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A CONTENT ANALYSIS OF REDDIT COMMENTS DISCUSSING FIBROADENOMA APPRAISAL AND DECISION MAKING

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THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Arts in the
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at the University of Kentucky

By

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ABSTRACT OF THESIS

A CONTENT ANALYSIS OF REDDIT COMMENTS ABOUT FIBROADENOMA APPRAISAL AND DECISION MAKING

Though fibroadenomas are clinically benign in most cases, clinical research suggests that these lesions can cause diagnosis-related physical health complications and psychological distress. However, this research is limited and should be investigated further. Thus, this study aimed to explore how patients appraise their fibroadenoma diagnosis uncertainty. Additionally, this study sought to determine if a correlation existed between appraisal and decision making as well as identify the factors that influence the most common treatment decision: removal. Data was retrieved from Reddit discussions for a content analysis. These discussions were then qualitatively analyzed using codebooks associated with this study's research questions. Findings revealed that 1) most patients negatively appraise their diagnosis, 2) no current correlation exists between appraisal and removal, and 3) several factors, both present and not present in the existing literature, influence removal. The conceptual and practical implications of these findings are discussed. Moreover, this study's findings may assist providers and patients in managing patients' uncertainty regarding their diagnosis. Further, they may help to improve patients' treatment decision-making in light of their diagnosis uncertainty. Limitations and future directions as they relate to these findings are elaborated on.

KEYWORDS: uncertainty management theory, appraisal, uncertainty reduction theory, fibroadenoma, decision-making

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A CONTENT ANALYSIS OF REDDIT COMMENTS ABOUT FIBROADENOMA APPRAISAL AND DECISION MAKING

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DEDICATION

To Katie Stahl, the most amazing cousin and devoted pediatric oncology nurse I know.

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CHAPTER 1: INTRODUCTION

Every year, a reported one in ten women is diagnosed with a fibroadenoma, a common and often benign breast lesion (Ajmal & Fossen, 2020). Because the medical community associates these lesions with such minimal concern for malignant pathology, little research has been done to truly understand the physiological and psychological impact the diagnosis of a fibroadenoma has on a patient. However, the research that does exist discovered that patients who experience this diagnosis often endure many diagnosis-associated health problems (Klinger et al., 2019). Among these health problems include diagnosis-induced psychological distress (i.e., anxiety, depression)(Witek-Janusek et al., 2007) and immune health dysregulation (i.e., diminished natural killer cell activity, cytokine dysregulation)(Witek-Janusek et al., 2007).

Since existing research proposes that this health event causes consequential health problems, it may be inferred that it occurs as a direct result of how the patient is managing their health uncertainty. That is, patients' uncertainty appraisal regarding their fibroadenoma diagnosis may be significant because of its disruptive nature (Bury, 1982). Uncertainty occurs when there is ambiguity, complexity, or unpredictability within a situation. It can also exist when there is a lack of or inconsistency within the presentation of information or simply when an individual lacks enough knowledge in a certain situation (Brashers, 2001). For patients diagnosed with fibroadenomas, uncertainty may occur for these patients for a couple of reasons. One reason is that there is no way of confirming a breast lesion as a probable fibroadenoma without a biopsy or complete removal of the mass (i.e., excisional biopsy, lumpectomy)(Klinger et al., 2019). Another reason may be that there is still a small chance that a fibroadenoma's pathology will increase the risk for the development of breast cancer later (Klinger et al., 2019). Furthermore, because of the uncertainty that patients face when diagnosed with fibroadenomas, this study

aimed to understand how patients appraise their uncertainty and how it may influence their decision to remove their fibroadenoma(s). These findings may assist providers and patients alike with alleviating patients' uncertainty regarding their diagnosis and making appropriate treatment decisions.

CHAPTER 2: LITERATURE REVIEW

2.1 Fibroadenomas

2.1.1 Fibroadenoma Commonality

Fibroadenomas represent a particularly helpful context within which to examine uncertainty appraisal given the various uncertainties entailed within the clinical diagnosis. With that said, while breast lumps are most regularly associated with breast cancer, fibroadenomas are among the most common findings among breast biopsies (American Cancer Association, 2017). This benign form of breast disease is a painless lesion, or tumor, of one of the breasts that occurs in 10% of the world's female population (Ajmal & Fossen, 2020). As a result of their commonality, these fibroadenomas are responsible for an estimated two-thirds of all benign lesions found in young women (Berkey et al., 2012). Moreover, while multiple fibroadenomas can develop, 80% of the time they occur individually and only once in a patient's lifetime (Westmead Breast Cancer Institute, 2018). Most commonly, these manifest during menarche (between the ages of 15 and 25 years old)(Greenberg et al., 1998), but they can develop at any point in life, with 5% of diagnoses occurring in patients over 50 years old (Westmead Breast Cancer Institute, 2018).

2.1.2 Pathology

Medical science currently tells us these fibroadenomas are aberrations of normal breast development (Greenberg et al., 1998) and are often characterized by a nodule of fibrous tissue that has epithelial elements (Dent & Cant, 1989). Like stated before, these masses are described as painless lumps, only becoming painful when tender. They also oftentimes feel rubbery and can move around freely when a patient or physician examines them (John Hopkins Medicine, 2020).

While physicians are unsure of the leading causes of this medical phenomenon, they commonly occur in patients in high socioeconomic classes (Brinton et al., 1981; Soini et al., 1981; Yu et al. 1992) and among patients with dark skin (Burk & Leffall, 1972). They may also be the result of hyperplastic processes instead of neoplasms (Dent & Cant, 1989; Greenberg et al., 1998). Additionally, fibroadenomas are often associated with hormonal changes and are observed most of the time in patients of childbearing age because of hormonal etiology where the breast tissue is highly sensitive to estrogen (Ajmal & Fossen, 2020; Greenberg et al., 1998). Additionally, some studies suggest there could be a link to an increased risk of developing these benign lesions when a family history of breast cancer in first-degree relatives is connected to the patient (Greenberg et al., 1998). In contrast, however, two factors: body mass index (BMI) and the number of biological children a person have both been linked to a negative association with benign breast lesions including fibroadenomas (Greenberg et al., 1998). Newer findings report that fibroadenomas are increasingly being found in post-menopausal patients that are taking hormonal therapies as well (John Hopkins Medicine, 2020). However, the use of oral contraceptives has been shown to not be as consistently correlated with the diagnosis of fibroadenomas (Greenberg et al., 1998).

2.1.3 Diagnosis and Treatment

Diagnosis and treatment of fibroadenomas often vary because of the diverse nature (i.e., size, family history of breast cancer) and the role of patient's autonomy over treatment decisions (Greenberg et al., 1998). However, textbook fibroadenoma cases include an initial clinical evaluation (i.e., manual breast examination and palpation)(Jingmei et al., 2018) and then imaging (i.e., CT scan, mammogram, or ultrasound)(MayoClinic, 2020). With that said, modern ultrasounds are among the most reliable medical tool used when diagnosing young patients with

fibroadenomas (O'Neill et al., 2013; Smith & Burrows, 2008; Yue, et al., 1992). In addition, pathology workup is recommended when the mass overrides clinical concern (O'Neill et al., 2013; Smith & Burrows, 2008; Yue et al., 1992). Following imaging, treatment is decided.

Among the most common treatments include a core biopsy, a Fine Needle Aspiration (FNA), or an excisional biopsy (Greenberg et al., 1998; Klinger et al., 2019). However, sometimes, physicians will not perform any of these. This usually happens when the patient's mass is without any abnormalities. Instead, they will recommend the patient to monitor the mass and only remove it later, if it becomes concerning to the physician or if the patient demands removal (Greenberg et al., 1998; Klinger et al., 2019). The chosen procedure usually is determined by several factors, including the size of the mass (Greenberg et al., 1998; Klinger et al., 2019). Regardless of the chosen treatment, all the phases of the procedure from examination to diagnosis, to treatment, can cause patients uncertainty and high levels of anxiety (Meechan et al., 2005).

While all these treatments exist, an excisional biopsy (a form of removal) is classified as the most utilized strategy for definitive treatment of fibroadenomas with roughly 500,000 procedures occurring each year (Klinger et al., 2019). This form of treatment is highlighted as the best course of action especially for those with symptomatic masses and for those with juvenile fibroadenomas (giant masses) for several reasons including potential psychological harm (Klinger et al., 2019).

Though these fibroadenomas are normally benign (Nassar et al., 2015), existing research suggests that the diagnosis process can lead to a reduction in patients' quality of life, due to the uncertainty, anxiety, and depression patients may experience (Dorfman et al., 2018; Hughes et

al., 1986; Lou et al., 2015; Meechan et al. 2005). Thus, this study aimed to determine how patients are appraising their diagnosis.

In addition, though there are studies from providers' perspectives on why excisional biopsies and other forms of removal are primarily recommended for patients with suspected fibroadenomas, there is little research that assesses patients' decision processing when determining whether to go under the knife to have their mass removed. Therefore, this study also aimed to understand how patients determined whether to remove their fibroadenoma and what role uncertainty management played in that process.

2.2 Uncertainty Management in Fibroadenoma Diagnosis

Brashers (2001) defines uncertainty as the state "when details of situations are ambiguous, complex, unpredictable, or probabilistic; when information is unavailable or inconsistent; and when people feel insecure in their state of knowledge or the state of knowledge in general" (p. 478). The expanded theory of uncertainty in illness adds that uncertainty can spread into many areas of a person's life, including their mental health, rendering it impossible to eliminate uncertainty (Mishel, 1990). Moreover, according to the Uncertainty Management Theory (UMT), appraisal helps individuals, including patients, make sense of their uncertainty.

Individuals engage in appraisal either positively or negatively (Brashers, 2001). Positive appraisal (PA) happens when an individual experiences uncertainty that is relevant and consistent with their goals, while negative appraisal (NGA) happens when the uncertainty is registered as relevant and inconsistent with a person's goals (Brashers, 2001; Rauscher et al., 2019). When a person experiences NGA, they will attempt to reduce their uncertainty while if they have PA, they will try to increase or maintain their uncertainty (Brashers, 2001; Rauscher et al., 2019). In the case of patients with fibroadenomas, if someone appraises their diagnosis

positively, they may choose not to remove their fibroadenoma or get a less invasive procedure like an FNA. On the other hand, if someone appraises their experience negatively, they may be more proactive and opt for a removal procedure.

