



BMJ Open Prospectively investigating the impact of AI on shared decision-making in post kidney transplant care (PRIMA-AI): protocol for a longitudinal qualitative study among patients, their support persons and treating physicians at a tertiary care centre

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ABSTRACT

Introduction As healthcare is shifting from a paternalistic to a patient-centred approach, medical decision making becomes more collaborative involving patients, their support persons (SPs) and physicians. Implementing shared decision-making (SDM) into clinical practice can be challenging and becomes even more complex with the introduction of artificial intelligence (AI) as a potential actant in the communicative network. Although there is more empirical research on patients' and physicians' perceptions of AI, little is known about the impact of AI on SDM. This study will help to fill this gap. To the best of our knowledge, this is the first systematic empirical investigation to prospectively assess the views of patients, their SPs and physicians on how AI affects SDM in physician–patient communication after kidney transplantation. Using a transdisciplinary approach, this study will explore the role and impact of an AI-decision support system (DSS) designed to assist with medical decision making in the clinical encounter.

Methods and analysis This is a plan to roll out a 2 year, longitudinal qualitative interview study in a German kidney transplant centre. Semi-structured interviews with patients, SPs and physicians will be conducted at baseline and in 3-, 6-, 12- and 24-month follow-up. A total of 50 patient–SP dyads and their treating physicians will be recruited at baseline. Assuming a dropout rate of 20% per year, it is anticipated that 30 patient–SP dyads will be included in the last follow-up with the aim of achieving data saturation. Interviews will be audio-recorded and transcribed verbatim. Transcripts will be analysed using framework analysis. Participants will be asked to report on their (a) communication experiences and preferences, (b) views on the influence of the AI-based DSS on the normative foundations of the use of AI in medical decision-making, focusing on agency along with trustworthiness, transparency and

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This longitudinal study will investigate the communication experiences and preferences of patients, support persons and physicians regarding the role and impact of artificial intelligence (AI) on shared decision-making (SDM) following kidney transplantation.
- ⇒ Participants are included consecutively in the study to reduce the risk of selection bias.
- ⇒ Given that this is a qualitative mono-centre study, the generalisability of the findings may be limited.
- ⇒ With this explorative, hypothesis-generating approach, this research helps fill a gap in the literature by providing currently lacking empirical data on AI-assisted SDM in order to inform future research and clinical practice.

responsibility and (c) perceptions of the use of the AI-based DSS, as well as barriers and facilitators to its implementation into routine care.

Ethics and dissemination Approval has been granted by the local ethics committee of Charité—Universitätsmedizin Berlin (EA1/177/23 on 08 August 2023). This research will be conducted in accordance with the principles of the Declaration of Helsinki (1996). The study findings will be used to develop communication guidance for physicians on how to introduce and sustainably implement AI-assisted SDM. The study results will also be used to develop lay language patient information on AI-assisted SDM. A broad dissemination strategy will help communicate the results of this research to a variety of target groups, including scientific and non-scientific audiences, to allow for a more informed discourse among different actors from policy, science and society on the role and impact of AI in physician–patient communication.

INTRODUCTION

Shared decision-making as a core component of optimal patient-centred care

In recent times, researchers, patient advocates and policymakers have increased efforts to shift healthcare from a paternalistic to a patient-centred approach, which focuses on the patient as a person to ensure the highest quality healthcare.^{1–3} This includes shared decision-making (SDM) as a collaborative process that integrates medical expertise with patients' needs and values.^{4,5} SDM has been studied in numerous clinical settings and is advocated when discussing treatment with patients diagnosed with cancer, as difficult trade-offs must be made that require patients' consideration and that it does aim to reach goal concordant care.⁶

Nonetheless, it has received comparatively little attention in solid organ transplantation such as kidney transplantation.⁷ Kidney transplantation is one of the most performed solid organ transplantations and although the application of SDM before and after kidney transplantation has been discussed, very little is known on the role of artificial intelligence (AI) on SDM and how it can be optimised.^{8,9} This is surprising, as there are numerous potentially preference-sensitive decisions that patients, support persons (SPs) and physicians may have to make, such as those related to the management of comorbidities, the impact of treatment on fertility, the use of immunosuppressants and the risk of secondary neoplasms.^{10,11}

