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**Breast Cancer Patient Preferences in Patient-Provider Discussions**

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Master of Public Health

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## **Abstract**

**Objectives.** To examine breast cancer patient preferences in patient/provider communication methods during prognostic and treatment side effect conversations in an exploratory survey study.

**Methods.** A sample of 28 breast cancer patients receiving care from Yale New Haven Hospital Smilow Cancer Center completed an in-person, scenario-based survey between February-April 2022. Utilizing Smilow Cancer Center's breast cancer repository, breast cancer patients who had a routine medical oncologist visit during the study period were recruited. Mann-Whitney U tests, univariate logistic regression, ordinal logistic regression, Wilcoxon Signed-Rank Tests, and qualitative analyses were utilized to determine patient preferences of communication methods that maximize patient understanding while minimizing patient stress, stratified by breast cancer stage.

**Results.** Statistical analyses supported the associations between higher breast cancer stages and preferences towards simplified conversation formats, and lower breast cancer stages and preferences towards detailed conversation formats. However, qualitative analyses and Signed-Rank Tests suggested that the incorporation of both simplified and detailed information was the most ideal format, regardless of a patient's breast cancer stage. Quantitative analyses also supported the association between higher breast cancer stages and stress due to detailed conversation formats. This finding was also supported by qualitative analyses that identified detailed information as a potential source of patient stress.

**Conclusion.** Breast cancer stage may influence a patient's preference for more simplified or detailed language during sensitive patient-provider conversations. Regardless of stage, participants noted the importance of a blended conversation that included both simplified and detailed information. Therefore, it may be optimal to ask a patient of their preferences before initiating a sensitive conversation.

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## **I. Introduction**

The National Health Service Cancer Plan has emphasized the importance of quality patient and provider communication (NHS, 2000). Given the patient has received enough information to make informed decisions, the clinician must balance how much detail about one's treatment or disease status should be conveyed against the emotional turmoil that the conversation could cause. The way a clinician presents sensitive information to patients may have implications for optimal patient understanding and future decision making.

Effective patient-provider communication has been the cornerstone quality healthcare, patient satisfaction, and optimal patient understanding (Fong Ha *et al.*, 2010). One fundamental factor of optimal communication has been cultivating a shared understanding of values between the patient and provider (Natafqi *et al.*, 2022). These values are often rooted in a patient's personal experiences, such as their health profile, medical literacy, and previous healthcare experiences (Natafqi *et al.*, 2022). Therefore, to successfully communicate with a patient, a provider must consider each patient's personal values and experiences.

Effective communication has also been shown to promote treatment compliance and more accurate diagnoses (Yeh *et al.*, 2020). However, one of the largest barriers to effective communication has been the accompanying stress of the situation itself (Yeh *et al.*, 2020). Studies have shown the link between stress and suboptimal decision making through three relevant pathways. First, patients under stress have failed to consider alternative situations to the one presented by their provider (Yeh *et al.*, 2020). Second, stress has played a role in dysregulated feedback processing that may promote suboptimal decision making (Yeh *et al.*, 2020). Third, stress has encouraged intuitive decision making rather than logical decision making, which may impact patient decision-making (Yeh *et al.*, 2020). When considering how to offer effective patient-

provider communication, the situational stress and a patient's susceptibility to stress must be taken into consideration.

Breast cancer patients have undergone several difficult decisions during treatment (Snaman *et al.*, 2019). These decisions have required increased cognitive demand and contributed to emotional stress, both of which have degraded a patient's ability to make optimal decisions (Zikmund-Fisher, 2008). Other major influences during the decision-making process are the clinicians themselves, how clinicians frame the patient's situation, and the patient's personal preferences and values (Fu *et al.*, 2015 and Aning *et al.*, 2012). For a patient to make the best treatment decisions, the clinician must convey data in a way that will align to a patient's preferences, promote optimal patient understanding, and be relevant to the patient's disease profile. For example, a young patient with metastatic cancer may need to know that treatment will not cure her cancer, but she may not be prepared to hear median survival or exact life expectancy. Given that these numbers are estimates and any individual patient could live much longer or shorter than the median, clinicians have struggled with knowing how much information to provide (Johnson *et al.*, 2015).

One study suggested that 20% of cancer patients prefer simplified information about their illness due to the psychological harm that may accompany specific data (Back *et al.*, 2006). While the study recommended that providers ask their patients about how they want to discuss their illness, it was unable to examine trends in preference based on a patient's personal experience and illness (Back *et al.*, 2006). Another study involving cancer patient communication preferences found that 87% of study participants wanted all possible information, as long as it was conveyed in a way that they could understand (Jenkins *et al.*, 2001). This finding suggests that comprehension plays a role in communication preferences.

The goal of this exploratory survey study is to understand how providers can best communicate with breast cancer patients to promote optimal patient understanding while minimizing associated stress. Specifically, this study is exploring methods of communication during conversations regarding prognosis and potential side effects from treatment. The survey will examine patient preferences between two scenarios that convey the same information in either a simplified or detailed format. The main aim of the study is to understand if a patient's breast cancer stage is associated with a preference toward one method of communication or the other.

## **II. Review of Relevant Studies**

A common scenario for cancer patients is wanting to know details about their cancer while experiencing challenges in understanding the information due to emotional stress and cognitive strain (Fu *et al.*, 2015). One qualitative study examined how conveying varied degrees of detail about the survival benefits to palliative chemotherapy impacted decision making (Audrey *et al.*, 2008). The study found that clinicians needed to balance giving detailed information with the amount of emotional pain that these conversations can bring to promote optimal patient understanding. For example, one study found that prognostic understanding was associated with increased patient stress, anxiety, and a worse quality of life (Epstein *et al.*, 2016). However, Epstein also found that patients with advanced cancer who had a prognosis conversation, regardless of the emotional response they may have had, ultimately left with a better understanding of their illness.

Conversations about prognosis and side effects should be patient centered (Lagarde *et al.*, 2008). One study examining metastatic cancer patient preferences for prognosis communication found that patients preferred detailed information that was communicated according to their



personal preference (Hagerty *et al.*, 2016). These preferences related to the extent, format, and timing of the conversation. Another study found that most of its sample patients who underwent esophagectomy for cancer desired information about prognosis (Lagarde *et al.*, 2008). A significant proportion of these patients wanted their clinician to initiate and lead the conversation using more realistic language than optimistic language. However, the study did not address how to best communicate realistic language.

A patient's demographics have also been found to influence decision making. One asthma study found that disease severity may impact a patient's preferences in disease management (Bereza *et al.*, 2015). A breast cancer study also examined how age can impact patient preference in decision making (Mandelblatt *et al.*, 2010). This study found that older breast cancer patients prefer to not receive chemotherapy due to their perceptions of side effects, such as toxicity risk (Mandelblatt *et al.*, 2010). Both studies revealed that patient demographics, such as age and disease severity, are important considerations in understanding patient preferences in decision making.

Knowledge about a patient's disease characteristics have also been found to influence decision making. A study of prostate cancer patients found that when patients learn about prognosis, side effect information, and other baseline characteristics, they are more likely to take an active role in the decision-making processes (Aning *et al.*, 2012). However, this study did not discuss how this information should be conveyed to elicit an active decision-making response.

When clinicians present data to patients, they have often reported data as it was reported in clinical trials. This was a challenging issue in patient-provider communication because study-formatted data may have not provided patients with transparent information about their individual benefit or risk. Statistically, this issue has represented the difference between relative risk reduction and absolute risk reduction. For example, if a clinician was reporting a patient's risk of

recurrence for different treatment paths, they may have failed to incorporate that the magnitude of risk reduction involved each patient's individual risk to start. So, if one treatment plan's risk of recurrence was 90%, then the absolute benefit of a 50% risk reduction was 45%. However, if a patient had a recurrence risk of 5%, the absolute benefit of a 50% risk reduction would only be 2.5%. To summarize, as a patient's starting risk declines, the absolute benefit between regimens becomes smaller and smaller, and regimens with higher toxicity may not be justified. It is not currently known how to optimally relay these statistical terms to patients so they can make informed choices that align with their preferences.