Moreover, Mishel's (1990) theory suggested that the diagnosed person's perspective of their life is altered where uncertainty is integrated both positively and negatively. This was further supported by Brashers and colleagues (2003), who argued uncertainty could be multifunctional and help individuals meet their needs (Babrow, 1992; Brashers, 1995; Brashers & Babrow, 1996). Brasher also suggested a individuals' uncertainty management is dependent on their appraisal of the uncertainty (Brashers, 2000).

Appraisal and its relation to uncertainty management have further been researched. Some studies have suggested that Simultaneous Appraisal (SA)(i.e., appraising a situation positively and negatively at the same time) is possible. Cohen and colleagues (2016) found that Appalachian women who experienced uncertainty related to cervical cancer screenings appraised their experience both positively and negatively at the same time. Findings from Darnell and colleagues (2018) reinforced the possibility of SA. They found that adolescent women who had experienced a miscarriage sometimes simultaneously appraised their experience (Darnell et al., 2018). Since then, Kerr and colleagues (2020) explored parents' decision-making experiences when faced with uncertainty about their child's vascular anomaly and reinforced the possibility of SA. Moreover, these findings would support the idea that without having an appraisal, uncertainty management is shown to not be as easily obtained by those struggling with their illness uncertainty (Brashers et al., 2000). However, though these findings are significant, they do not hold enough leverage to support this conclusion fully. Furthermore, Cohen and colleagues (2016) proposed that future examination of SAis warranted because of its, "potential to expand

the understandings of the complex process of uncertainty and its relationship to health behaviors." (p. 1797) As a result, it can and has been argued (Cohen et al., 2016; Darnell et al., 2018; Kerr et al., 2020) that SA needs to be studied further in different health contexts which involve uncertainty management. Thus, this study investigated NA, PA, and SA as they related to fibroadenoma diagnoses.

2.3 Uncertainty Appraisal and Decision Making

In addition to investigating appraisal of patients' fibroadenoma diagnoses, exploring whether appraisal impacts decision-making should be conducted. While scholars have examined the link between decision-making and how someone appraised their situational uncertainty, there is still an abundance of research that needs to be done to further the validity of this claim. Previous research suggests that appraisal does impact decision-making (Darnell et al., 2019; Kerr et al., 2020; So et al., 2015). So and colleagues (2015) sought to understand the nature of emotional appraisals and their impact on decision making. They concluded that decisions dictated by emotions were correlated with how they were appraised (So et al., 2015). Other scholars supported this idea. Herrald and Tomaka (2002) examined emotion-specific patterns of appraisal, coping, and cardiovascular reactivity during emotional episodes, and found that emotions have the capability of impacting decision-making and judgment by activating distinct coping strategies. Additionally, Winterich and Haws (2001) looked at the effect of temporal focus on positive emotions of individuals when they were presented with a self-control dilemma involving snack consumption. The results reinforced the previous studies, stating that emotions can affect appraisal and, ultimately, decision-making. Many other researchers have also argued that there is a link between appraisal and decision-making (Agrawal & Duhacheck, 2010; De Mello et al., 2007; Duhachek, 2005; Tiedens & Linton, 2001).

However, most scholars' research has addressed only decision-making and its link to appraisal from a consumerism or marketing standpoint. Very little has discussed decision-making as it connects to appraisal from a health context. Additionally, no research has considered the role of appraisals in fibroadenoma treatment decision-making. Considering these premises, this study attempted to identify how patients appraised their diagnosis of a fibroadenoma and how it played a role in decision-making for the removal of the mass.

2.4 Uncertainty Appraisal and Decision-Making Pertaining to Fibroadenoma Diagnosis

While previous research does suggest that uncertainty may be potentially managed and appraised simultaneously, positively, or negatively (Cohen et al., 2016; Darnell et al., 2018; Mishel, 1990), existing research specific to fibroadenomas has primarily found that patients diagnosed with them often deal with uncertainty negatively thus decreasing the quality of their life. Specifically, decreasing the quality of life through additional diagnoses of anxiety and depression (Dorfman et al., 2018; Hughes et al., 1986; Lou et al., 2015; Meechan et al. 2005). Hughes and colleagues (1986) exemplified this through their study. They found that patients with benign breast disease (i.e., fibroadenomas) had a higher rate of depressive symptomology (associated with their anxiety about the diagnosis) in comparison to both the general population as well as patients who had breast cancer (Hughes et al., 1986). Other scholars agreed and reported that some patients maintain anxiety even after being told their breast illness is benign (Deane & Degner, 1998; Howard & Harvey, 1998). This claim was also supported by other scholars who found that patients diagnosed with fibroadenomas and other benign breast diseases have similar physical and psychological distress levels to those diagnosed with malignant breast diseases, mainly breast cancer, both pre- and post-treatment (Witek-Janusek et al., 2007). Miller and colleagues (2014) echo that high levels of anxiety before treatment (i.e. pre-biopsy) either

remain stable or increase post-treatment (i.e. post-biopsy), which is also consistent with findings from Soo and colleagues (2014). Moreover, they stated that pre-biopsy anxiety and distress are related to more severe pain and greater physical discomfort during the procedure. This was further supported by research that demonstrated that female patients with persistent post-biopsy problems were connected to more psychological distress when experiencing breast symptoms (i.e., tenderness, skin irritation)(Cunningham et al., 1998). This stress was then highly correlated to other physical health complications such as diminished natural killer cell activity and cytokine dysregulation (Witek-Januseket al., 2007). Poorer adherence to recommended breast cancer screenings (i.e., initiation of annual mammograms starting at the age of thirty years old rather than the typical forty years old) was also reported in some cases where anxiety was high because of the diagnosis (Andrykowski et al., 2001). However, though these preliminary findings suggest that the diagnosis of a fibroadenoma correlates with high levels of negatively appraised uncertainty, this data is limited and largely outdated. Thus, the present study seeks to further investigate the current state of patients' appraisal of this diagnosis:

RQ 1: How do patients appraise their uncertainty related to their diagnosis of one or multiple fibroadenomas?

In addition, because appraisal may influence decision making, this study also investigated whether a correlation existed between appraisal and the decision to remove a fibroadenoma:

RQ 2: Does the type of appraisal relate to a patient's decision-making about whether to remove their fibroadenoma or pursue other treatment options?

2.5 Decision Factors Pertaining to Removing Fibroadenomas

Because patients diagnosed with fibroadenomas are reportedly experiencing high levels of anxiety and uncertainty like that of patients with breast cancer diagnoses, a much more

malignant diagnosis, it is important to better understand what current strategies patients are using to effectively manage this. As a result, it is imperative to investigate the factors that are influencing the decision to remove a fibroadenoma.

While there is no current research that highlights the factors that contribute to the decision to get a fibroadenoma removed, there is research that explores similar phenomenon. Rippy and colleagues (2014) investigated the factors that influenced patients with early-stage breast cancer getting a mastectomy. It found that patients' regard for their surgeon's opinion played the most significant role in getting a mastectomy (Rippy et al., 2014). Other healthcare-related factors included adjuvant treatment options, availability of surgical techniques, and uptake in screening programs (Rippy et al., 2014). Among the other factors tested for included patient-related factors (i.e., age, ethnicity, distance from treatment, and patient education)(Rippy et al., 2014). Additionally, including Yi and colleagues (2010) identified factors related to breast cancer patients' decisions to undergo a contralateral prophylactic mastectomy, a procedure similar to a biopsy. They discovered similar factors tied to removal procedures. These factors included: age, family history, BRCA 1 or 2 mutation testing, and clinical stage of breast cancer pathology (Yi et al., 2010). These factors' influence is comprehendible since the specific clinical and pathological factors associated with increased risk of different types of breast cancer, include age younger than 50 years old, family's genetic history of breast cancer, previous chest irradiation (Boughey et al., 2006; Gogas et al., 2003; Yi et al., 2009; Yi et al., 2010), African American ethnicity (Gao et al., 2003; Yi et al., 2010), overweight BMI, and medullary carcinoma histology (often associated with patients who test positive for BRCA 1 mutation)(Li et al., 2003; Yi et al., 2010). Moreover, more generally, risk factors associated with any form of breast cancer treatment include similar factors: age (getting older), genetic mutations like testing positive for

BRCA1 or 2, reproductive history involving prolonged exposure to hormones (i.e., having period before 12 years old or starting menopause after 55 years old), personal history of breast cancer or other forms of breast disease, family history, and history of irradiation (radiation therapy treatment)(Centers for Disease Control and Prevention, 2021).

Moreover, though these factors are not related to fibroadenoma treatment or removal, it is insightful and provides a basis for the factors that may influence treatment for and removal of fibroadenomas because it is a similar breast disease pathology. Furthermore, based on these findings, a number of potential factors may play a role in patient's decisions to go under the knife. These may include:

1. Age (Centers for Disease Control and Prevention, 2021; Rippy et al., 2014; Yi et al., 2010;)
2. Family history of breast cancer (Centers for Disease Control and Prevention, 2021; Yi et al., 2010)
3. Personal history of cancer or other breast disease (Boughey et al., 2006; Centers for Disease Control and Prevention, 2021; Gogas et al., 2003; Yi et al., 2009; Yi et al., 2010)
4. Previous treatment (i.e., irradiation) for any form of cancer (Boughey et al., 2006; Gogas et al., 2003; Yi et al., 2009; Yi et al., 2010)
5. Ethnicity (African American dissent may be more likely to get procedure)(Gao et al., 2003; Yi et al., 2010)
6. Testing Positive for BRCA 1 or 2 genetic mutation (Centers for Disease Control and Prevention, 2021; Yi et al., 2010)
7. Pathology (Greenberg et al., 1998; Klinger et al., 2019; Yi et al., 2010)
    a. Size of mass (Klinger et al., 2019)
    b. Pain level associated with mass (Klinger et al., 2019)
    c. Texture of mass (Klinger et al., 2019)
8. Provider's recommendation (Rippy et al., 2014)