Lack of data on the role and impact of AI on SDM

Patients vary in their preferences for involvement in decision-making.^{11–13} Factors that may influence patients' preferences for decision-making include age, gender and current life situation.¹⁴ Preferences may also change over time, for example, as patients' health status changes.¹⁵ As a result, it can be difficult for physicians to elicit patients' decision-making preferences and tailor care accordingly.¹⁵ This has become even more challenging with the introduction of AI as a potential new actant in the clinical encounter. Advanced AI systems, such as decision support systems (DSS), are rapidly making their way into medical research and practice, and research on their impact on the clinical encounter is emerging.¹⁶ In nephrology, in particular, AI could become a valuable tool to improve medical decision-making.¹⁷ Various potential use cases employing AI to predict health parameters and end points around contexts such as kidney transplantation¹⁸ and dialysis^{18–20} have been explored, including earlier versions of the machine learning models used in this study.²¹ Research has mostly focused on technical and medical challenges related to robustness and implementation, with comparatively little attention paid to the impact on the interactions between patients, SPs and physicians as well as ethical and regulatory aspects.²² Also, despite the tremendous enthusiasm surrounding the potential of AI-based DSS to improve medical prognosis, diagnosis and decision-making, there is limited evidence-based communication guidance available to support and

facilitate the implementation of AI-assisted SDM. Further research in this area could facilitate the evaluation and iterative improvement of these technologies and thus benefit healthcare.

SPs' role in SDM remains understudied

SPs are often one of the most important sources of information and advice for patients and have been shown to facilitate patient engagement in SDM.²³ Most patients prefer their SPs to have a say in treatment decisions,^{23,24} with some even preferring their SPs to lead the decision-making process.¹² Patients often feel more confident about their decisions after consulting their SPs.²⁵ The level of SP involvement often increases when patients are facing serious health issues such as kidney transplantation.^{25–27} Involving SPs can help physicians understand and respond to patients' decision-making needs and preferences.²⁸ A few studies have leveraged the connection between patients and their SPs to foster SDM.²⁷ Additionally, there is anecdotal proof indicating that crafting interventions to enhance care with a focus on both patients and their SPs can result in noteworthy enhancements in patient outcomes, such as significant improvements in lifestyle behaviours and health outcomes among survivors of breast cancer and their family members.²⁹ Nevertheless, a research gap exists regarding the involvement of SPs in SDM and the untapped potential of leveraging the patient–SP relationship to amplify patient engagement in healthcare choices.³⁰

How this research will fill this gap

By using an innovative methodology in an interdisciplinary setting, this study will provide currently lacking evidence on the role and impact of AI-based decision support in SDM. To the best of our knowledge, this is the first longitudinal study to assess the communication experiences and preferences of kidney transplant patients, their treating physicians and SPs, on how AI impacts SDM over time and how AI-assisted SDM could be implemented in routine care. Semi-structured interviews will be used to provide in-depth insights into participants' needs and preferences. Qualitative research is particularly suited to explore understudied phenomena and to evaluate the use of new interventions and their integration into standard medical care.^{31,32} Longitudinal qualitative research (LQR) can help understand and reconstruct communication experiences and preferences as they evolve over time.^{31–33} By employing an LQR design, this project will provide new insights into the role and impact of AI on SDM and how it might be channelled to promote rather than undermine or limit patient engagement in healthcare and ensure optimal, patient-centred care. The findings will be used to develop evidence-based communication strategies for AI-assisted SDM.

Objectives

This is a mono-centre longitudinal qualitative interview study employing semi-structured interviews with patients,

SPs and physicians to explore their views on the role and impact of AI-assisted SDM after kidney transplantation.

METHODS AND ANALYSIS

Study design

This is a 2 year, longitudinal qualitative interview study in a German kidney transplant centre. Semi-structured interviews with patients, SPs and physicians will be conducted at baseline and in 3, 6, 12 and 24 months. This is in line with routine care with patients attending the clinic once in a month for the first 6 months after the transplantation and once in every 3 months thereafter. It received funding for 2 years. Anticipated to start on 1 January 2024, this study is expected to end on 1 January 2026. An extension, if possible, is aimed.