The most common provider strategies to convey prognosis have unintended consequences (Back *et al.*, 2006). One study found that the most conveyed tactics are realism, optimism, and avoidance. Because these approaches were found to be unsatisfactory for patients, the study offered a framework for discussing prognosis that involved asking the patient about her conversation preferences prior to divulging information (Back *et al.*, 2006). Some literature has also suggested that general concepts such as "months not years or years not decades" may be a usable framework for discussions about survival (Epstein *et al.*, 2016 and Epstein *et al.*, 2015). These studies argued that conveying prognostic ranges rather than specific prognostic estimates may be a more effective way to communicate realistic prognostic information that balances realism and hope (Epstein *et al.*, 2016). These studies also found that ongoing prognostic conversations were the most effective at accurate patient recognition of their cancer stage and at patient's recognizing their prognosis in terms of months, instead of years (Epstein *et al.*, 2015).

Data presentation has implications for patient understanding and preference. Patients have strongly preferred data presented in a pictograph format rather than conventional graphical formats. One hypothesis for this preference was the lessened cognitive effort needed to interpret

pictographs compared to graphs. Indeed, one study found that decision aid graph effectiveness was associated with graphical format (Zikmund-Fisher, 2008). However, when patients in this study were presented with the optimal pictograph format, patient understanding deficits remained. This finding contrasted that of another study, which found that pictographs were significantly associated with greater understanding when compared to text or tables (Tait et al., 2010). Further studies are needed to understand the optimal balance between graphical format, patient preference, and patient understanding.

Breast cancer patients face numerous difficult decisions throughout treatment. These decisions may be shaped by a patient's demographics or understanding of their diagnosis and treatment risk factors. The amount of detail that clinicians use to present this information may also cause variation in patient interpretation. Therefore, it is necessary to explore how clinicians can best present sensitive data that promotes optimal patient understanding, coincides with patient preferences, and minimizes associated patient stress.

### **III. Research Design**

#### ***Sampling and Recruitment***

In this mixed-methods study, 28 patients enrolled in breast cancer treatment at Yale New Haven Hospital's Smilow Cancer Center were introduced to a 10-minute paper survey study examining patient preferences for provider communication during stress-inducing prognostic and treatment side effect conversations. To be eligible for study participation, patients must have been diagnosed with breast cancer of any stage at least one year before study initiation. Patients also must have been 18 years old at study initiation and fluent in English. Patients who had a routine appointment scheduled with the Smilow Breast Center during the study period of February 2022

to April 2022 were eligible for study enrollment. During these appointments, the medical oncologist would introduce the patient to the survey study and ask if they would be interested in participating. If the patient expressed interest, they would be taken to a private room to review the associated consent form and complete the survey.

### ***Survey Instrument***

The survey instrument contained four sections: a demographic section, a prognosis communication section, a treatment side effect communication section, and an open-ended qualitative section. The demographic section asked patients for information regarding their current age, age of diagnosis, breast cancer stage at diagnosis, race/ethnicity, and education level. Both the prognosis and treatment side effect sections contained two conversational scenarios that conveyed the same information in different formats (Table 1). The first scenario of each section discussed prognosis and side effects, respectively, with more simplified and generalizable terminology. The second scenario of each section discussed prognosis and side effects, respectively, with a more detailed and data-driven approach. All scenarios were developed in tandem with a medical oncologist to ensure content and conversational accuracy.

Upon reading each scenario, participants were asked to rank how much they agreed with a set of listed statements on a 5-point Likert Scale, where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Statements can be found in Tables 2-6. After reading both scenarios in each section, participants were asked to compare each section's scenarios based on stress induction, personal preference, and optimal understanding using the same 5-point Likert Scale. Statements can be found in Tables 2-6. Finally, the fourth section contained open-ended questions regarding communication preferences. Participants had the opportunity to respond to the

following questions: What is your takeaway from these scenarios? How well did you understand each scenario, and did your understanding change with each scenario? Did you learn about how you prefer your data to be presented?

### *Analysis Methodology*

To account for small sample size, self-reported breast cancer stages were aggregated into two groups. The first group consisted of breast cancer stages 0, 1, and 2. The second group consisted of breast cancer stages 3 and 4. Demographic descriptive statistics were also aggregated to protect patient privacy. Nonrandom associations between aggregated descriptive statistics and aggregated breast cancer stages were assessed via Fisher's exact test in SAS software.

Mann-Whitney U tests in R software were utilized to assess a statistical difference between each scenarios' Likert scale responses across the aggregated breast cancer stages.

Recognizing the ordinal behavior of Likert scale responses, ordinal logistic regression was utilized in R software to understand the odds of survey responses based on aggregated breast cancer stage.

Univariate logistic regression was used to understand the association between Likert scale response and aggregated breast cancer stage. Before running the analyses, all Likert scale responses were visualized by histogram (Appendix IA, IB) to establish a universal cut point to divide responses by. Upon histogram analyses, all Likert scale responses were coded as indicator variables, with "strongly disagree," "disagree," and "neutral" consisting of one level and "agree" and "strongly agree" consisting of another level.

Wilcoxon Signed-Rank Tests were attempted to assess consistency in a patient's Likert scale response across corresponding prognosis and side effect scenarios. The Tests were also used

to compare a patient's Likert scale response between scenarios 1 and 2 for both prognosis and side effect topics, respectively.

Multivariate logistic regression was attempted to understand the influence of sociodemographic covariates on the univariate model. To do so, demographic variables were coded as indicator variables. Both age of diagnosis and current age variables were split into "age 18-64" and "age 65+" levels. The education variable was split into "high school" and "college and advanced degrees" levels. Finally, the race/ethnicity variable was split into "Caucasian" and "all other races."

Manual content analysis was utilized to assess qualitative survey questions. Inductive coding was implemented in RQDA software to recognize patterns and themes within the written survey responses. Coding occurred in six stages: reading the raw data, identifying key themes, labeling relevant text, reviewing existing codes, aggregating existing codes, and a final review of aggregated codes. This method of qualitative analysis was chosen due to the limited knowledge within the provider communication field.

### ***Ethical Considerations***

The survey study received exempt status by the Yale University Institutional Review Board. Upon patient recruitment, verbal consent was received by method of a recruitment script (Appendix II), and written consent was received by way of a written consent form. All survey instruments were kept in a locked cabinet to ensure complete security and confidentiality.

## **IV. Analysis of Findings**

### ***Self-Reported Descriptive Statistics***

Participants' self-reported data by itself and stratified by breast cancer stage were presented in Table 7A and 7B. A participant's current age, age at diagnosis, highest education level, and race/ethnicity acted as variables of interest. To protect patient privacy and visualize more appreciable results, demographic data was aggregated from the original levels offered on the survey. Fisher's exact test was utilized to determine significant associations between breast cancer stage and all other study variables. All study variables were significantly associated with breast cancer stage ( $P < 0.001$ ).

### ***Evaluating Likert Responses by Breast Cancer Stage***

#### ***Mann-Whitney U Tests***

Mann-Whitney U tests were utilized to explore the relationship between Likert scale responses and aggregated breast cancer stages. Median Likert scale responses stratified by breast cancer stage were listed alongside Mann-Whitney U findings. Responses to statements associated with the prognosis scenarios were not found to be significantly different between breast cancer stages (Table 2A, 2B, 2C). Similarly, responses to statements associated with side effect scenarios 1 and 2 were also not found to be significantly different between breast cancer stages (Table 3A, 3B).

When comparing side effect scenario 1 and scenario 2, three statement responses were significantly different between breast cancer stages (Table 3C). When responding to the statement that the detailed side effect scenario induced more feelings of anxiety, depression, or stress, the responses of participants with lower breast cancer stages were significantly different than

responses by participants with higher breast cancer stages ( $W=21.0, P<0.001$ ). The median Likert response for participants with lower breast cancer stages was 3, and the median Likert response for participants with higher breast cancer stages was 5. When responding to the statement of preference towards the more simplified format, the responses of participants with lower breast cancer stages were significantly different than responses by participants with higher breast cancer stages ( $W=40.0, P=0.015$ ). The median Likert response for participants with lower breast cancer stages was 2, while the median Likert response for participants with higher breast cancer stages was 4. Finally, when responding to the statement of preference towards the more detailed format, the responses of participants with lower breast cancer stages were significantly different than responses by participants with higher breast cancer stages ( $W=136.0, P=0.026$ ). The median Likert response for participants with lower breast cancer stages was 4, while the median Likert response for participants with higher breast cancer stages was 2.5.