In addition to these factors, and as mentioned earlier, it is possible that patients who choose to receive treatment for a fibroadenoma negatively appraise their diagnosis because of the way that it impacts their mental health antagonistically (Dorfman et al., 2018; Hughes et al., 1986; Lou et al., 2015; Meechan et al. 2005). This may include the fibroadenoma causing the

patient a high level of anxiety or depression (Deane & Degner, 1998; Howard & Harvey, 1998; Hughes et al., 1986; Miller et al., 2014; Soo et al., 2014; Witek-Janusek et al., 2007). As a result, some other factors can be argued as playing a role in patients' decision making:

9. Patient's education pertaining to fibroadenoma (i.e., high level of uncertainty)(Rippy et al., 2014)
10. High level of Anxiety regarding Fibroadenoma (Dorfman et al., 2018; Hughes et al. 1986; Lou et al., 2015; Meechan et al. 2005)
11. High Level of Anxiety about Overall Health (i.e., Generalized Anxiety Disorder, Illness Anxiety Disorder)(Dorfman et al., 2018; Hughes et al., 1986; Lou et al., 2015; Meechan et al. 2005)

Using the findings that pertain to similar removal procedures for cousin diagnoses, certain factors can be predicted to have an impact on patients' decision about removing their fibroadenoma. However, this existing research does not provide enough evidence to conclude what factors actually influence a patient to remove their mass. Therefore, this study aims to identify the factors that play a role in patients' decision-making to remove their fibroadenoma. In addition to the factors that influence patients to remove a fibroadenoma suggested by the literature (i.e., age, family history of breast cancer, personal history of cancer or other breast disease, previous treatment for any form of cancer, ethnicity, testing positive for BRCA 1 or 2 genetic mutation, pathology, provider's recommendation, patient's education regarding fibroadenoma, and high level of anxiety about overall health will be influential factors associated with patients removing their fibroadenoma(s)), RQ 3 asked:

RQ 3: What other factors influence patients to remove a fibroadenoma?

CHAPTER 3: METHOD

3.1 Rationale for A Content Analysis

A Content Analysis (CA) is a method used throughout a multitude of research focuses (i.e., psychology, media, communication)(Krippendorff, 2004; Neuendorf, 2017) and is classified as a systematic method used to gather data that has already been produced by individuals through the recording or transcribing of textual, visual, or audible messages (Krippendorff, 2004) and sorted it into categories (Stemler, 2000). Moreover, scholars' studies have demonstrated multiple benefits to using CAs in social science research (Kolbe & Burnett, 1991), including that analyzing data in CAs: a) removes bias, b) prevents limitations when examining variables, c) opens the door to research on specific topics in communication, and d) can be used with multiple methods research studies. Additionally, CAs are high in both reliability and validity (Neuendorf, 2017; Riffe et al., 2019), meaning that the method is both consistent and effective in measuring accurately what it is intended to (Riffe et al., 2019). This is essential to accurately understand the results of this study.

In the case of the present study, a CA offers an excellent way to analyze such data to better understand treatment decision-making regarding fibroadenoma diagnoses. While there have been no specific CAs that explore patients' appraisals of their fibroadenoma or its associated decision making, there have been several CAs that examine health contexts of decision-making. One such CA examined patient testimonials that discussed medical tourism facilitation companies that were commented on YouTube (Hohm & Snyder, 2015). Hohm and Snyder (2015) sought to understand how these videos influenced patients' decision-making and concluded that the videos were imperative to study because of their substantial influence on patients' decision-making. Similarly, Tran and colleagues (2021) recently explored online health

care resources that substitute-decision-makers used to support their decisions. It echoed Hohm and Snyder's (2015) findings by arguing that further research in the realm of health decision-making needed to be conducted through the exploration of media using content analyses (Tran et al., 2021). Additionally, Diedrich and Schreier (2009) aimed to describe underlying prioritized criteria that influenced decision-making in health. Finally, Gould and colleagues (2010) used a CA to evaluate decision-making. Using a qualitative CA, the scholars sought to understand the cognitive, emotional, and contextual experiences women with breast cancer had when deciding when to seek care and what caused most to delay treatment (Gould et al., 2010). Furthermore, while not all these scholars collected data from mediated sources, all of these studies suggest that decision-making in health contexts can be analyzed fruitfully using CAs.

Because this study also attempts to access patients' appraisal of their diagnoses, again, CA is a reasonable choice. Understanding health appraisal has also been explored with the utilization of CAs. This includes Gould and colleagues' (2010) CA that was mentioned earlier. In addition to their attempt to understand patient's decision-making pertaining to seeking treatment following the discovery of cancer symptomology, it also tried to comprehend the mechanisms that supported these patients' health appraisals in the context of seeking treatment (Gould et al., 2010). Sobell and colleagues (2001), similarly, used a CA to understand health appraisals of alcohol and drug abusers. The authors utilized a computer-assisted CA to identify the health appraisal processes of drug and alcohol abusers and how they were affected by clinical addiction recovery interventions (Sobell et al., 2001). This suggests that health appraisals can be captured with the utilization of CAs successfully and can be applied to online forums such as Reddit.

3.2 Content Source: Reddit

Over the past decade, CA has become a significant method used when studying health behaviors (O'Donnell & Guidry, 2020), and is now commonly used to study interactive communication media because of its increased popularity (Skalski et al., 2017). Some traditional interactive media sources include social networking sites like Facebook, Twitter, Reddit, and more. Increasingly, scholar's research analyses have used the platform of Reddit to understand health information seeking among patient-users with several different health concerns (O'Donnell & Guidry, 2020). One reason for the interest in Reddit is because of how the site is set up and utilized by users. This internet site, which is ranked the sixth most popular site on the internet in the United States and 18th globally (Alexa Internet Inc., 2020), encourages users to share news, information, and personal insight referring to the content of over one million crowd-sourced discussion forums also known as "subreddits" (O'Donnell & Guidry, 2020; Reddit, 2020).

According to Tasente (2019), Reddit's discussion-based algorithm presents information as mass conversations, or subreddits, where users can read other individuals' thoughts on almost any given topic they want to learn more about. As a result, it facilitates, among other things, anonymous health testimonials, including experiences with fibroadenomas and their treatment, which can ultimately provide curious users (and researchers) with insight into others' health behaviors (O'Donnell & Guidry, 2020). Many individuals comment their testimonies on sites like Reddit to gain support, reduce stigma, enhance coping, and share the progress of their situation (Ziebland & Wyke, 2012), which makes this content particularly valuable to researchers because the patients who describe the process, experience, and outcomes surrounding their diagnosis, illness, and treatment (Shaffer et al., 2018).

A growing number of CA studies have used Reddit as a primary data source. Sowles and colleagues (2018) examined a pro-eating disorder community's subreddit and how the comments and comments influenced and reinforced eating disorder symptoms and behaviors. Additionally, two other CAs performed by Brett and colleagues (2019) and Zhan and colleagues (2019) similarly examined threads on Reddit to better understand patterns and perceptions of JUUL (a popular nicotine product) use among youth. Moreover, Balsamo and colleagues' (2021) analysis sought to understand the nonmedical interest and consumption of opioids using the platform. Beyond using Reddit to examine perceptions and use of substances, CA has also been used to investigate subreddits' influence over health behaviors, including encouraging weight loss (Liu & Yin, 2020), understanding patient information needs regarding illnesses like gout (Derksen et al., 2017), and reasons for not following through with a suicide attempt (Mason et al., 2021).

In the case of the present research, this allows us to use patients' testimonials about fibroadenoma diagnoses to better understand how patients appraise them how it connects to the decisional factors related to having their fibroadenoma(s) removed.

3.3 Sample

Reddit generates discussion by having a conversational threading format. In this way, users can submit content, specifically testimonials of health, to specific subreddits which can be directly replied to by other users (O'Donnell and Guidry, 2020). When comments are posted below a comment, a new conversational thread emerges (O'Donnell and Guidry, 2020). From there, users can Upvote, meaning they support the comment, or Downvote, or dislike, comments (O'Donnell and Guidry, 2020). Comments with the highest volume of Upvotes and least amount of Downvotes are then moved to the top of the thread for current and future users to immediately see when interacting with the discussion (O'Donnell and Guidry, 2020). In other words, if a

patient wanted to examine other patients' experiences with pancreatic cancer and the treatment associated with it when clicking on a certain subreddit, the comment with the most Upvotes will be the one that the user will see first. Moreover, these Upvotes and Downvotes are significant measurements that signal how much the content resonates with the audience (O'Donnell and Guidry, 2020). So, hypothetically, if the top subreddit comment on a thread about breast cancer treatment options argued that getting a double mastectomy was the best option, then it could be inferred that a great deal of the audience resonated with that decision. Therefore, this study only analyzed threads with an Upvote percentage of over 50% to ensure that the thread was a relatively popular opinion among those who resonated with the health discussion.

3.4 Data Observation and Extraction

Because of this formatting system, this study analyzed discussion threads that had the key term "fibroadenoma" mentioned and discuss either or both appraisal of diagnosis and procedural decisions about diagnosis with a heavy focus on determining the factors that pertain to removing a fibroadenoma. To go into more detail, I manually identified threads that spanned 10 years between October of 2011 and October of 2021 using a systematic approach of searching criteria. To be in line with previous health-decision-related content analyses (Garg et al., 2020), specific manual searches in subreddits were conducted. Given that there is no specific subreddit for fibroadenomas, I specifically searched and collected comments from five relevant subreddits: r/WomensHealth, r/TwoXChromosoms, r/medical_advice, r/breastcancer, and r/HealthAnxiety. These subreddits were selected because they contained the most threads which discussed fibroadenoma treatment and removal. From this, a total of 36 subreddit threads that contained 361 comments with an average Upvote of 87% were collected (Table 1).