This study is part of a larger randomized controlled trial described in detail elsewhere.³⁴

Semi-structured interviews will be used to ask participants about their perceptions of the decision-making process and the resulting treatment decisions. There is no to little risk of selection bias as the participants are included consecutively in the study and not selected individually by the researcher. The participants recruited at baseline and lost to follow-up will be compared. The research team checks regularly on the participants via reminders 2 days before the interview and provides maximum flexibility when scheduling interview appointments.

Inclusion and exclusion criteria

Patients will be enrolled if they have undergone an active kidney transplantation, are scheduled for routine follow-up at the participating Kidney Transplant Centre (KTC), are willing and able to participate in the study and have provided written informed consent. In addition, patients must be able to communicate in German. SPs are eligible if they are 18 years of age or older and can provide informed consent. Physicians, namely, nephrologists, who are working in the participating clinic and responsible for the patients' after-care routine and using an existing AI-based DSS, are also eligible to participate in the study. This DSS assesses the risk of kidney transplant patients for transplant loss, rejections and infections within the next 90 days.²¹ The AI algorithm of the DSS is rigorously developed and pretested before deployment and is monitored by the study team of the technical subproject. The system is based on a Gradient Boosted Regression Tree (GBRT) and has been tested on retrospective data. Included patients will be randomised and assigned to the intervention (treatment with AI) or control group (treatment without AI) to enable comparisons. Within the post kidney transplant care AI research project, there is a quantitative substudy that uses clinical data to assess graft survival and complications such as graft loss and tract infection.

Sample size and recruitment

A total of 50 patient–SP dyads and their treating physicians will be recruited at baseline. Assuming a dropout rate of 20% per year, it is anticipated that 30 patient–SP dyads and 20 treating physicians will be included in the final follow-up. The age and gender of non-consenting patient–SP dyads will be recorded to investigate consent bias.

Eligible patients will be identified from clinic lists prior to their appointment by the treating physician who will inform patients and SPs about the study and ask for consent to speak with a member of the research team who will provide them with verbal and written study information, obtain informed consent and conduct the interview. Consent will also be obtained from the SP accompanying the patient to the appointment. If SPs are not present, the patients will be asked to give a recruitment packet to their SP. Applicants are aware of the need to ensure that data collection does not interfere with the functioning of the clinic. The research team will liaise with clinic staff and provide appropriate training to all research support staff to ensure that the recruitment process is efficient and runs smoothly.

Eligible physicians will be identified by the research team from clinic lists, will be invited to participate and will be provided with verbal and written study information and consent forms.

Data collection

It is planned that data collection for the baseline and 12- and 24-month follow-up interviews will be conducted in person. Data collection for the 3- and 6-month follow-up interviews will be conducted by telephone to reduce the research-related burden on participants. Patients may also appreciate being interviewed by telephone, as they may feel more relaxed when interviewed in this way and may find it easier to rearrange a telephone interview rather than a face-to-face interview.^{35–40} Participants will be able to choose the interview mode according to their preferences. They will be encouraged to express their views on how the AI-based DSS has impacted the physician–patient–SP communication and the decision-making process, in the way they prefer. The narrative approach will be used to elicit the variety and interplay of potential factors related to physician–patient communication in this area, followed by semi-structured questions.³¹ At the end of the interview, participants are given the opportunity to provide additional comments. The research team received intensive training of an interdisciplinary expert team in conducting these interviews to reduce bias in question framing, administration and interpretation. Standardised interview protocols are being used and three researchers will inductively and then deductively code the transcripts independently.

Interview guide and questions

The interview guide was developed based on a literature review and discussions among the interdisciplinary

research team, which included experts in medicine, communication and behavioural science, health services research, ethics and medical informatics. The preliminary interview guide can be found in online supplemental appendix 1. Participants are asked about:

1. Their communication experiences and preferences related to the use of AI in SDM: This will help explore and understand changes in preferred and perceived patient and SP involvement in decision-making, the role and impact of the AI-based DSS in the medical encounter, with a particular focus on AI potentially creating information asymmetries, but also transparency within the process of decision-making, as well as in understanding risks associated with treatment options and acceptance of AI-assisted SDM.
2. Their views on the impact of AI-based decision support on the normative foundations of the use of AI in medical decision-making: Participants will be asked questions about their perceptions of concepts such as trust, transparency or agency (defined as an agent with the capacity to act, and agency denotes the exercise or manifestation of this capacity).⁴¹ They will be asked how they evaluate the tool's outputs and how these outputs are related to their physicians' judgements. Participants may also be asked about their views on the validity, effectiveness and perceived likelihood of error of the system, as well as who is morally and legally responsible for individual treatment decisions.
3. Their perceptions of the use of AI-based decision support in routine care and the barriers and facilitators to its implementation: Participants will be asked about their perceptions of acceptability, ease of use, agreement with specific components of the system's outputs and self-efficacy (ie, belief that one can understand and use the system's outputs). Participants will also be asked about other potential barriers to the use of AI in clinical practice, such as environmental factors like time pressure.

Sociodemographic and disease variables gathered from patients and SPs will include gender, marital status, country of birth, zip code, highest level of education completed, income and perceived health status. SPs will also be asked to self-report their relationship with the patient and whether they live with the patient. All socio-demographic and disease variables will be assessed at baseline and follow-up to account for changes in participants' circumstances that may affect their views and experiences.¹⁴ With patients' permission, information on diagnosis, disease stage and treatments received will be obtained from patients' medical records to reduce the research-related burden on patients.

Data analysis

Interviews will be transcribed verbatim, pseudomised and checked for accuracy by a researcher before being analysed using framework analysis. This approach belongs to a broad family of qualitative data analysis methods often related to 'thematic analysis' or 'qualitative content

analysis'.⁴² As suggested by these approaches, both manifest and latent contents will be analysed, and descriptive and explanatory conclusions will be drawn from the data.⁴³ This qualitative data analysis method will provide a systematic model for mapping and interpreting the data, which is considered appropriate for developing a profound in-depth understanding of participants' communication experiences and preferences.^{44 45} This approach involves analysing both manifest and latent contents in order to draw descriptive and explanatory conclusions from the data.⁴³ Each interview will serve as a unit of analysis, and a journal of reasoning and additional ideas regarding data analysis will ensure transparency of the coding process. Coding will be conducted by two researchers and discussed during regular meetings of the interdisciplinary research team. ATLAS.ti will be used to support the analysis. It is anticipated that data saturation will be achieved with a sample of 30 kidney transplant recipients. Demographics will be presented using appropriate summary statistics.

Patient and public involvement

Patient representatives were involved in conceptualising the study as well as in piloting and further refining study materials, including study information and interview guide. Patients were also involved in piloting the AI-based DSS used in this study. In addition to that, patient representatives are members of the scientific advisory board. The study findings will be used to develop communication guidance for physicians on how to introduce and sustainably implement AI-assisted SDM. The study results will also be used to develop lay language patient information on AI-assisted SDM. A broad dissemination strategy will help communicate the results of this research to a variety of target groups, including scientific and non-scientific audiences, to allow for a more informed discourse among different actors from policy, science and society on the role and impact of AI in physician-patient communication.

Ethics and dissemination

This study will be conducted in accordance with the tenets of the Declaration of Helsinki (1996). The results of this research will be disseminated to various groups, including scientific and non-scientific audiences, through publications in newspapers, public science journals and institutional press releases. Findings will also be presented at congresses, symposia and science communication competitions and through social media channels. Interdisciplinary workshops and communication guidelines on AI-assisted SDM for clinicians and patients will be developed to facilitate the translation of research findings into clinical practice. The results will be summarised in a common governance perspective, highlighting points of connection and interrelatedness of the findings. This will further support an informed discourse between different stakeholders from policy, research and society on the role and impact of AI in medical encounters. Given

the funding period, the study can only conduct a 2-year follow-up.

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Appendix

Interview guide

Interview guide for patients

Stimulus

Thank you very much for your willingness to participate in our study. We are interested in your experiences with the conversation with your doctor. All experiences and opinions are welcome!

During our conversation, I will ask you a few questions, but mainly listen attentively and take notes to potentially follow up later. You can interrupt or end the conversation at any time.

Our conversation will be recorded, but the data will be completely anonymized and used exclusively for scientific purposes. If you do not wish to answer a question, that's completely fine.