#### *Univariate Logistic Regression Tests*

Participant responses on the Likert scale were collapsed into two groups that indicated agreement or disagreement. This indicator version of Likert scale responses acted as a response variable in a univariate logistic model to understand the relationship between participant preferences and breast cancer stage. No participant responses associated with any prognosis scenario were significantly associated with breast cancer stage (Table 4A, 4B). In addition, no participant responses associated with both the simplified and detailed side effect scenarios were significantly associated with breast cancer stage (Table 5A).

Two participant responses relating to the comparison of side effect conversation formats were significantly associated with breast cancer stage (Table 5B). The first significant association



regarded the following statement: “The detailed scenario made me experience more feelings of anxiety, depression, or stress than the simplified scenario.” The odds of choosing “agree” or “strongly agree” to this statement were 14 times greater for patients with breast cancer stage 3 or 4 compared to patients with breast cancer stage 0, 1, or 2 ( $P=0.037$ ). The second significant association regarded the following statement: “I prefer the detailed scenario format more than the simplified scenario format.” The odds of choosing “agree” or “strongly agree” to this statement were 0.07 times that for patients with breast cancer stage 3 or 4 compared to patients with breast cancer stage 0, 1, or 2 ( $P=0.037$ ).

#### *Wilcoxon Signed-Rank Test*

Wilcoxon Signed-Rank Tests were used to examine a patient’s consistency in preference for both prognostic and side effect scenarios (Table 6A, 6B, 6C). The median Likert scale response value by aggregated breast cancer stage was evaluated for both prognosis scenarios and side effect scenarios. The samples used in the Signed-Rank Tests were the Likert responses for a prognosis statement and its corresponding side effect statement (e.g., the simplified prognosis scenario statement regarding stress and the simplified side effect scenario statement regarding stress were analyzed together). The test for all comparisons yielded no significant associations, suggesting that Likert scale responses were not significantly different between corresponding prognosis and side effect scenario statements for patients of a similar breast cancer stage. This finding suggests that patients expressed similar opinions towards simplistic vs. detailed scenarios, regardless of topic.

Signed-Rank Tests were also used to visualize Likert scale responses for each aggregated stage group between scenarios 1 and 2 for both prognosis and side effect preferences (Appendix IIIA, IIIB). The goal of this analysis was to understand if a patient prefers the simplified or detailed

scenario for each topic. All results were nonsignificant to an alpha level of 0.05. These findings suggest that there were no significant differences between a patient's scenario 1 and scenario 2 preferences, regardless of topic.

### *Ordinal Logistic Regression Tests*

To model the relationship between aggregated breast cancer stage and Likert scale responses, ordinal logistic regression was employed. Likert scale responses in relation to all prognosis scenarios did not have a significant association with breast cancer staging (Appendix IVA, IVB). In addition, Likert scale responses related to side effect scenarios 1 and 2 did not have a significant association with breast cancer staging (Appendix VA).

Three Likert scale responses for statements comparing the two side effect scenario formats had a significant association with breast cancer staging (Appendix VB). The first significant association regarded the following statement: "The detailed scenario made me experience more feelings of anxiety, depression, or stress than the simplified scenario." The odds of disagreeing with this statement was 71.1 times higher for patients with breast cancer stage 0, 1, or 2 compared to patients with breast cancer stage 3 or 4 ( $P=0.001$ ).

The second significant association regarded the following statement: "I prefer the simplified scenario format more than the detailed scenario format." The odds of disagreeing with this statement was 7.07 times higher for patients with breast cancer stage 0, 1 or 2 compared to patients with breast cancer stage 3 or 4 ( $P=0.013$ ).

Finally, the third significant association regarded the following statement: "I prefer the detailed scenario format more than the simplified scenario format." The odds of disagreeing with

this statement was 0.17 times that for patients with breast cancer stage 0, 1, or 2 compared to patients with breast cancer stage 3 or 4 (P=0.022).

### *Qualitative Analysis*

The open-ended questions allowed participants to reflect on how their own experiences influenced their decision making throughout the survey. Coding all responses resulted in three major themes that resonated throughout the participant sample.

#### *Information Processing Deficits Upon News of Diagnosis*

Most participants expressed that being given a cancer diagnosis impeded their ability to understand subsequent information in the patient-provider conversation. Many expressed the desire for processing time between initial diagnosis and more detailed information to allow for an opportunity to overcome overwhelming feelings of shock and stress.

*“The anxiety of being told you have breast cancer leaves your head cloudy of what is being said about your treatment. You just fully don’t understand what is being said both ways.”*

Considering the several important decisions that breast cancer patients must make, it is imperative for optimal understanding to occur during patient-provider conversations, especially those surrounding prognosis and potential treatment side effects. One participant suggested that external support may aid in information retention.

*“People need to have family members in the room. Otherwise, no one will help or ask the right questions or remember the information.”*

### *Facts and Figures as a Source of Comfort, for Some*

The more detailed scenario offered some participants more comfort than the simplified scenario because they believed that the emphasis on numerical data equated to a more thorough conversation that “focused on the facts.” One participant noted her background in scientific research and how it has influenced her preference towards more specific terminology. Another participant noted that patients with more advanced medical literacy would benefit from more specific terminology, while those without wouldn’t receive any added benefit.

*“I think using terms, like chemotherapy and triple negative are too much information for the brain of a person that is receiving the prognosis. Maybe you can be more empathetic and go down you level to the person.”*

Participants who did not experience terminology-focused patient-provider conversations noted their desire to have had that option. While most participants found the simplified scenario to be more comforting and empathetic towards one’s stress level, some patients wished for more specific information to see the full picture.

*“I remember when I was first diagnosed, they just said I have cancer. It was very stressful, and I wish they told me more.”*

While some participants advocated for more information during stressful conversations, others warned against providing too much detail. Considering the amount of stress induced in prognosis and side effect conversations, the provider must acknowledge that patients who do prefer more detailed information also have limits when it comes to data intake.

*“I like to receive detailed information and to ask questions for further details or clarification that applies to a patient with my specific diagnosis/condition. Sometimes, doctors provide a sea of data, statistics, percentages that can be confusing when you are receiving a new and negative diagnosis.”*

### *The Importance of Timing*

When deciding between the two scenario formats, most participants stated that they preferred a mixture of the two approaches. These participants stressed how easing into these conversations would have allowed them to emotionally accept their diagnosis and be more ready to accept detailed information. One participant remembered that during her diagnosis, she did not know anything about cancer and was not able to fully participate in her prognosis and side effect conversations with her provider. While she would have benefitted from more generalized language at her diagnosis, she stated that now, after having learned the terminology, she was ready to have more detailed conversations.

*“Now that I lived the experience of breast cancer, I understood everything. But back on my first day, the terms [would be] too complicated. you don’t understand anything that day.”*

The most prominent theme that emerged from the analysis was having appropriate timing for conducting these conversations. Participants urged providers to express empathy and recognize when participants could not continue in a conversation. Breaking up the conversation into segments and continually checking the patient’s mental health was of the utmost importance.

*“More detail is generally a good thing. However, you must also consider readiness to hear info. Timing is everything. Sometimes people need to adjust to the diagnosis before hearing all the details.”*

## V. Discussion

### *Summary*

The analysis did not find significant associations between prognosis scenario preferences but did find significant associations between side effect scenario preferences. This may be attributed to potential biases due to the prognosis scenarios being the first section in the survey. It may also be attributed to the sensitivity of the prognosis conversation and needing the provider to initiate and drive the conversation, resulting in more neutral responses (Clayton *et al.*, 2005).

The responses to three side effect-related statements were found to be significantly associated with breast cancer stage by both the Mann-Whitney U Test and Ordinal Logistic Regression Analysis.

One association pointed to patients with higher breast cancer stages preferring conversations about side effects that include more simplified terminology. This finding was directly supported by findings from the univariate logistic regression. Considering their more advanced cancer profile, this cohort may experience excess stress and may want to limit their exposure to additional stress. However, considering the small sample size and subsequent lack of robust findings, it may be possible that this patient cohort prefers detailed information as well. The qualitative analysis suggested that while the simplified format caters to the difficulty of the conversation, accessing all the available information may also appease stress. As a result, these findings cannot rule out the possibility that patients with advanced breast cancer stages also prefer detailed information.

A second association from the Mann-Whitney test and ordinal logistic regression related patients with a lower breast cancer stage with a preference towards a more detailed conversational format. This cohort may wish to know all options when it comes to possible treatment side effects and how they may interfere with their quality of life (Mayo Clinic, 2021). Again, the small sample

size hindered the robustness of this association. It may be possible that patients within this cohort also prefer more simplified information.