Table 1

Subreddit Descriptions

Subreddit	Thread Name	Upvote	*N* Comments
r/Women's health	Does anyone have experience with a simple fibroadenoma?	100%	3
	Fibroadenoma/benign breast tumor question	84%	6
	Fibroadenoma Journey	100%	3
	Fibroadenoma surgery??	84%	6
	Worried about a lump on my chest. Do you have experience with fibroadenoma?	93%	61
	Is it okay to leave fibroadenoma untreated for a long time?	100%	6
	Painful Fibroadenomas?	72%	9
	breast fibroadenomas	100%	8
	Waiting for an ultrasound appointment for a breast lump and need some comfort	100%	13
	Fibroadenoma vs. lymph node vs. something else	100%	3
	Fibroadenomas	67%	10
	Anyone else have multiple benign breast masses?	67%	8
	Fibroadenoma in right breast: Looking for similar experiences	100%	34
	Small round lump in breast	100%	14
	28-year-old Needing Breast Biopsy	100%	28
r/TwoXChromosomes	Fibroadenoma	62%	9
	Do I get my fibroadenoma removed?	90%	13
	[UPDATE] I'm a 16 year old girl and I have a few "red-flag" symptoms	94%	49
	Breast fibroadenoma: do I really need it removed? What should I expect from the procedure?	100%	9
	What to expect from fibroadenoma removal?	67%	2
	Second breast lump in 4 years	82%	5
	Excisional breast biopsy - does it affect nipple sensitivity?	73%	2
	My experience dealing with a breast lump	73%	4
	Having biopsy tomorrow; feeling anxious	57%	2
	Has anyone here had a "giant" fibroadenoma removed?	81%	5
r/medical_advice	Lump under nipple	100%	4
	I can't decide if a lumpectomy on a benign fibroadenoma is worth it?	100%	10
r/breastcancer	Hematoma after excisional biopsy	81%	4
	Needle Biopsy question (fibroadenoma?)	84%	6
	23f. Diagnosed with fibroadenoma. Feeling like s***	60%	6
	Cancer instead of benign breast fibroadenoma	100%	4
	Dr. recommended surgery for my fibroadenoma and I'm scared	100%	1
	Got diagnosed with a fibroadenoma, should I be worried?	75%	4

r/HealthAnxiety	doctor says it's a fibroadenoma, I'm scared it's not	100%	7
	Fibroadenoma experiences/reassurance	100%	2
	How do I calm myself when I'm surrounded by triggers?	100%	1
N Totals	36	87%	361

Following this, the threads were then searched for relevant terms, word-sense, and phrases that connected to the overall themes of the research (i.e., "fibroadenoma," "removal," "surgery for benign breast mass"). Once threads were identified as relevant, two coders met to confirm the relevancy and acceptability of the data set. The threads then were vetted and cut down to only include posts that have at least one comment. This was done to ensure there is a conversation occurring on the thread (Garg et al., 2020). Then, both the original thread subreddit post and comments were analyzed.

3.5 Coding Process, Procedures, and Associated Rationale

Because this study sought to answer three separate RQs, I conducted a CA that utilized three codebooks, with one codebook addressing one research question each. The coding procedures for this CA was adapted from existing methodological guidelines expressed in Carley (1993). While there are different ways to code concepts, this study used multiple coding schemas based on the needs of the RQs. Thus, codebook 1 addressed RQ 1, Codebook 2 addressed RQ 2, and Codebook 3 addressed RQ 3.

To start, RQs 1 and 2 were answered using codebooks that had predefined lists that were coded for frequency. The current dataset was coded for frequency because coding for frequency allows for discussions of saliency and emphasis on certain ideas to emerge from the analyses more in-depth than when coding simply for existence. Additionally, a predefined list (i.e., coding for PA, NA, SA) was utilized. The reasoning for this was elaborated by Carley (1993), who explains that when coding, a researcher can either utilize a predefined list of concepts

(predefined coding) or create a list of concepts incrementally while coding the texts (iterative coding), with predefined coding as a prerequisite for interactive coding (Carley, 1993). Using a predefined list made more sense since we were exploring appraisal, a concept already well documented within uncertainty appraisal research (Dorfman et al., 2018; Hughes et al., 1986; Lou et al., 2015; Meechan et al. 2005).

To answer RQ3, a predefined approach for the RQ's codebook was initially undertaken using the factors found in the associated literature. That is, since preliminary research provided factors that may have influenced patients to remove their fibroadenoma, these factors were used when conducting preliminary coding. However, open coding was also done during the preliminary round because RQ 3 asked about what factors actually influenced removal decisions. The benefits of open coding for this research include that codes can freely emerge from the raw data and then be categorized into codes, which helps to establish answers for the question of what factors influence the decision investigated in RQ 3. Moreover, using this form of coding allows for the construction of a descriptive and multi-dimensional framework that can be used for future analysis. Thus, during the preliminary round, both coders sought to code for both the preliminary research factors while also open coding (i.e., notice, analyze, and collect themes)(Khandkar, 2009).

Following this preliminary round of coding, a new list of predefined codes (that were based on the findings from preliminary coding) were established and used for the following rounds of coding. This approach to coding was similar to that of the codebooks for RQ 1 and 2 because these codes were also coded for frequency for the same reason as the other RQs (Carley, 1993; Skalski et al., 2017). However, it is also important to mention that the finalized codebooks were not finalized until the actual preliminary analysis was concluded (Skalski et al., 2017).

3.6 Creating the Codebook and Associated Procedures

Several procedures were followed when creating the codebook and coding the Reddit data.

3.6.1 Codebook Creations

Codebook 1 was used to examine how fibroadenoma patients on Reddit were currently appraising their fibroadenoma diagnoses. As stated before, this codebook was predetermined to use predefined categories based on the existing research regarding diagnosis appraisal. So, because initial research from the UMT suggests patients can appraise their diagnosis positively, negatively, or simultaneously, these were the categories coded for. For example, if a commenter states "I was just diagnosed with a fibroadenoma and it is really scaring me," then it would be coded as NA. After the preliminary round, these categories were further confirmed to be significant after both coders successfully coded all three types of appraisals. Thus, coders independently coded Reddit commenters' positive, negative, and simultaneous appraisal each round. This codebook was adapted from Massey and colleagues' (2016) CA codebook, which identified HPV vaccine communication on Twitter. Therefore, it was developed as a content classification codebook that included a feature (i.e., appraisal), description, and example of Reddit thread comment (see Table 2). This list was then used to code frequency through descriptive statistics.

Table 2

Appraisal Descriptions and Examples

Appraisal	Description	Example from Data
Positive Appraisal	Perceives fibroadenoma diagnosis in a positive manner (i.e., happy, opportunistically)	"I wear [my fibroadenoma surgery scar] proudly and if anyone asks about it, I use it as an opportunity to remind women [or the brother/mother/husband of a woman] to do self-exams."

Negative Appraisal	Perceives fibroadenoma diagnosis in a negative way (i.e., anxious, depressed, scared)	"Hey guys! I 22(F) was diagnosed with a fibroadenoma in my left breast three months ago. The doctor suggested either 3 month follow-up or surgery and I chose follow-ups because I'm terrified of surgeries. Besides it wasn't really required. The tumor hasn't really grown in size during these three months although it gets really small in size when I'm a week away from my periods and comes back to it's normal size after the periods end. I'm really an anxious kid and recently I started to think what if it's cancer and the next ultrasound leads me to biopsy, surgery and eventually chemotherapy and I'm so tensed because of my overthinking."
Simultaneous Appraisal	Perceives diagnosis both positively and negatively at the same time (i.e., anxious but opportunistically, scared but thankful)	"I didn't know much at the time about fibroadenomas so when I heard "benign" I was ecstatic.. but soon my health anxiety rained over me because the lack of concern from the doctors that day, became extremely concerning to me."

Like Codebook 1, Codebook 2 also looked at patients' appraisal of their diagnosis (i.e., coding for PA, NA, SA) using a predefined coding list and was adapted from Massey and colleagues' (2016) CA codebook. Additionally, it included instructions on how to code for frequency. However, it went a step farther and required the coders to identify the decision made regarding their diagnosis: removal (i.e., patient wanted to, planned to, or had removed their fibroadenoma) or other (i.e., patient wanted to, planned to, or already decided to go another treatment route such as biopsy, ultrasound, semi-annual monitoring by a provider, self-monitoring). Doing so allowed for correlation to be examined and RQ 2 to be answered sufficiently through SPSS. In essence, analysis in response to RQ 2 involved coding for how patients were currently appraising their diagnosis (i.e., positively, negatively, simultaneously positive) and how it correlated to their decision to remove their fibroadenoma (Table 3). For example, if a person stated, "I had extreme anxiety which was impacting my mental health and

well-being so, I decided to remove it for peace of mind," then that would be coded as a NGA and removal.

Table 3

Descriptions

Decision made	Description	Generic Example
Removal	Commenter discussed wanting to, pursuing, or already previously having at least one fibroadenoma removed (i.e., excisional biopsy, lumpectomy, removed)	"I decided to get mine removed but ultimately the experience helped me better appreciate my health."
Other	Comment discussed deciding to go another treatment route: testing (i.e., core biopsy, mammogram), monitoring, leaving in fibroadenoma, etc.	"I decided to leave mine in and just get it monitored. Since it is not cancer, I feel extremely lucky."

Codebook 3 was developed as a content classification codebook that included a feature (i.e., removal decisional factor), description, and example of a Reddit thread comment (see Tables 3 and 4). The two coding rounds (post-preliminary round) utilized a predefined list of codes and coded for frequency. However, the predefined list for Codebook 3 was established through an initially mixed coding schema where both open coding and the factors suggested by existing medical and UMT literature (i.e., age, Family history of breast cancer, personal history of cancer or other breast diseases, previous treatment for any form of cancer, ethnicity, presence of BRCA 1 or 2 genes, pathology, doctor recommendation, patient's education level, fibroadenoma diagnosis anxiety, health anxiety) were coded for simultaneously (Table 4).

Table 4

Factor Descriptions Found in Literature

Factor in Decision for Removal	Description
Age	Comment contains Age as a factor for removing Fibroadenoma.
Family History of Breast Cancer	Comment contains Family History of Breast Cancer as a factor for removing Fibroadenoma.
Personal History of breast Cancer or Other Breast Disease	Comment contains Personal History of Cancer/Breast Disease as a factor for removing Fibroadenoma.