Please think again about the conversation with your doctor. How did you experience the conversation?

1) Conversation Atmosphere, Setting, Shared Decision Making (SDM)

- How did the conversation proceed overall?

Who was present? What was discussed? What information were you given? How long did it last? What was helpful for you? What was challenging?

- How did you perceive the conversation with your doctor?

(Was anything different compared to previous conversations? Did the doctor address your needs and concerns, and if so, how?)

- Did you feel that you were provided with all the necessary information to make an informed decision? (if applicable)

- Family Members: What was particularly helpful/difficult for you about the conversation? (Were there things at the doctor's office or in the surroundings that bothered or distracted you?)

- Were there decisions that needed to be made?

(Were you involved in the decision, and if yes, how? If not, why not? How was the decision about your treatment made? What was the process? Could you express your thoughts and concerns, and if yes/no, to what extent? Did you ask questions, and if yes, what and why?)

2) General Questions about the Conversation Process

- What does the perfect doctor-patient conversation look like for you?
- How important is it to you to be involved in your clinical decision-making (brief explanation / informed discussion)? How precisely would you like to be involved? *How do you envision the ideal decision-making process?*
- What is your opinion of the medical staff, or in other words: how do you get along with the medical staff?

(What does having control over a medical treatment mean to you? Who is should have control over your treatment? Why?)

- How important is trust in your medical treatment?

(What needs to be in place for you to have trust in the treatment?)

- Who is responsible for the course of your treatment and why?
-

3) Questions about Attitudes and Dealing with Artificial Intelligence

In your conversation, a (support) tool, a so-called artificial intelligence (AI)-based device , was also used.

- Did you know that? If yes/no, why/how? How did the doctor discuss this with you?
 - What role did AI play in the conversation?
[Did the conversation or the treatment then differ from what you are used to? In what way (not)? Were you told how the AI tool works? If yes, how did you feel about it? How important is it to you, to understand the AI?]

- How did the treating doctor use AI?
(Could you discuss all questions/worries in regarding the AI?)

- Did AI influence your role in the conversation?

(If yes, how? If no, why not? What are your expectations regarding the use of AI in patient counseling? If you could choose, would you prefer treatment with or without AI? Why (not)?)

- How do you feel when you think about the possibility that artificial intelligence could influence your treatment? (E1/2)

(Does something scare or worry you when you think about the AI's decision? How did you feel when the AI shared your prognosis with you?)

- Can you once again explain in your own words what the AI is good for in treatment?

(What do you need to know about the AI, and who should inform you about it? What reasons might you have for not wanting to incorporate the AI into your treatment?)

- What would be important for you to know regarding AI?
(How important is it for you to know which data is used for prognosis? Why? Would you like to see and verify this data? Has this been offered to you? Would/was this important to you?)
- In your opinion, did AI affect the doctor's prognosis?
(If yes, how?)
- Can you please describe how your treatment decisions were made? *[How did it unfold? Were you able to understand and accept the decisions made with the help of AI? Why (or why not)?]*
- Is there something that would have helped you regarding the use of AI (as decision support) and discussing it? *If yes, what would that be?*
- Do you feel that you were provided with all the necessary information to make an informed decision?
- What do you think of the accuracy of AI predictions?
(Did you have concerns regarding the prediction? How does it affect you when AI makes decisions?)
- Do you think AI handles your data trustworthily?
(Why (not)?)
- Do you believe that AI acts "neutrally," guided by certain interests, or could also cause harm? (E2)
*(Could an AI discriminate against certain individuals or be manipulated differently?
Does this issue matter to you?)*
- What do you generally think about the inclusion of Artificial Intelligence (AI, brief explanation) in conversations with doctors after kidney transplantation?
- What would the optimal treatment using AI look like?
- Should AI be further developed and more integrated into medicine?
(Why (not)? Do you believe AI can replace the doctor? Why (not)?)

- When you now think about the concept of responsibility, does your assessment change with the use of AI? (E2)

Why (not)?

4) Questions about the Support Person (SP)

- Did you discuss with your family member after the conversation with the doctor?

If yes, what did you talk about? Did you also discuss AI? What exactly did you discuss?