The third association from the Mann-Whitney test and ordinal logistic regression found that patients with breast cancer stage 0, 1, or 2 were less likely to experience stress, anxiety, or depression from hearing the detailed side effect scenario compared to patients with higher breast cancer stages. This finding was directly supported by findings from the univariate logistic regression. Patients with more advanced cancer profiles may have endured severe stress due to fear of cancer progression, symptoms, finances, or death (Al-Azri *et al.*, 2014). Detailed information may cause an unnecessary burden on patients exposed to chronic stress and may be counterproductive for optimal understanding and stress mitigation.

Wilcoxon Signed-Rank Tests supported the idea that patients had similar conversation preferences, regardless of scenario topic. This finding implies that patients may have consistent conversation format preferences across topics, suggesting that physicians should try to tailor their conversation format to the patient, not the topic.

Signed-Rank Tests also found that patients had similar preferences for both the simplified and detailed version of a scenario, regardless of topic. This finding corresponds to that of the qualitative analysis, which found that the majority of patients prefer a blended conversation consisting of both detailed and simplified components.

The qualitative analysis suggested three main themes related to patient conversational preferences: the importance of a patient's capacity to understand detailed information, the significance of tailoring information to the appropriate audience, and the relevance of considering when to present detailed information. As a provider, it is imperative to remember that a patient's personal preference will influence their capacity to understand and participate in any stress-

inducing conversation. Many patients said they needed time to accept their diagnoses before partaking in more detailed discussions. Some patients noted the desire to have someone else in the room with them during stressful conversations as a form of social support.

Multivariate analyses were attempted to adjust the model for patients' sociodemographic covariates. However, the model failed to converge due to a limited sample size.

The aforementioned associations support the expansion of this exploratory study into a larger, more comprehensive study that encompasses a larger sample size, multiple test centers, and a longer study period.

### *Limitations*

This study faced several limitations. First, the limited sample size was largely homogenous and impacted the robustness and power of all analyses. As a result, all estimates found in this analysis should be subject to further statistical scrutiny. Second, all Likert scale responses were prone to the central tendency bias, acquiescence bias, and social desirability bias, which may have impacted survey findings. Third, a few participants neglected to complete the qualitative questions. As a result of this missing data, the qualitative themes may be biased towards participants with personal interest in the study and extra time to spare after their oncology appointments. Finally, the collapse of Likert scale data could have been more clinically relevant by isolating stage four cancer into one level of the variable, and stages 0, 1, 2, and 3 into the other level of the variable.

The survey design was also subject to limitations. While the survey was designed with literacy rates in mind, some participants still experienced confusion due to the survey. In addition, many patients responded to the Likert scale questions based on their personal prognosis and side effect experiences, rather than the associated scenario. Finally, family members who accompanied



participants in the survey would offer input, which may have skewed the respondent's personal answer choices.

### ***Future Recommendations***

The significant associations found in this pilot study indicate the need for a larger, more comprehensive study. A future recommendation is to continue collecting data to add to this sample or conduct another comprehensive survey study with a longer data collection allotment time.

In addition to conducting another comprehensive survey study, the order that the scenarios are in be randomized to prevent potential respondent biases. The ranking difference between each scenario may be analyzed to view individual patient preferences.

To continue studying breast cancer patient preferences, it is important to conduct more mixed-methods studies with a larger, more heterogeneous cohort. It may be beneficial to conduct the study in multiple care sites to account for regional differences in patient/provider conversations.

Providers should also be continually educated on bedside manner and how to conduct sensitive conversations. Providing educational materials for providers may benefit bedside manner in a scalable manner.

This study was unable to study patient preferences in relation to pictographs or visual aids. Considering their vast impact on how information is conveyed in a healthcare setting, exploring patient preferences for these decision aids could impact the way providers utilize decision aids.

## *Conclusions*

Patient-provider prognosis and side effect conversations are some of the most important conversations that breast cancer patients will have with their provider. It is imperative that patients experience optimal understanding of the conversation with minimal associated stress.

The analysis did not find significant associations between prognosis scenario preferences but did find significant associations between side effect scenario preferences. However, analyses suggest that patients with similar breast cancer stages have a consistent preference for conversation format, regardless of topic.

Patients with higher breast cancer stages were found to prefer simplified conversational formats and patients with lower breast cancer stages were found to prefer detailed conversational formats. The qualitative analysis found that rather than patients preferring one method alone, they preferred a blended format consisting of both simplified and detailed information.

Overall, the aforementioned associations suggest that breast cancer patient preferences for sensitive conversations are highly variable and dependent on several factors. While it may be helpful for providers to see that more advanced cancer stage patients prefer simplified formats and lower stage patients prefer detailed formats, the trend suggesting that patients have consistent preferences regardless of topic suggests that providers may benefit from establishing a baseline preference for future conversations. Perhaps, by asking about data presentation upfront, breast cancer patients will experience a more tailored conversation experience.

**Table 1.** Prognosis and Side Effect Scenarios Used in Survey

<i>Overall Theme</i>	<i>Scenario Version</i>	<i>Content</i>
Prognosis	Scenario 1 ( <i>Simplified</i> )	“Imagine that you are visiting your doctor for newly diagnosed breast cancer. You are expecting to have a conversation regarding your prognosis. To explain your prognosis, your doctor says the following: ‘Your cancer is high risk. Patients with your cancer profile substantially benefit from chemotherapy. Chemotherapy will offer substantial reduction to your cancer.’”
	Scenario 2 ( <i>Detailed</i> )	“Imagine that you are visiting your doctor for a new diagnosis of breast cancer. You are expecting to have a conversation regarding your prognosis. To explain your prognosis, your doctor says the following: ‘You have Stage 3 Triple Negative breast cancer. Your cancer profile has a 50% risk of recurrence. Chemotherapy may reduce your risk of recurrence by 25%.’”
Treatment Side Effects	Scenario 1 ( <i>Simplified</i> )	“Imagine that you are visiting your doctor for newly diagnosed breast cancer. You are expecting to have a conversation regarding your treatment options and the accompanying side effects. In this Scenario, you are looking for a treatment for an early breast cancer diagnosis. To explain a treatment option, your doctor says the following: ‘One treatment option is the use of Femara (letrozole). Many patients with your cancer profile who used Femara had adverse reactions that were mild or moderate. For example, some patients experience joint pain and bone fractures.’”
	Scenario 2 ( <i>Detailed</i> )	“Imagine that you are visiting your doctor for an exam. You are expecting to have a conversation regarding your treatment options and the accompanying side effects. In this Scenario, you are looking for a treatment for an early breast cancer diagnosis. To explain a treatment option, your doctor says the following: ‘One treatment option is the use of Femara (letrozole). 75% of patients with your cancer profile who used Femara had adverse reactions that were Grades 1 or 2 on the Common Toxicity Criteria scale. As an example of these adverse reactions, 20% of women get joint pain and an extra 10% of women get bone fractures.’”

**Table 2A.** Prognosis Scenario 1 Statement Interpretation<sup>1</sup>

Statement	Median <sup>2</sup>		W-statistic <sup>3</sup>	P*
	Stage 0, 1, 2	Stage 3, 4		
This scenario made me experience feelings of anxiety, depression, or stress.	5	5	95.5	0.789
The information made me fully understand my prognosis.	2.5	2	96.5	0.767
I still have questions regarding my prognosis.	5	4	126.0	0.065

<sup>1</sup> Mann-Whitney U Test comparing Likert scale responses based on aggregated breast cancer group

<sup>2</sup> Median based on 1-5 Likert Scale

<sup>3</sup> W-statistic from Mann-Whitney U Test

\*P-value for Mann-Whitney U Test

**Table 2B.** Prognosis Scenario 2 Statement Interpretation<sup>1</sup>

Statement	Median <sup>2</sup>		W-statistic <sup>3</sup>	P*
	Stage 0, 1, 2	Stage 3, 4		
This scenario made me experience feelings of anxiety, depression, or stress.	4	5	80.0	0.619
The information made me fully understand my prognosis.	3	2	109.5	0.351
I still have questions regarding my prognosis.	4	3	121.5	0.115

<sup>1</sup> Mann-Whitney U Test comparing Likert scale responses based on aggregated breast cancer group

