*. 2016;19(8):883–7.
48. Yeh JC, Cheng MJ, Chung CH, Smith TJ. Using a question prompt list as a communication aid in advanced cancer care. *J Oncol Pract*. 2014;10(3):e137–41.
49. Caminiti C, Diodati F, Filiberti S, Marcomini B, Annunziata MA, Ollari M, et al. Cross-cultural adaptation and patients' judgments of a question prompt list for Italian-speaking cancer patients. *BMC Health Serv Res*. 2010;10: 16.
50. Libert Y, Langhendries C, Choucroun L, Merckaert I. Interventions aiming to improve advance care planning uptake in oncology: a scoping review of recent randomized controlled trials. *Curr Opin Oncol*. 2024;36(4):233–47.
51. Brighton LJ, Bristowe K. Communication in palliative care: talking about the end of life, before the end of life. *Postgrad Med J*. 2016;92(1090):466–70.
52. Sutar R, Chaudhary P, Yadav V. Prevalence of collusion in cancer communications: a meta-analysis. *Psychooncology*. 2022;31(3):372–87.
53. Polacek LC, Saracino RM, Walsh LE, Jutagir DR, Costas-Muniz R, Applebaum AJ, et al. How patients with advanced cancer conceptualize prognosis: A phenomenological qualitative inquiry. *Palliat Med*. 2023;37(7):1006–15.
54. Huo B, Song Y, Chang L, Tan B. Effects of early palliative care on patients with incurable cancer: a meta-analysis and systematic review. *Eur J Cancer Care (Engl)*. 2022;31(6):e13620.
55. Harvey G, Kitson A. PARIHS revisited: from heuristic to integrated framework for the successful implementation of knowledge into practice. *Implement Sci*. 2015;11(1):1–13.

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