- Could he/she express their questions/worries?

- Did the doctor also address your family member(s)?

- Did your family member(s) help you make a decision?

How would you rate the help? Did it change your relationship with your family member?

// Closing

5) Interview guide for Doctors

Good day, my name is X, I am a research assistant in the PRIMA-AI project, in which we investigate how AI affects doctor-patient conversations. Thank you for your willingness to participate in the interview (focus group)!

During our conversation, I will listen attentively and take notes to potentially clarify further questions later. You can interrupt or end the conversation at any time if you wish.

Please remember that our conversation will be recorded, but the data will be pseudonymized and used exclusively for scientific purposes.

Please think about the recent patient conversations in which treatment decisions were made with the help of AI.

- Do you use AI-supported systems for treatment decisions? If yes/no, to what extent and why (not)?
- Do you discuss AI during doctor-patient conversations? If yes/no, to what extent and why?
- What experiences have you had in this regard?
- Can you please describe how you prepare your patients for the results from the AI? (*Do you discuss the predictions/function of the tool with your patients? If yes, why and how? If not, why not?*)
- What role does AI play in the conversation with your patients?

And what role does it play in treatment decisions? What are your expectations regarding the use of AI in patient counseling?

- How do you assess the acceptance and rejection of AI among your patients?
- To what extent have you experienced changes in communication with patients since using an AI-assisted system?
- How has AI helped you make better decisions in the best interest of the patient?
- Have you received feedback from patients that led you to change or deepen your opinion about AI-assisted systems? *If yes, what was the feedback and how did it influence your opinion?*
- How important is it for you to understand how AI systems work? (E1/2)
- Do you think it's important to prepare for the AI tool in practice?

Or is it sufficient to know the basics of how it works? (How did you specifically prepare for the current tool? Have you dealt with any potential patient questions beforehand? Do you understand the basic working process of AI?)

- What do you need to be successful in working with AI? (T2)
- Is the integration of the AI tool into clinical practice easy? What do your colleagues say about AI?

What needs to change? (T2) Are there barriers to your work? How can implementation be made easier? What would be the best way to incorporate AI into the treatment process?

- When you think about AI becoming part of the decision-making, how do you feel about this idea?
- What are your major concerns about using this AI in your daily work?
- Do you have concerns about data privacy and security when using AI-assisted systems?

(If yes, what are your specific concerns?)

- How important do you think it is to understand how AI systems work? (E1/2)
- Do you believe that AI systems are ethically justifiable? (brief explanation) (E1/2)
- Should AI also be *held responsible for its statements*, for example, if the wrong therapy decision is made? Could AI also cause harm? (E1/2)
- How do you see the role of AI in future medical care? What should be done differently regarding the use of AI?

// closing

Appendix

Interview guide

Interview guide for patients

Stimulus

Thank you very much for your willingness to participate in our study. We are interested in your experiences with the conversation with your doctor. All experiences and opinions are welcome!

During our conversation, I will ask you a few questions, but mainly listen attentively and take notes to potentially follow up later. You can interrupt or end the conversation at any time.

Our conversation will be recorded, but the data will be completely anonymized and used exclusively for scientific purposes. If you do not wish to answer a question, that's completely fine.

Please think again about the conversation with your doctor. How did you experience the conversation?

1) Conversation Atmosphere, Setting, Shared Decision Making (SDM)

- How did the conversation proceed overall?

Who was present? What was discussed? What information were you given? How long did it last? What was helpful for you? What was challenging?

- How did you perceive the conversation with your doctor?

(Was anything different compared to previous conversations? Did the doctor address your needs and concerns, and if so, how?)

- Did you feel that you were provided with all the necessary information to make an informed decision? (if applicable)

- Family Members: What was particularly helpful/difficult for you about the conversation? (Were there things at the doctor's office or in the surroundings that bothered or distracted you?)

- Were there decisions that needed to be made?

(Were you involved in the decision, and if yes, how? If not, why not? How was the decision about your treatment made? What was the process? Could you express your thoughts and concerns, and if yes/no, to what extent? Did you ask questions, and if yes, what and why?)