<sup>2</sup> Median based on 1-5 Likert Scale

<sup>3</sup> W-statistic from Mann-Whitney U Test

\*P-value for Mann-Whitney U Test

**Table 2C.** Comparison of Simplified and Detailed Prognosis Scenarios<sup>1</sup>

Statement	Median <sup>2</sup>		W-statistic <sup>3</sup>	P*
	Stage 0, 1, 2	Stage 3, 4		
The simplified scenario made me experience more feelings of anxiety, depression, or stress than the detailed scenario.	3.5	2.5	104.5	0.491
The detailed scenario made me experience more feelings of anxiety, depression, or stress than the simplified scenario.	3	3.5	89.5	1.000
The information in the simplified scenario made me understand my prognosis better than the information in the detailed scenario.	2.5	2	115.5	0.216
The information in the detailed scenario made me understand my prognosis better than the information in the simplified scenario.	4	2.5	127.0	0.072
I prefer the simplified scenario format more than the detailed scenario format.	2	3	69.5	0.318
I prefer the detailed scenario format more than the simplified scenario format.	4	2.5	115.0	0.225

<sup>1</sup> Mann-Whitney U Test comparing Likert scale responses based on aggregated breast cancer group

<sup>2</sup> Median based on 1-5 Likert Scale

<sup>3</sup> W-statistic from Mann-Whitney U Test

\*P-value for Mann-Whitney U Test

**Table 3A.** Treatment Side Effect Scenario 1 Statement Interpretation<sup>1</sup>

Statement	Median <sup>2</sup>		W-statistic <sup>3</sup>	P*
	Stage 0, 1, 2	Stage 3, 4		
This scenario made me experience feelings of anxiety, depression, or stress.	4	4	96.0	0.783
The information made me fully understand potential side effects.	2.5	4	65.5	0.232
I still have questions regarding potential treatment side effects.	4	4	98.5	0.687

<sup>1</sup> Mann-Whitney U Test comparing Likert scale responses based on aggregated breast cancer group

<sup>2</sup> Median based on 1-5 Likert Scale

<sup>3</sup> W-statistic from Mann-Whitney U Test

\*P-value for Mann-Whitney U Test

**Table 3B.** Treatment Side Effect Scenario 2 Statement Interpretation<sup>1</sup>

Statement	Median <sup>2</sup>		W-statistic <sup>3</sup>	P*
	Stage 0, 1, 2	Stage 3, 4		
This scenario made me experience feelings of anxiety, depression, or stress.	4	4	80.0	0.634
The information made me fully understand potential side effects.	4	3	117.5	0.178
I still have questions regarding potential treatment side effects.	4	4	87.5	0.918

<sup>1</sup> Mann-Whitney U Test comparing Likert scale responses based on aggregated breast cancer group

<sup>2</sup> Median based on 1-5 Likert Scale

<sup>3</sup> W-statistic from Mann-Whitney U Test

\*P-value for Mann-Whitney U Test

**Table 3C.** Comparison of Simplified and Detailed Treatment Side Effect Scenarios<sup>1</sup>

Statement	Median <sup>2</sup>		W-statistic <sup>3</sup>	P*
	Stage 0, 1, 2	Stage 3, 4		
The simplified scenario made me experience more feelings of anxiety, depression, or stress than the detailed scenario.	3	3	90.5	1.000
The detailed scenario made me experience more feelings of anxiety, depression, or stress than the simplified scenario.	3	5	21.0	<0.001 ***
The information in the simplified scenario made me understand treatment side effects better than the information in the detailed scenario.	2	2	95.0	0.823
The information in the detailed scenario made me understand treatment side effects better than the information in the simplified scenario.	4	2.5	110.5	0.323
I prefer the simplified scenario format more than the detailed scenario format.	2	4	40.0	0.015 ***
I prefer the detailed scenario format more than the simplified scenario format.	4	2.5	136.0	0.026 ***

<sup>1</sup> Mann-Whitney U Test comparing Likert scale responses based on aggregated breast cancer group

<sup>2</sup> Median based on 1-5 Likert Scale

<sup>3</sup> W-statistic from Mann-Whitney U Test

\*P-value for Mann-Whitney U Test

**Table 4A.** Univariate Logistic Regression, Prognosis Scenario<sup>1</sup> by Breast Cancer Stage<sup>2</sup>

Prognosis Scenario	Statement	Estimate (95% CI) <sup>3</sup>	P*
1 (Simplified)	This scenario made me experience feelings of anxiety, depression, or stress.	0.467 (0.06, 3.44)	0.440
	The information made me fully understand my prognosis.	0.67 (0.11, 4.06)	0.654
	I still have questions regarding my prognosis.	0.19 (0.02, 1.55)	0.1115
2 (Detailed)	This scenario made me experience feelings of anxiety, depression, or stress.	0.14 (0.00, 1.93)	0.135
	The information made me fully understand my prognosis.	0.54 (0.09, 3.20)	0.479
	I still have questions regarding my prognosis.	0.13 (0.02, 1.01)	0.051

<sup>1</sup> Response variable: aggregated Likert scale responses, where strongly agree/agree is the qualitative attribute (1) and neutral/disagree/strongly disagree is the reference (0)

<sup>2</sup> Predictor variable: aggregated breast cancer stage, where stage 3,4 is the qualitative attribute (1) and stage 0,1,2 is the reference (0)

<sup>3</sup> Exponentiated log odds of univariate logistic regression

\*P-value for univariate logistic regression



**Table 4B.** Univariate Logistic Regression, Prognosis Scenario<sup>1</sup> Comparison by Breast Cancer Stage<sup>2</sup>

Statement	Estimate (95% CI) <sup>3</sup>	P*
The simplified scenario made me experience more feelings of anxiety, depression, or stress than the detailed scenario.	0.43 (0.07, 32.55)	0.338
The detailed scenario made me experience more feelings of anxiety, depression, or stress than the simplified scenario.	1.25 (0.23, 6.75)	0.79
The information in the simplified scenario made me understand my prognosis better than the information in the detailed scenario.	0.22 (0.02, 2.68)	0.225
The information in the detailed scenario made me understand my prognosis better than the information in the simplified scenario.	0.21 (0.03, 1.32)	0.093
I prefer the simplified scenario format more than the detailed scenario format.	1.33 (0.23, 7.61)	0.737
I prefer the detailed scenario format more than the simplified scenario format.	0.34 (0.06, 2.05)	0.229

<sup>1</sup> Response variable: aggregated Likert scale responses, where strongly agree/agree is the qualitative attribute (1) and neutral/disagree/strongly disagree is the reference (0)

<sup>2</sup> Predictor variable: aggregated breast cancer stage, where stage 3,4 is the qualitative attribute (1) and stage 0,1,2 is the reference (0)

<sup>3</sup> Exponentiated log odds of univariate logistic regression

\*P-value for univariate logistic regression

**Table 5A.** Univariate Logistic Regression, Side Effect Scenario<sup>1</sup> by Breast Cancer Stage<sup>2</sup>

Side Effect Scenario	Statement	Estimate (95% CI) <sup>3</sup>	P*
1 (Simplified)	This scenario made me experience feelings of anxiety, depression, or stress.	0.95 (0.17, 5.33)	0.956
	The information made me fully understand my prognosis.	1.88 (0.34, 10.35)	0.456
	I still have questions regarding my prognosis.	0.90 (0.14, 5.71)	0.905
2 (Detailed)	This scenario made me experience feelings of anxiety, depression, or stress.	1.49 (0.25, 8.96)	0.655
	The information made me fully understand my prognosis.	0.16 (0.03, 1.05)	0.056
	I still have questions regarding my prognosis.	0.67 (0.10, 4.48)	0.665

<sup>1</sup>Response variable: aggregated Likert scale responses, where strongly agree/agree is the qualitative attribute (1) and neutral/disagree/strongly disagree is the reference (0)

<sup>2</sup> Predictor variable: aggregated breast cancer stage, where stage 3,4 is the qualitative attribute (1) and stage 0,1,2 is the reference (0)

<sup>3</sup> Exponentiated log odds of univariate logistic regression

\*P-value for univariate logistic regression

**Table 5B.** Univariate Logistic Regression, Side Effect Scenario<sup>1</sup> Comparison by Breast Cancer Stage<sup>2</sup>