Previous Treatment for Any Form of Cancer	Comment contains Previous Treatment of Cancer as a factor for removing Fibroadenoma.
Ethnicity (African American dissent may be more likely to get procedure)	Comment contains Ethnicity as a factor for removing Fibroadenoma.
Testing Positive for BRCA1 or 2 Genetic Mutation	Comment contains positive BRCA 1 or 2 gene as a factor for removing Fibroadenoma.
Pathology (i.e., size of mass, pain level, texture; results from work-up)	Comment contains pathology of Fibroadenoma as a factor for removal.
Provider's Recommendation	Comment contains provider's recommendation as a factor for removing Fibroadenoma.
Patient's education pertaining to Fibroadenoma	Comment contains patient's level of education as a factor for removing Fibroadenoma.
High Level of Anxiety regarding Fibroadenoma	Comment contains mention of high anxiety pertaining to diagnosis as a factor for removing Fibroadenoma.
High Level of Anxiety about Overall Health (i.e., Generalized Anxiety Disorder, Illness Anxiety Disorder)	Comment contains mention of high anxiety pertaining to overall health as a factor for removing Fibroadenoma.
Other	Open coding: code any additional factors which seem thematically significant in regard to patients removing their fibroadenoma.

From this, a new list emerged (Table 5) consisting of both coding categories discovered through open analysis and some of the factors suggested by the literature. These categories were finalized after both coders suggested, discussed, and agreed that each coded category was imperative. Practically speaking, Codebook 3 aimed to identify the factors that were associated with removing a fibroadenoma. So, for example, if a patient-user stated, "I was recommended by

my doctor to get my fibroadenoma removed due to the large size of it," then "doctor recommendation" and "size" would both be coded as factors for the patient's decision to remove their fibroadenoma.

Table 5

Decisional Factors Descriptions Found in Data

Factor in Decision for Removal	Description
Amount of fibroadenomas (concurrently)	Patient currently has multiple fibroadenomas and decides to have the removed because of the amount.
Risk to Current or Future health (i.e., fibroadenoma turning into a malignant tumor)	Fibroadenoma is perceived to influence the current mental, physical, or social health and well-being of the patient to some capacity.
Convenience (i.e., avoid excessive testing, procedures, invasive diagnostics)	Patient removes fibroadenoma because it is convenient and presents better benefits than other alternatives. (i.e., avoid excessive testing/monitoring, removing it since they're already removing other fibroadenomas).
Cosmetic	Fibroadenoma affects cosmetic/aesthetic appearance of breast which influences patient to get it removed to avoid this.
Personal history of cancer (i.e., breast) or breast disease (i.e., previous diagnosis of fibroadenoma, cysts, FEM influences decision to remove fibroadenoma)	Health history influences patient to remove fibroadenoma.
Size & growth	Patient decides to remove fibroadenoma because of its size and/or its growth.
Pain	Patient complains of pain associated with fibroadenoma and consequentially removes it.
Pathology	Exam work up/testing (i.e., biopsy, ultrasound) done by health providers influences decision to remove fibroadenoma.
Provider recommendation	Health provider recommends the mass to be removed and patient complies with recommendation.

High level of Anxiety pertaining to fibroadenoma (as it relates to overall health)	Patient's diagnosis makes them anxious or scared and therefore they get it removed to eliminate that anxiety.

3.6.2 Procedural Rules

Regarding all codebooks, several procedural rules were decided (Table 6, Figure 1, Figure 2). These rules were determined both before and after the preliminary round of coding.

Table 6

Procedural Rules

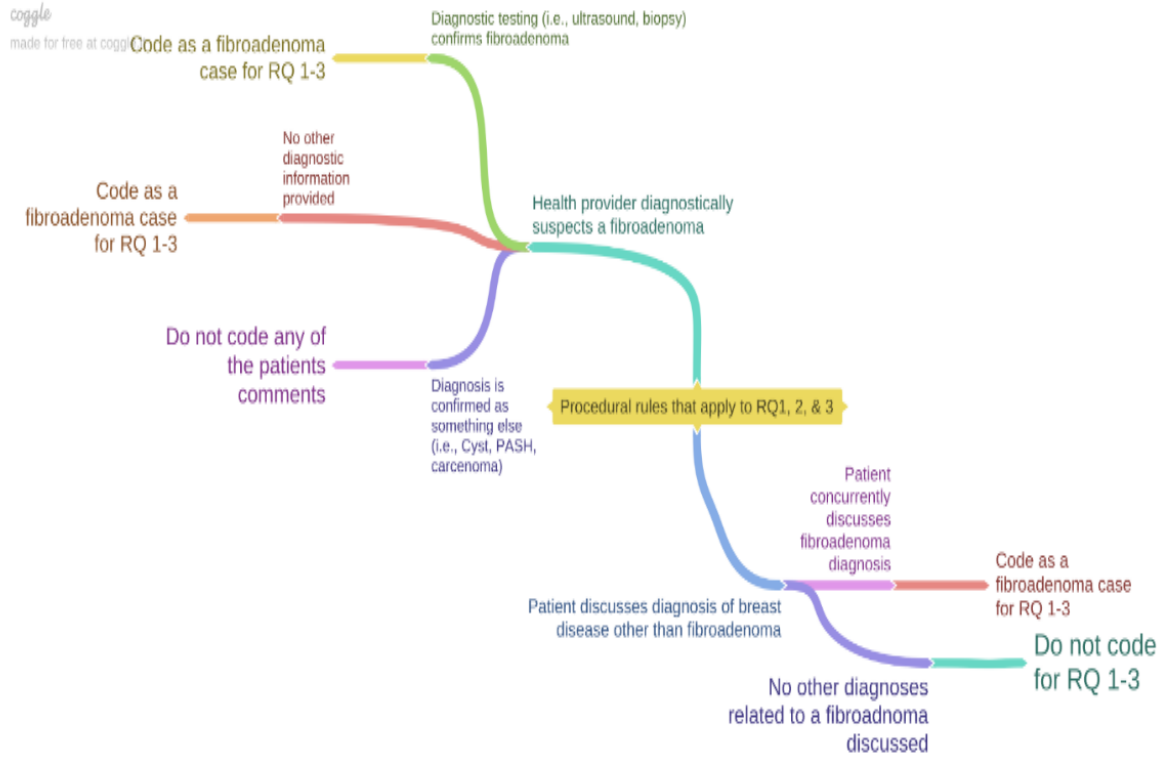
Rule #	Codebook Application	Rule Description	Supporting Information	Clarifying example
1	1, 2, 3	Code cases where the doctor suspects and confirms a fibroadenoma.	However, If the same person updates and it turns out their fibroadenoma is something else, do NOT code any of their comments.	"A while back I found a lump in my right breast, and it freaked me out. It turned out to be a PASH. I needed up getting it removed for its size."
1	1, 2, 3		Do NOT code cases/comments of anything other than fibroadenomas (i.e., cyst, FEM, PASH) unless it is discussed alongside a case of a fibroadenoma.	"I once had a PASH and two fibroadenomas all at the same time. I didn't like the anxiety they caused me so I got them all removed."
2	2, 3	Regarding removal: Those who want, plan to, or have had it removed, code it as "removal."	However, if they update and report doing something else, then code them as other for all of their comments.	[Comment 1] "I'm thinking about getting my fibroadenoma removed because it's freaking me out…" [Comment 2] "I decided not to get it

				removed since my doctor advised against it."
3	1, 2, 3	Code per person, meaning if one person mentions "size" in multiple comments, all of their comments should be put into one code.	All commenters' comments about one factor should be grouped into one code to avoid frequency error.	"I had it removed for size… It was just really big."
4	3	If a person mentions multiple factors (RQ 3), then separate comments based on factor.	Code each user's comments per factor related to removal discussed.	"I had it removed because it was growing rapidly and was causing me a lot of pain. 1. Pain: was causing me a lot of pain 2. Size: I had it removed because it was growing rapidly."
5	3	The same comment can fall under multiple categories if they fit both.	If a comment infers or directly states something that can fit under multiple categories, put it under all that apply.	"I had my fibroadenoma removed because I didn't want to deal with its possible cosmetic or health consequences" (Code: Risk to current or future health Code: Convenience).

These rules ensured there was minimal confusion related to coding for all three codebooks (Figure 1). For example, when distinguishing among concepts, because the coding was from a conversational platform, it was important to code text the same way regardless of how they appeared (Skalski et al., 2017).