2) General Questions about the Conversation Process

- What does the perfect doctor-patient conversation look like for you?
- How important is it to you to be involved in your clinical decision-making (brief explanation / informed discussion)? How precisely would you like to be involved? *How do you envision the ideal decision-making process?*
- What is your opinion of the medical staff, or in other words: how do you get along with the medical staff?

(What does having control over a medical treatment mean to you? Who is should have control over your treatment? Why?)

- How important is trust in your medical treatment?

(What needs to be in place for you to have trust in the treatment?)

- Who is responsible for the course of your treatment and why?
-

3) Questions about Attitudes and Dealing with Artificial Intelligence

In your conversation, a (support) tool, a so-called artificial intelligence (AI)-based device , was also used.

- Did you know that? If yes/no, why/how? How did the doctor discuss this with you?
 - What role did AI play in the conversation?
[Did the conversation or the treatment then differ from what you are used to? In what way (not)? Were you told how the AI tool works? If yes, how did you feel about it? How important is it to you, to understand the AI?]

- How did the treating doctor use AI?
(Could you discuss all questions/worries in regarding the AI?)

- Did AI influence your role in the conversation?

(If yes, how? If no, why not? What are your expectations regarding the use of AI in patient counseling? If you could choose, would you prefer treatment with or without AI? Why (not)?)

- How do you feel when you think about the possibility that artificial intelligence could influence your treatment? (E1/2)

(Does something scare or worry you when you think about the AI's decision? How did you feel when the AI shared your prognosis with you?)

- Can you once again explain in your own words what the AI is good for in treatment?

(What do you need to know about the AI, and who should inform you about it? What reasons might you have for not wanting to incorporate the AI into your treatment?)

- What would be important for you to know regarding AI?
(How important is it for you to know which data is used for prognosis? Why? Would you like to see and verify this data? Has this been offered to you? Would/was this important to you?)
- In your opinion, did AI affect the doctor's prognosis?
(If yes, how?)
- Can you please describe how your treatment decisions were made? *[How did it unfold? Were you able to understand and accept the decisions made with the help of AI? Why (or why not)?]*
- Is there something that would have helped you regarding the use of AI (as decision support) and discussing it? *If yes, what would that be?*
- Do you feel that you were provided with all the necessary information to make an informed decision?
- What do you think of the accuracy of AI predictions?
(Did you have concerns regarding the prediction? How does it affect you when AI makes decisions?)
- Do you think AI handles your data trustworthily?
(Why (not)?)
- Do you believe that AI acts "neutrally," guided by certain interests, or could also cause harm? (E2)
*(Could an AI discriminate against certain individuals or be manipulated differently?
Does this issue matter to you?)*
- What do you generally think about the inclusion of Artificial Intelligence (AI, brief explanation) in conversations with doctors after kidney transplantation?
- What would the optimal treatment using AI look like?
- Should AI be further developed and more integrated into medicine?
(Why (not)? Do you believe AI can replace the doctor? Why (not)?)

- When you now think about the concept of responsibility, does your assessment change with the use of AI? (E2)

Why (not)?

4) Questions about the Support Person (SP)

- Did you discuss with your family member after the conversation with the doctor?

If yes, what did you talk about? Did you also discuss AI? What exactly did you discuss?

- Could he/she express their questions/worries?

- Did the doctor also address your family member(s)?

- Did your family member(s) help you make a decision?

How would you rate the help? Did it change your relationship with your family member?

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- What role does AI play in the conversation with your patients?

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- To what extent have you experienced changes in communication with patients since using an AI-assisted system?
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- What do you need to be successful in working with AI? (T2)
- Is the integration of the AI tool into clinical practice easy? What do your colleagues say about AI?

What needs to change? (T2) Are there barriers to your work? How can implementation be made easier? What would be the best way to incorporate AI into the treatment process?

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- What are your major concerns about using this AI in your daily work?
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(If yes, what are your specific concerns?)

- How important do you think it is to understand how AI systems work? (E1/2)
- Do you believe that AI systems are ethically justifiable? (brief explanation) (E1/2)
- Should AI also be *held responsible for its statements*, for example, if the wrong therapy decision is made? Could AI also cause harm? (E1/2)
- How do you see the role of AI in future medical care? What should be done differently regarding the use of AI?

// closing