Statement	Estimate (95% CI) <sup>3</sup>	P*
The simplified scenario made me experience more feelings of anxiety, depression, or stress than the detailed scenario.	1.11 (0.18, 7.10)	0.905
The detailed scenario made me experience more feelings of anxiety, depression, or stress than the simplified scenario.	14.14 (1.19, 167.80)	0.037 ***
The information in the simplified scenario made me understand my prognosis better than the information in the detailed scenario.	1.73 (0.29, 10.24)	0.530
The information in the detailed scenario made me understand my prognosis better than the information in the simplified scenario.	0.33 (0.06, 1.90)	0.206
I prefer the simplified scenario format more than the detailed scenario format.	3.90 (0.66, 23.05)	0.127
I prefer the detailed scenario format more than the simplified scenario format.	0.07 (0.00, 0.84)	0.037 ***

<sup>1</sup> Response variable: aggregated Likert scale responses, where strongly agree/agree is the qualitative attribute (1) and neutral/disagree/strongly disagree is the reference (0)

<sup>2</sup> Predictor variable: aggregated breast cancer stage, where stage 3,4 is the qualitative attribute (1) and stage 0,1,2 is the reference (0)

<sup>3</sup> Exponentiated log odds of univariate logistic regression

\*P-value for univariate logistic regression

**Table 6A.** Comparing Simplified Prognosis and Side Effect Answer Medians by Aggregated Cancer Stage

Statement	Stage 0, 1, 2			Stage 3, 4		
	Prognosis Median <sup>1</sup>	Side Effect Median <sup>2</sup>	P-Value <sup>3</sup>	Prognosis Median <sup>1</sup>	Side Effect Median <sup>2</sup>	P-Value <sup>3</sup>
This scenario made me experience feelings of anxiety, depression, or stress.	5	4	0.087	5	4	0.520
The information made me fully understand my prognosis/side effects.	2.5	2.5	0.424	2	4	0.052
I still have questions regarding my prognosis/side effects.	5	4	0.200	4	4	0.850

<sup>1</sup>Median Likert stage value for simplified prognosis scenario

<sup>2</sup>Median Likert stage value for simplified side effect scenario

<sup>3</sup>P-value for Wilcoxon Signed-Rank Test

**Table 6B.** Comparing Detailed Prognosis and Side Effect Answer Medians by Aggregated Cancer Stage

Statement	Stage 0, 1, 2			Stage 3, 4		
	Prognosis Median <sup>1</sup>	Side Effect Median <sup>2</sup>	P-Value <sup>3</sup>	Prognosis Median <sup>1</sup>	Side Effect Median <sup>2</sup>	P-Value <sup>3</sup>
This scenario made me experience feelings of anxiety, depression, or stress.	4	4	0.0512	5	4	1.000
The information made me fully understand my prognosis/side effects.	3	4	0.116	2	3	0.665
I still have questions regarding my prognosis/side effects.	4	4	0.169	3	4	0.423

<sup>1</sup>Median Likert stage value for detailed prognosis scenario

<sup>2</sup>Median Likert stage value for detailed side effect scenario

<sup>3</sup>P-value for Wilcoxon Signed-Rank Test

**Table 6C.** Comparing Prognosis and Side Effect Comparison Statement Answer Medians by Aggregated Cancer Stage

Statement	Stage 0, 1, 2			Stage 3, 4		
	Prognosis Median <sup>1</sup>	Side Effect Median <sup>2</sup>	P-Value <sup>3</sup>	Prognosis Median <sup>1</sup>	Side Effect Median <sup>2</sup>	P-Value <sup>3</sup>
The simplified scenario made me experience more feelings of anxiety, depression, or stress than the detailed scenario.	3.5	3	0.266	2.5	3	1.000
The detailed scenario made me experience more feelings of anxiety, depression, or stress than the simplified scenario.	3	3	0.100	3.5	5	0.098
The information in the simplified scenario made me understand my prognosis/side effects better than the information in the detailed scenario.	2.5	2	0.628	2	2	0.472
The information in the detailed scenario made me understand my prognosis/side effects better than the information in the simplified scenario.	4	4	0.746	2.5	2.5	0.784
I prefer the simplified scenario format more than the detailed scenario format.	2	2	0.932	3	4	0.071
I prefer the detailed scenario format more than the simplified scenario format.	4	4	0.410	2.5	2.5	0.386

<sup>1</sup>Median Likert stage value for comparison of prognosis scenarios

<sup>2</sup>Median Likert stage value for comparison of side effect scenarios

<sup>3</sup>P-value for Wilcoxon Signed-Rank Test

**Table 7A.** Distribution of Study Variables

Variable	Total Sample N (%) <sup>1</sup>
<b>Current Age</b>	
18-44	1 (3.6)
45-64	16 (57.1)
65+	11 (39.3)
<b>Age at Diagnosis</b>	
18-44	3 (10.7)
45-64	17 (60.7)
65+	8 (28.6)
<b>Highest Education Level</b>	
High School	8 (28.6)
College	13 (46.4)
Advanced Degree	7 (25.0)
<b>Race/Ethnicity</b>	
Caucasian	17 (60.7)
African American	8 (28.6)
All Other	3 (10.7)
<b>Breast Cancer Stage</b>	
0	3 (10.7)
1	12 (42.9)
2	3 (10.7)
3	7 (25.0)
4	3 (10.7)

Note: Percentages may not sum to 100% due to rounding.

<sup>1</sup> Column percentages.

**Table 7B.** Distribution of Study Variables Stratified by Breast Cancer Stage

Variable	Total Sample N (%) <sup>2</sup>	Breast Cancer Stage, n (%) <sup>1</sup>					p*
		0	1	2	3	4	
<b>Current Age</b>							<b>P=0.010</b> <b>***</b>
18-44	1 (3.6)	0 (0)	1 (100.0)	0 (0)	0 (0)	0 (0)	
45-64	16 (57.1)	1 (6.3)	7 (43.8)	2 (12.5)	4 (25.0)	2 (12.5)	
65+	11 (39.3)	2 (18.2)	4 (36.4)	1 (9.1)	3 (27.3)	1 (9.1)	
<b>Age at Diagnosis</b>							<b>P=0.003</b> <b>***</b>
18-44	3 (10.7)	0 (0)	1 (33.3)	0 (0)	2 (66.7)	0 (0)	
45-64	17 (60.7)	2 (11.8)	8 (47.1)	2 (11.8)	3 (17.6)	2 (11.8)	
65+	8 (28.6)	1 (12.5)	3 (37.5)	1 (12.5)	2 (25.0)	1 (12.5)	
<b>Highest Education Level</b>							<b>P&lt;0.001</b> <b>***</b>
High School	8 (28.6)	0 (0)	1 (12.5)	0 (0)	6 (75.0)	1 (12.5)	
College	13 (46.4)	2 (15.4)	7 (53.8)	2 (15.4)	0 (0)	2 (15.4)	
Advanced Degree	7 (25.0)	1 (14.3)	4 (57.1)	1 (14.3)	1 (14.3)	0 (0)	
<b>Race/Ethnicity</b>							<b>P&lt;0.001</b> <b>***</b>
Caucasian	17 (60.7)	3 (17.6)	9 (52.9)	2 (11.8)	2 (11.8)	1 (5.9)	
African American	8 (28.6)	0 (0)	3 (37.5)	1 (12.5)	2 (25.0)	2 (25.0)	
All Other	3 (10.7)	0 (0)	0 (0)	0 (0)	3 (100.0)	0 (0)	