Figure 1

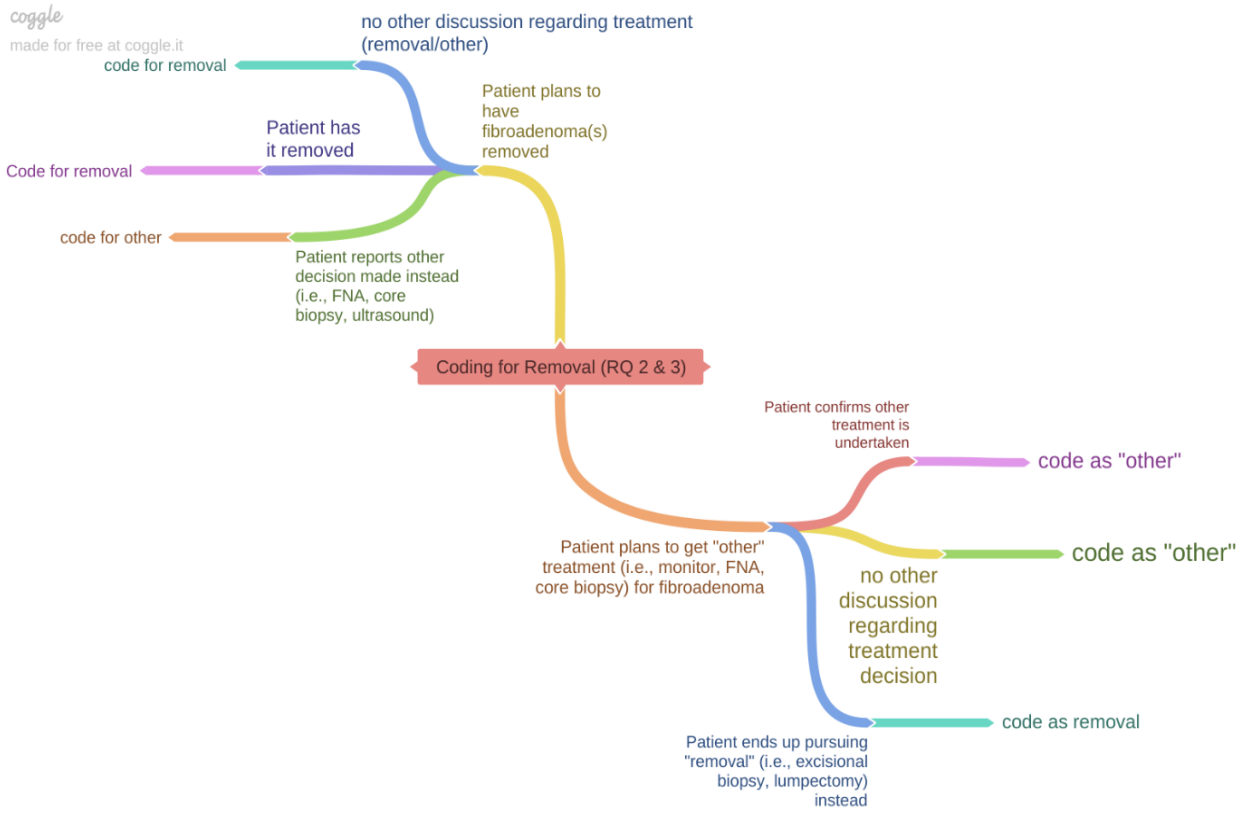
Procedural Rules that Apply to RQ 1-3



In other words, when coding for "size" as a decisional factor related to removing a fibroadenoma, if one user's comment says, "I removed it because it was big," and another said, "I removed it because of the fibroadenoma's large size" then both statements were categorized under "size." This is because the CAs allowed for an understandable level of implication when coding the data set (Carley, 1993)(Figure 2).

Figure 2

Coding for Removal for RQ 2 & 3



3.6.3 Coding Round Procedures

Both coders independently coded all data provided by the sample of subreddits over the course of three rounds of coding. Prior to coding, both coders had varying levels of coding experience prior to the initial coding session. To ensure coding was done sufficiently, I provided the assistant coder with a basic refresher course on qualitative coding analysis as it related to UMT and fibroadenoma diagnoses. After I felt comfortable with the assistant coder's ability to properly code the data for this project, the assistant was provided with the data, initial codebooks, and procedural rules. Each coder was allotted a week per coding round to ensure they were able to sufficiently code for all three codebooks. To start, coders analyzed all collected data during the preliminary round of coding. This was where both predefined lists and open

coding were conducted concurrently in an effort to finalize the codebooks for future coding purposes. The finalized codebooks were then established after discussing and confirming all three codebooks with the assistant coder. During this meeting, both coders discussed code findings and questions, as well as identified and settled any disagreements. Following the preliminary coding, two additional rounds of coding were performed. After each round of coding, again, the author met with the assistant coder to review and discuss findings, agreements about the coding categories and deliberate over disagreements. For additional context, the second round involved the initial coding of comments within the data. Then, the third round was conducted in an effort to collect additional findings as well as ensure relevance of all comments coded. All coding was performed using an Office Word file and was then be transferred to SPSS for final analysis.

3.7 Data Analysis

3.7.1 Codebook 1 Categories

Positive Appraisal. PA occurred in subreddit thread comments when the patient-user discussed perceiving their fibroadenoma(s) diagnosis positively (i.e., happy, opportunistically). PA coding was in line with Brashers's (2001) description of positive uncertainty appraisal.

Negative Appraisal. NGA occurred in subreddit thread comments when the patient-user discussed perceiving their fibroadenoma(s) diagnosis in a negative manner (i.e., anxious, depressed, scared). NGA coding was in line with Brashers's (2001) description of negative uncertainty appraisal.

Simultaneous Appraisal. Coders categorized data as simultaneous when patient-users commented that they perceived their fibroadenoma diagnosis as both an equally positive and negative at the same time (i.e., anxious but opportunistically, scared but thankful). Codes in this

category were in line with SA theorists' proposals (Cohen et al., 2016; Darnell et al., 2018; Kerr et al., 2020).

3.7.2 Codebook 2 Categories

Removal Decision. Removal was coded for when a commenter discussed wanting to, pursuing, or already previously having at least one fibroadenoma removed (i.e., excisional biopsy, lumpectomy, "removed"). Each patient's comments were vetted to ensure that the "removal" decision never changed to be "other." That is, if a patient initially stated they wanted removal but then reported that they would be or had done something else (i.e., core biopsy, ultrasound), then it would be coded for "Other."

Other Decision. Coders categorized comments as Other Decision (a.k.a. "other") when a commenter discussed deciding to go another treatment route (i.e., annual testing, core biopsy, mammogram, monitoring, leaving in fibroadenoma). Each patient's comments were vetted to ensure that the "other decision" decision never changed to be "removal." That is, if a patient initially stated they wanted to only get another treatment but then reported that they removed it (i.e., excisional biopsy, lumpectomy), then it would be coded for "Removal."

3.7.3 Codebook 3 Categories

Amount of Fibroadenomas (concurrently). This was coded for when the patient currently had a multi-fibroadenoma diagnosis and decided to have one or more of them removed because of the amount.

Risk to Current or Future Health (i.e., fibroadenoma turning into a malignant tumor). Coders put comments in this category when patients' fibroadenoma(s) were perceived to influence the current mental, physical, or social health and well-being of the patient to some capacity.

Convenience (i.e., avoid excessive testing, procedures, invasive diagnostics). This was coded when patients commented that they removed their fibroadenoma(s) because it was a convenient decision and presented better benefits than other alternatives. (i.e., avoid excessive testing/monitoring, removing it since they're already removing other fibroadenomas).

Cosmetic. Coders categorized comments as cosmetic when a patient reported that the fibroadenoma affected the cosmetic or aesthetic appearance of their breast(s) and subsequently influenced the patient to have it removed.

Personal History of Cancer or Breast Disease (i.e., previous diagnosis of breast cancer, fibroadenoma, cysts, FEM influences decision to remove fibroadenoma). Coders identified this in cases where a patient reported that their health history influenced their decision to remove their fibroadenoma(s).

Size or Growth. This was coded for when a patient commented that they decided to have their fibroadenoma removed because of their size or its growth. Both size and growth were put into the same category primarily because they were largely interconnected in most cases examined during the coding process.

Pain. When patients commented that they removed their fibroadenoma because of the pain associated with the diagnosis, coders put it into this category. Additionally, pain was only coded when commenters discussed physical pain. Psychological and other mental pain was not coded for since it could be seen as related to health anxiety which was a separate category coded for.

Pathology. This was coded for when patients reported that exam workup or testing (i.e., biopsy, ultrasound) done by their health providers influenced their decision to remove the

fibroadenoma. In cases of pathology, oftentimes, patients removed their fibroadenoma when the testing came back suspicious or had unusual features.

Provider Recommendation. In cases where a patient reports that a trusted health provider recommended the mass be removed and they consequently followed the recommendation and got it removed, coders would categorize those instances as Provider Recommendation.

High Level of Anxiety Pertaining to Fibroadenoma (as it relates to overall health). This was categorized by coders when patients reported that their diagnosis made them anxious or scared or uncertain and therefore, they had it removed to eliminate these feelings.

3.8 Intercoder Reliability

Since some qualitative scholars believe inter-coder and inter-rater reliability is problematic (Braun & Clarke, 2013; Clark & Braun, 2014; O'Connor & Joffe, 2020), intercoder reliability (ICR) was not calculated for this qualitative CA. Instead, I placed a heavy focus on developing and executing a reliable coding process. This process was adopted from other qualitative scholars who developed similar coding procedures (Sowles et al., 2018; Struik & Yang, 2021). Within the process was a thorough approach to coding that involved recurrent discussions among coders. This process also allowed all coders to have ample time to collect and reflect on their codes to ensure the confidence of their analysis. This method was successful according to the minimal discrepancies found in the finalized analysis provided by both coders. Conclusively, only eleven total discrepancies were found within the data after three rounds of coding. These discrepancies were all addressed, resolved, and worked into the final coding framework.

CHAPTER 4: RESULTS

4.1 Patient User Demographics

Partial demographic information data was available for Reddit patient-users. Though several patients did not mention any demographic characteristics, those who did had theirs collected. Those who mentioned their age (*N*=50) had an average age of 25 years old (Oldest: 43 years old; youngest: 17 years old). In addition, while many patients did not explicitly mention their gender, 100% of those who did report it (*N*=25) were female. There were no ethnic demographic descriptions found in the data sample.

Additionally, it is imperative to recognize that this information was self-reported. With that said, this demographic information does make sense when looking at the broad description of most patients who are diagnosed with fibroadenomas (i.e., young adult, post-menarche, female)(Klinger et al., 2019). Moreover, there was no feasible way to successfully confirm any of this information as correct. Thus, this demographic information should not hold significant weight. Rather, the results pertaining to the actual RQs should primarily be focused on.

4.2 Comments Collected

A total of 361 comments from 36 independent threads were collected for coding. Collectively, each thread had a mean (*M*) of 10 comments (Minimum = 1, Maximum = 61, SD=13.04). Of the 361 comments collected, 126 (35%)(RQ 1 & 2 *N*=63; RQ 3 *N*=63; RQ 1-3 *N*=42) were coded to answer all three RQs. The other 235 comments were made up of information including discussions of similar health phenomenon (i.e., breast cysts, cancer) and other miscellaneous discussions (i.e., providing support for person undergoing diagnosis and treatment, thanking patient-users for sharing their story). All comments coded had a collective Upvote percentage of 87% (SD=0.14), signaling a large majority of information discussed

related to fibroadenoma appraisal and decision-making was agreed upon and supported by patients interacting with the subreddit threads (i.e., people who have had experiences with fibroadenoma diagnoses) (Table 7).

Table 7

Descriptive Statistics

RQ	*N* Patient Users	*N* Comments Coded	Upvote%	Min	Max	*M*	Std. Deviation
RQ 1 & 2	43	63	88%	43	110	72	72
RQ 3	57	63	87%	57	101	73.667	73.67
Total (RQ1-3)	100	126	87%	100	211	145.667	145.67

Note: Total users, total comments, coded comments, and Upvote percentage were collected during the time of coding.