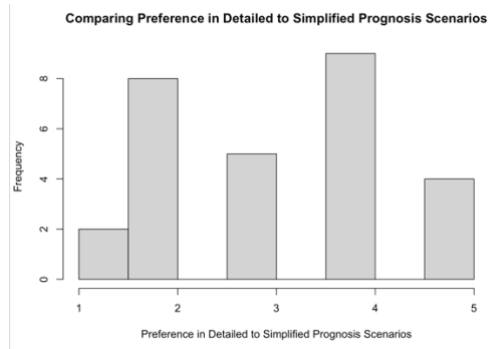
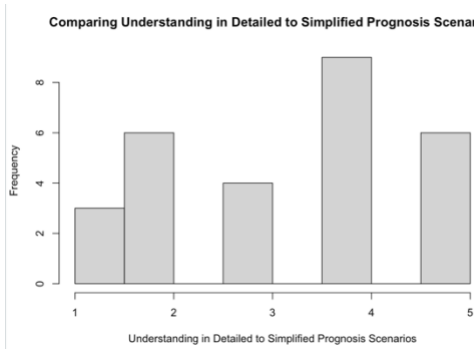
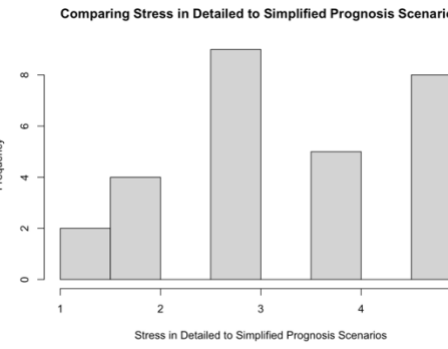
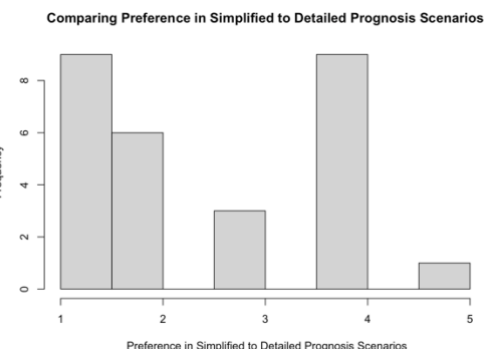
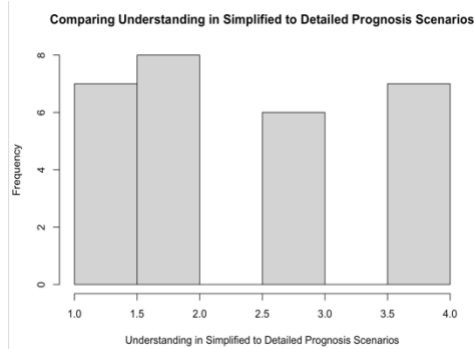
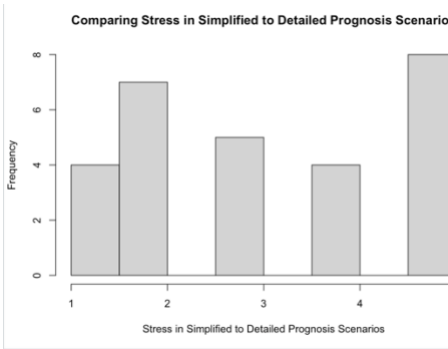
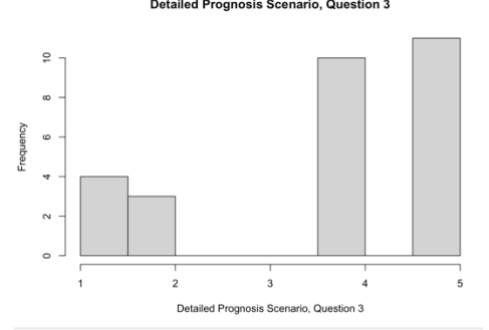
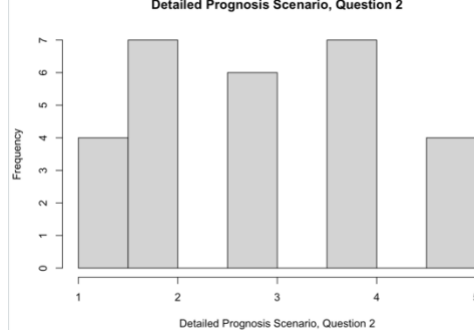
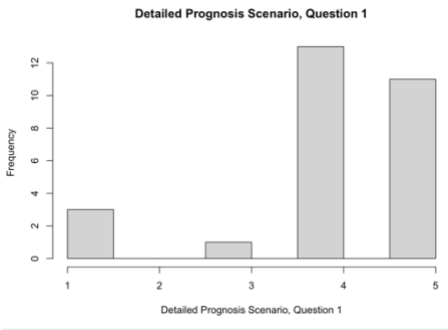
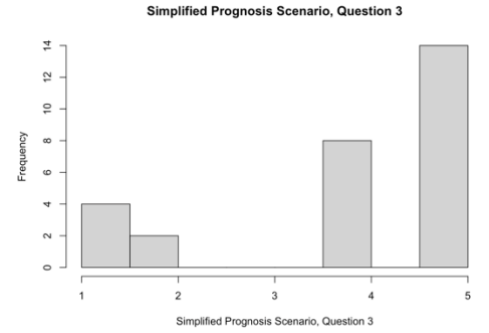
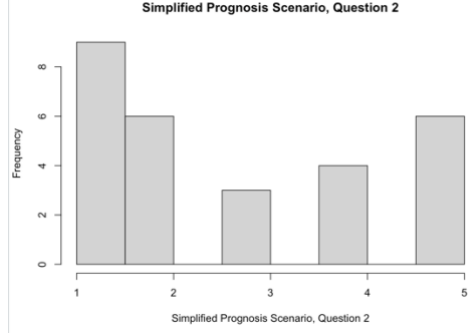
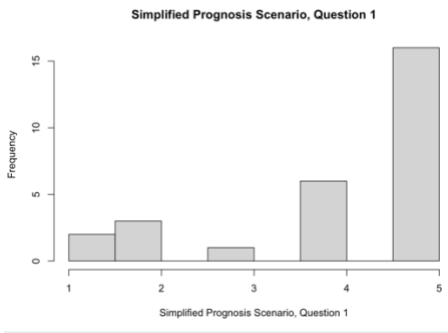
Note: Percentages may not sum to 100% due to rounding.

<sup>1</sup> Row percentages. <sup>2</sup> Column percentages.

\* P-value for Fisher's exact test.

# Appendix IA.

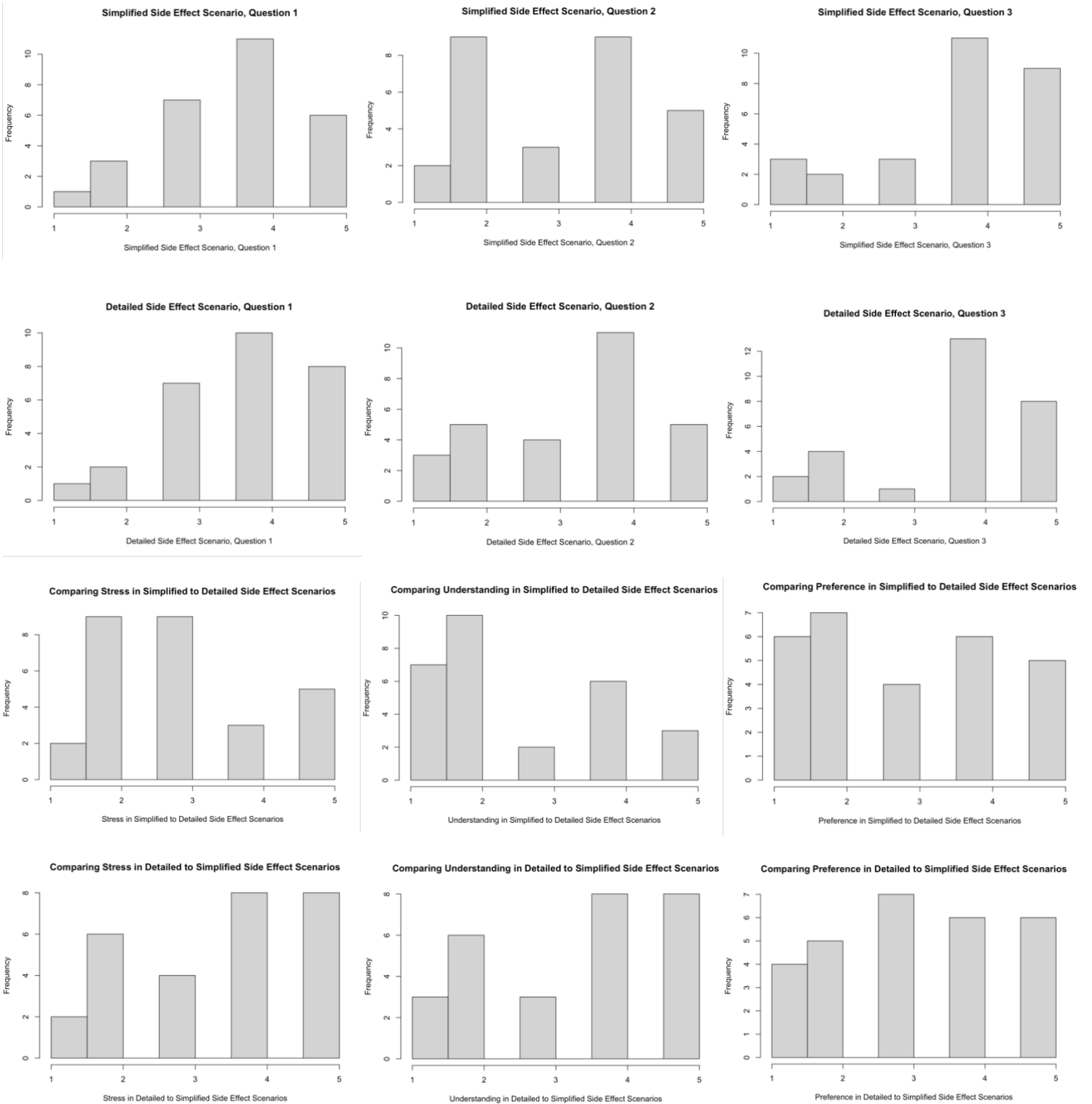
## Histograms of Likert Scale Responses, Prognosis Questions





# Appendix IB.

## Histograms of Likert Scale Responses, Side Effect Questions



## **Appendix II.**

### ***Recruitment Script***

Dear [Patient Name],

My name is Lauren Cueto, and I am a master's student in the School of Public Health at Yale University. I am conducting a research study examining how clinicians can best present sensitive data that promotes optimal patient understanding and coincides with patient preferences, and you are invited to participate in the study. If you agree, you are invited to participate in a 10-minute paper survey with questions regarding your preferences for sensitive conversations with your clinician.

The survey is anticipated to take no more than 10 minutes.

Participation in this study is voluntary. Your identity as a participant will remain anonymous during and after the study. Your survey will be identified with the participant ID number and date of collection as the only identifiers. Any information published as a result of the study will be such that it will not permit identification of any participant.

Thank you for your participation,

Lauren Cueto  
Yale University  
School of Public Health  
Master's Student

**Appendix IIIA.** Wilcoxon Signed-Rank Test, Comparing Preferences for Prognosis Scenarios 1 and 2 by Breast Cancer Stage

Breast Cancer Aggregated Stage	Prognosis Scenario 1 Median <sup>1</sup>	Prognosis Scenario 2 Median <sup>2</sup>	P-Value <sup>3</sup>
Stage 0, 1, 2	2	4	0.087
Stage 3, 4	3	2.5	0.793

<sup>1</sup> Median in reference to the Likert scale response for the following statement: “I prefer the simplified scenario format more than the detailed scenario format.”

<sup>2</sup> Median in reference to the Likert scale response for the following statement: “I prefer the detailed scenario format more than the simplified scenario format.”

<sup>3</sup> P-value from Wilcoxon Signed-Rank Test

**Appendix IIIB.** Wilcoxon Signed-Rank Test, Comparing Preferences for Side Effect Scenarios 1 and 2 by Breast Cancer Stage

Breast Cancer Aggregated Stage	Side Effect Scenario 1 Median <sup>1</sup>	Side Effect Scenario 2 Median <sup>2</sup>	P-Value <sup>3</sup>
Stage 0, 1, 2	2	4	0.064
Stage 3, 4	4	2.5	0.200

<sup>1</sup> Median in reference to the Likert scale response for the following statement: “I prefer the simplified scenario format more than the detailed scenario format.”

<sup>2</sup> Median in reference to the Likert scale response for the following statement: “I prefer the detailed scenario format more than the simplified scenario format.”

<sup>3</sup> P-value from Wilcoxon Signed-Rank Test

**Appendix IVA.** Ordinal Logistic Regression, Prognosis Scenario<sup>1</sup> by Breast Cancer Stage<sup>2</sup>

Prognosis Scenario	Statement	Odds (95% CI) <sup>3</sup>	P*
1 (Simplified)	This scenario made me experience feelings of anxiety, depression, or stress.	1.08 (0.17, 3.90)	0.929
	The information made me fully understand my prognosis.	0.78 (0.18, 3.28)	0.736
	I still have questions regarding my prognosis.	0.23 (0.05, 1.01)	0.057
2 (Detailed)	This scenario made me experience feelings of anxiety, depression, or stress.	1.61 (0.32, 8.50)	0.563
	The information made me fully understand my prognosis.	0.47 (0.11, 1.99)	0.310
	I still have questions regarding my prognosis.	0.27 (0.05, 1.21)	0.094

<sup>1</sup>Response variable: Likert scale responses

<sup>2</sup> Predictor variable: aggregated breast cancer stage, where stage 3,4 is the qualitative attribute (1) and stage 0,1,2 is the reference (0)

<sup>3</sup> Exponentiated Log Odds of Ordinal Logistic Regression

\*P-value for Ordinal Logistic Regression

**Appendix IVB.** Ordinal Logistic Regression, Prognosis Scenario<sup>1</sup> Comparisons by Breast Cancer Stage<sup>2</sup>

Statement	Odds (95% CI) <sup>3</sup>	P*
The simplified scenario made me experience more feelings of anxiety, depression, or stress than the detailed scenario.	0.59 (0.14, 2.41)	0.457
The detailed scenario made me experience more feelings of anxiety, depression, or stress than the simplified scenario.	1.02 (0.23, 4.55)	0.978
The information in the simplified scenario made me understand my prognosis better than the information in the detailed scenario.	0.40 (0.09, 1.61)	0.202
The information in the detailed scenario made me understand my prognosis better than the information in the simplified scenario.	0.25 (0.05, 1.04)	0.063
I prefer the simplified scenario format more than the detailed scenario format.	2.09 (0.52, 8.76)	0.303
I prefer the detailed scenario format more than the simplified scenario format.	0.40 (0.09, 1.63)	0.206

<sup>1</sup>Response variable: Likert scale responses

<sup>2</sup> Predictor variable: aggregated breast cancer stage, where stage 3,4 is the qualitative attribute (1) and stage 0,1,2 is the reference (0)

<sup>3</sup> Exponentiated Log Odds of Ordinal Logistic Regression

\*P-value for Ordinal Logistic Regression

**Appendix VA.** Ordinal Logistic Regression, Treatment Side Effect<sup>1</sup> by Breast Cancer Stage<sup>2</sup>

Treatment Side Effect Scenario	Statement	Odds (95% CI) <sup>3</sup>	P*
1 (Simplified)	This scenario made me experience feelings of anxiety, depression, or stress.	0.80 (0.19, 3.33)	0.756
	The information made me fully understand potential side effects.	2.49 (0.60, 11.00)	0.212
	I still have questions regarding potential treatment side effects.	0.72 (0.17, 3.06)	0.656
2 (Detailed)	This scenario made me experience feelings of anxiety, depression, or stress.	1.49 (0.34, 6.73)	0.594
	The information made me fully understand potential side effects.	0.34 (0.08, 1.46)	0.153
	I still have questions regarding potential treatment side effects.	1.11 (0.24, 5.23)	0.890

<sup>1</sup>Response variable: Likert scale responses

<sup>2</sup> Predictor variable: aggregated breast cancer stage, where stage 3,4 is the qualitative attribute (1) and stage 0,1,2 is the reference (0)

<sup>3</sup> Exponentiated Log Odds of Ordinal Logistic Regression

\*P-value for Ordinal Logistic Regression

**Appendix VB.** Ordinal Logistic Regression, Treatment Side Effect Scenario<sup>1</sup> Comparisons by Breast Cancer Stage<sup>2</sup>

Statement	Odds (95% CI) <sup>3</sup>	P*
The simplified scenario made me experience more feelings of anxiety, depression, or stress than the detailed scenario.	0.98 (0.24, 4.04)	0.980
The detailed scenario made me experience more feelings of anxiety, depression, or stress than the simplified scenario.	71.11 (7.98, 1789.09)	0.001 ***
The information in the simplified scenario made me understand treatment side effects better than the information in the detailed scenario.	0.81 (0.18, 3.64)	0.786
The information in the detailed scenario made me understand treatment side effects better than the information in the simplified scenario.	0.45 (0.10, 1.92)	0.282
I prefer the simplified scenario format more than the detailed scenario format.	7.07 (1.61, 35.83)	0.013 ***
I prefer the detailed scenario format more than the simplified scenario format.	0.17 (0.03, 0.74)	0.022 ***

<sup>1</sup>Response variable: Likert scale responses

<sup>2</sup> Predictor variable: aggregated breast cancer stage, where stage 3,4 is the qualitative attribute (1) and stage 0,1,2 is the reference (0)

<sup>3</sup> Exponentiated Log Odds of Ordinal Logistic Regression

\*P-value for Ordinal Logistic Regression

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