4.3 RQ 1: Patients' Appraisal of Fibroadenoma Diagnoses

RQ 1 inquired about patients' uncertainty appraisal of their one or multiple fibroadenoma(s) diagnoses. All three forms of appraisal (i.e., Negative, Positive, and Simultaneous) were present in the data. Specifically, 63 comments (*M*=17.67; SD=7.64) published by 53 unique patients were coded for appraisal. Comments coded had a combined Upvote of 91% (Table 8).

Table 8

Appraisal Statistics

Appraisal	*N* Patient Users	*N* Comments	*N* Coded	Upvote %	Min	Max	*M*	Std. Deviation
Positive Appraisal	11	33	11	93%	11	33	18.34	12.70
Negative Appraisal	26	48	28	88%	26	48	34	12.17

Simultaneous Appraisal	16	25	24	93%	16	25	21.67	4.93
Total	53	110	63	91%	11	25	17.67	7.64

Coding revealed that most patients are negatively appraising their fibroadenoma diagnosis. Specifically, 26 patients were coded as having NGA (SD=12.17) in comparison to 11 (PA)(SD=12.70) and 16 (SA)(SD=4.93) patients (Table 9). Thus, it can be concluded that most patients negatively appraise their fibroadenoma diagnosis.

Table 9

Decision Statistics

Patient User's Treatment	*N* PA	*N* NA	*N* SA	Total	Min	Max	*M*	Std. Deviation
Removal	4	13	8	25	4	13	8.33	4.51
Other	7	13	8	28	7	13	9.33	3.22
Total	11	26	16	53	11	26	17.67	7.64

4.3.1 Negative Appraisal

Most patients' comments were coded as NA. Statistically speaking, 26 patients negatively appraised their diagnosis within 28 unique, coded comments (*M*=34; SD= 12.167). That is, patients who appraised their fibroadenoma and accompanying uncertainty in a negative way (regardless of treatment route) were coded as having NGA (Table 10). Oftentimes, when we coded for NA, themes related to feelings of fear and anxiety emerged as they related to interruption of life and current or future health concerns (Table 10). Table 10 further demonstrates some of these accounts of NGA related to the diagnosis.

Table 10

Negative Appraisal Examples

Appraisal	Example Comments Coded from Sample

Negative Appraisal (NGA)	A. *"Apparently the lump I had wasn't "nothing", but an actual tumor. As it turns out, I have fibroadenoma, a condition where I get tumors in my breast that have to be surgically removed as they can affect my mammary glands. Pretty scary stuff."*
	B. *"I had a walnut sized [fibroadenoma] removed from my breast when I was 16. Scared the bejeezus out of me."*
	C. *"I do have a family history of breast cancer which makes me super nervous but I know my age makes cancer really unlikely (it still scares me though)."*
	D. *"The doctor said it was suspicious because of my family history of breast cancer (two maternal aunts) but said he really thinks it's just a fibroadenoma.[…] I feel so scared and alone"*
	E. *"I got it removed mainly because it was starting to make my boob look kinda weird when lying down and it'd make me constantly anxious lol."*
	F. *"I have two- one in each, and tenderness, and health anxiety. I'm also clearly hyper fixating on it, and it's kind of ruined my holiday season."*
	G. *"I'm just terrified of having to face one more thing. I'm afraid to tell my family about this scare since years have already been taken off their lives from my other medical scares[…] I think about worrying that way too and yet can still never manage to stop doing it lol."*
	H. *"although it is benign, I was told that with time, in maybe like 2 years or so (it really depends) there is a more likely a chance it suffers a transformation and it might become malignant. So I had to have it removed."*
	I. *"I finally decided to get it removed tomorrow because my doctor didn't like the fact that it stayed categorized as BIRADS 3 for 2 years now"*
	J. *"I am worried that I will one day miss a cancer because I think 'pfftttt - just another fibroadenoma' to myself"*
	K. *"[My] doctor is pretty sure it's a fibroadenoma but they categorized it as "BIRADS 3" on my ultrasound report which means that it is LIKELY benign and I can't seem to stop worrying about the LIKELY part."*
	L. *"Even though my doctor was confident that I had nothing to worry about after my initial breast exam, I just needed to know for sure."*

M.	*"I had to have a mammogram and ultrasound done and that came back as a benign kind of tumor called a fibroadenoma[…][I] went to the hospital because I was having heart palpitations.[…] I started having problems with my other breast (also right before a period). It was painful constantly, felt lumpy, and I couldn't stop touching it. I was also having the stomach and digestive issues […]and I had a pain in my chest a lot (was certain I had cancer that had metastasized). This was when I started truly feeling anxious all the time. I cried all the time, I couldn't stop checking and feeling my breasts (which made the pain worse), and I couldn't sleep. I was constantly googling and asking questions on breast cancer forums trying to find reassurance and only getting more and more upset. I was such a mess my mother personally took me to a urgent care clinic on the way back home from vacation.[…] I'm back to being an anxious mess and I don't know what to do. My random pains in my breasts are back (especially if I'm stressed or thinking about breast cancer or my breasts in general), I'm crying a lot more out of nowhere, and I cannot seem to stop the damaging habit of obsessively checking my body.[…] . I'm starting to develop some body issues because of this and the anxiety in general is taking a toll on my life.*

4.3.2 Simultaneous Appraisal

The second most common way patients appraised their diagnosis was Simultaneously (SA). Statistically speaking, 24 comments published by 16 independent patients were coded for SA(*M*=21.67; SD=4.93). That is, patients' comments that were perceived both positively and negatively, simultaneously were coded as SA(Table 11). Moreover, similar to NA, many patients demonstrated feelings of fear and anxiety, however, they were also accompanied with positive emotions that resulted from gaining knowledge of the lumps' benign nature or because of providers' reassurance (Table 11). Table 11 provides examples of some of these accounts of SA related to different patients' experiences with fibroadenoma diagnoses.

Table 11

Simultaneous Appraisal Examples

Appraisal	Example Comments Coded from Sample
Simultaneous Appraisal (SA)	A. *"I had a fairly large one last year. It's one of those things that really is scary at first, but then you realize it's not such a big deal. I hated the thought of letting it stay there, though, and since I'm pretty small-chested it was large enough that I could actually see it, so I definitely wanted it gone."*
	B. *"As someone who suffers from health anxiety, I would definitely reach out to my practitioner about a biopsy or consider finding another practitioner for a second opinion if you are able to!"*
	C. *"If it is weighing on you a lot, advocate for yourself to get it biopsied or at least checked out again."*
	D. *"It was scary at first, but it's all been fine in the long run. I rarely even think about any part of it. I was also lucky that when we first discovered the tumors, my neighbor at the time (a sweet young mother I babysat for occasionally) confided in my mother and me that she had gone through the same thing and that it all turned out okay. That knowledge helped tremendously."*
	E. *"I tell myself that as long as I'm keeping an eye on it with my doctor, it will be ok"*
	F. *"Something I had to learn was to trust the professionals. Hard to do but I'm glad I did"*
	G. *"My fear with having boobs full of fibroadenomas, was that I'd never know if I had a 'bad lump'"*
	H. *"It's still there. Still worries me each time I go to the doctor for a test."*
	I. *"Sometimes I'll get in my head about it and I'll be very aware of them being there"*

4.3.3 Positive Appraisal

Lastly, the least common form of appraisal coded within the comments was PA. A total of 11 comments published by 11 independent patients were coded for PA (M=18.33; SD=12.70). Patients who described their diagnosis in an optimistic or generally beneficial way were coded

for PA (Table 12). Table 12 displays examples of some of these accounts of PA related to different patients' experiences with the diagnoses.

Table 12

Positive Appraisal Examples

Appraisal	Example Comments Coded from Sample
Positive Appraisal (PA)	A. *"Everything is well, the scar is not a problem at all, when my bf saw this for the first time he thought it looked pretty, I do too, I look at it and it reminds me of those times and that I should always be aware of my health"* B. *"The result was a fibroadenoma. Thankfully, it does not need to be excised. He said so long as it doesn't grow, it doesn't put me at any higher risk of cancer.[…] That made me so happy"* C. *"luckily everything came back benign and no signs of pre-cancer."* D. *"Mine turned out to be a benign fibroadenoma thank goodness!"* E. *"I have a nice little pink scar, perfectly straight, on my right breast. No major volume change. I wear it proudly and if anyone asks about it, I use it as an opportunity to remind women […] to do self-exams."* F. *"DON'T PUT OFF GETTING LUMPS CHECKED! My only regret was not seeking testing more promptly. It's better knowing sooner rather than later."*

4.4 Appraisal Correlation to Decision

RQ 2 built upon the results related to RQ 1. Coding revealed that PA was commonly associated with pursuing other treatments; while NGA and SA were equally associated with removal and pursuing other treatments.

Further, RQ 2 sought to determine if the appraisal was related to decision-making pertaining to fibroadenoma removal in comparison to pursuing other treatment options. A Chi-Square test showed that the relationship between appraisal and decision-making was not significant (p-value= 0.722; α= .650)(Table 13). Therefore, currently, there is not enough evidence to suggest an association between fibroadenoma diagnosis appraisal and decision-making.

Table 13

Test for RQ 2 Correlation

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.650[a]	2	0.722
Likelihood Ratio	0.659	2	0.719
Linear-by-Linear Association	0.400	1	0.527
N of Valid Cases	53	-	-

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.19.

4.5 Factors Influencing Fibroadenoma Removal

RQ 3 aimed to determine what factors currently influenced patients to remove their fibroadenomas. After 3 rounds of coding (i.e., preliminary, first, second), a total of 57 patients' 63 comments were coded (Upvote: 87%). Within those 63 comments, 127 instances of factors discussed were coded. From this coding emerged data that reported on the frequency of these factors influencing removal (Table 14).

Table 14

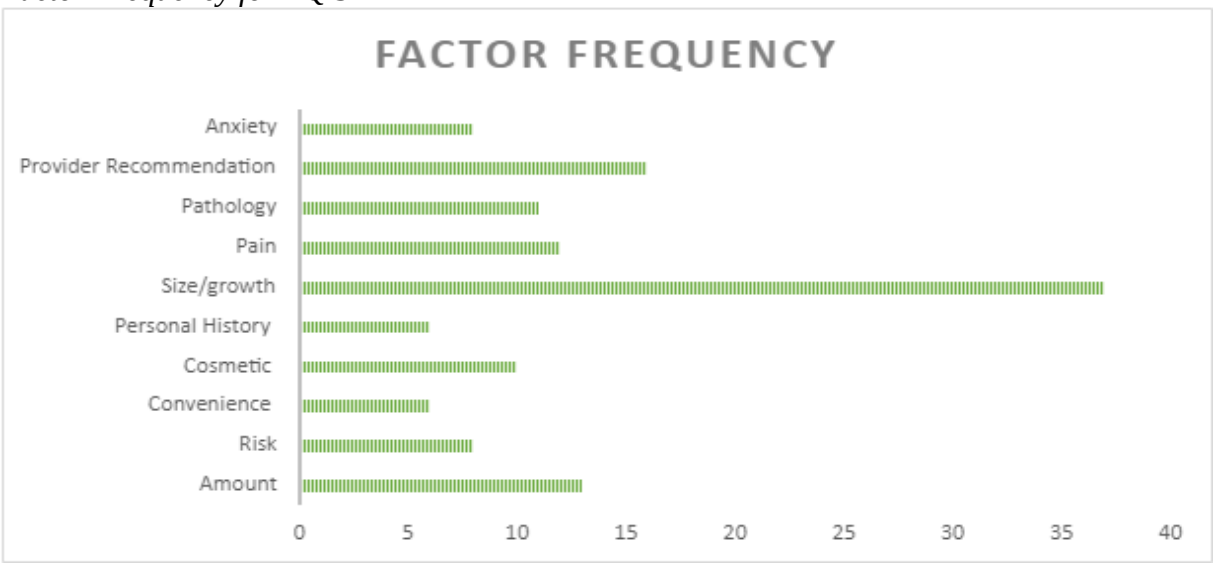
Factor Coding in RQ 3

Factor	*N* Factor Coded	Upvote%
Amount	13	84%
Risk	8	90%
Convenience	6	92%
Cosmetic	10	94%
Personal History	6	85%
Size & growth	37	72%
Pain	12	88%
Pathology	11	86%
Provider Recommendation	16	89%
Anxiety	8	87%
N Total	127	-
M	12.700	87%
Std. Deviation	9.497	6%

The factors most to least frequently coded were: Size and growth (*N*=37; Upvote: 72%), Provider Recommendation (*N*=16; Upvote: 89%), Amount of Fibroadenomas (*N*=13; Upvote: 84%), Pain (*N*=12; Upvote: 88%), Pathology (*N*=11; Upvote: 86%), Cosmetic (*N*=10; Upvote: 94%), Risk to Current or Future Health (*N*=8; Upvote: 90%), Health Anxiety (*N*=8; Upvote: 87%), Convenience (*N*=6; Upvote: 92%), Personal History of Breast Cancer or other Breast Disease (*N*=6; Upvote: 85%)(Figure 3).

Figure 3

Factor Frequency for RQ 3



4.6 Factors Coded

While there was a total of 10 factors coded for, there was some degree of factor overlap. That is, many times more than one factor would be present within a comment or string of comments written by one user. Because of this, and to prevent repetitiveness, the three factors with the highest frequency a) Size and Growth, b) Provider Recommendation, and c) Amount will be discussed with the other factors as they appeared in conjunction with those factors significantly. Examples of factors as they were coded are presented in Table 15.

Table 15

Factor Comments for RQ 3

Factor	Comment from Data
Size and Growth	*"Mine are 3cm in the left and 3.5cm in the right. Or at least they were. Most recently they increased in size to 3.6 and 4.3, respectively. I made the decision right then to get them removed"*
Provider Recommendation	*"[The doctor] also said, and this is IMPORTANT, that masses >3 cm (and mine is 6.4 cm) run the risk of developing into a phyllodes, which is a malignant form of breast cancer. He also said that the biopsy done on the mass four years ago would not have been an accurate representation of the entire mass since it is so large and the first doctor should have recommended surgery."*
Amount	*"I've had 6 Fibroadenomas removed in the past 5 years."*
Pain	*"...because mine was large and causing me pain she suggested I remove it..."*
Pathology	*"I got diagnosed with a fibroadenoma at 21 about two years ago and I finally decided to get it removed tomorrow because my doctor didn't like the fact that it stayed categorized as BIRADS 3 for 2 years now […] my tumor grew in size between these two years so I was a little concerned."*
Cosmetic	*"I decided to [remove] it since the masses were still growing and had potential to cause cosmetic damage to my breast. (And honestly I'm quite fond of my breasts so I wanted to avoid that!)"*
Risk	*"My consultant felt confident they were fibroadenomas from the ultrasound but didn't make any diagnosis until after the biopsy. The one that was removed was removed only because it had grown since the initial appointment and could potentially have been a phyllodes tumor which are rare but have similar characteristics"*
Anxiety	*"I have maybe a 2 cm fibroadenoma which I want to get out, and my surgeon reminded me that the issue with fibroadenomas is that you can't see what's underneath. (She also says that biopsies sometime give you a false sense of security.)"*
Convenience	*"My doctor gave me the option of not removing it but i would have to have it checked very often. i declined and just wanted it removed"*
Personal History	*"[In] the past 3 years I have had 3 fibroadenomas and 1 PASH mass removed from my breasts […] Then a few months ago I found 3 more masses, which I got removed immediately"*

4.6.1 Size and Growth

Size and Growth of patients' fibroadenomas was the most influential factor among decisions for removal. 37 patients reported Size and Growth as a factor within the 63 comments coded for RQ 3. When considering Size specifically, most patients' testimonies described their fibroadenomas as large. Thus, because of the fibroadenoma(s)' large size, patients oftentimes reported either planning to or already having it removed. However, some other patients reported that even though their fibroadenoma was deemed "smaller," the fact that a mass of any size was in their breast influenced them to have it removed.

Growth, consequentially, played a role in the size of the mass and ultimately influenced removal. Oftentimes, patients' testimonies would be coded for Growth when Size was also discussed. For example, some patients reported how initially they decided to not have their fibroadenoma removed because the size was small and did not affect them. However, the same patients reported eventual removal because the size of the fibroadenoma grew to be too significant.

Pain. Size and Growth was often related to other factors including pain (N=12; Upvote: 88%). For example, there were many instances where both Pain and Size and Growth were coded as equally important to certain patients which ultimately influenced removal.

4.6.2 Provider Recommendation

The second most frequently coded factor was Provider Recommendation. 16 patients' comments were coded for Provider Recommendation within the 63 comments coded for RQ 3. User comments that discussed removing their fibroadenoma because their provider recommended it or because patient-provider conversations led to the decision for removal were

coded for this factor. Many patients reported trusting their doctor's opinion and would often side with their doctor's suggestion for removal.

This trust and value put on doctors' recommendations seemed to be rooted in health providers' knowledge of the diagnosis. Some patients discussed their trust in doctors' recommendations and how it influenced their decision for removal. They also would go on to say other patients in the same situation should also trust health providers' recommendations.

Risk to Current or Future Health. One other factor that was concurrently coded with Provider Recommendation included Risk to Current or Future Health (*N*=8; Upvote: 90%). The possibility for the fibroadenoma diagnosis to be malignant was found to influence some patients to remove their masses.

Anxiety. Another factor coded alongside Provider Recommendation was Health Anxiety associated with their fibroadenoma (*N*=8; Upvote: 87%). Some patients who reported experiencing health anxiety either because of or in conjunction with their fibroadenoma diagnosis decided to get their mass removed because of the reasons mentioned by their provider.

Pathology. A final factor often accompanying Provider Recommendation was Pathology (*N*=11; Upvote: 86%). Some patients reported that they removed their fibroadenoma due to unsettling or alarming pathology (i.e., unusual test results) reported by their providers (who subsequently recommended removal).

Other factors were minimally coded in connection to Provider Recommendation. Yet, they were coded significantly when looking at the third most frequently coded factor: Amount.

4.6.3 Amount

Amount was the third most frequently coded factor among the 63 comments published by the 57 patients coded for RQ 3. Amount was coded for 13 times and had an Upvote of 84%.

Comments which discussed having multiple fibroadenomas either concurrently or recently (i.e., diagnosed with two fibroadenomas within a year) were coded for amount.

Personal History. Since Amount looked at having multiple fibroadenomas, the overlap between that factor and Personal History of Breast Cancer or other Breast Disease (*N*=6; Upvote: 85%) seemed inevitable. This was because it coded for experience and diagnosis with breast disease. There were many cases in which patients discussed having multiple fibroadenomas at once while also dealing with other breast diagnoses either simultaneously or historically.

Convenience. A second factor coded with Amount was Convenience (*N*=6; Upvote: 92%). Patients who were experiencing multiple fibroadenomas at once deemed removal as convenient. For example, some patients, who were experiencing pain associated with one of their multiple fibroadenomas, ultimately decided to remove them all since the patient was already undergoing surgery. While other patients had similar experiences where rather than undergoing extensive testing for their fibroadenomas, they decided to have them removed altogether.

Cosmetic. The last factor concurrently coded with Amount was Cosmetic (*N*=10; Upvote: 94%). The reasoning for removal decisions coded for Cosmetic and Amount was like those between Cosmetic and Size and Growth. That is to say, experiencing more than one fibroadenoma often sought to remove it for similar cosmetic reasons (i.e., asymmetry of breasts) to those only experiencing a singular fibroadenoma.

CHAPTER 5: DISCUSSION

There were three main objectives of the current study, including to a) determine how patients are currently appraising fibroadenoma diagnoses, b) discover if a correlation existed between appraisal and treatment decision-making for the diagnosis, and c) recognize the factors that influenced patients to remove their fibroadenomas. There are a number of conceptual implications from this study that contribute to the growing body of literature that explores decision-making and uncertainty management appraisal of health diagnoses. Moreover, findings from this research help lay a foundation for practically improving appraisal (i.e., minimizing NGA and consequential psychological and physical effects) of the diagnosis and for aiding providers in understanding patients' decision-making pertaining to the diagnosis (i.e., factor influence for removal).

5.1 Conceptual Implications

5.1.1 Appraisal and Emotions, Experiences, and Knowledge

The first implication relates to the connection between appraisal and emotions, experiences, and knowledge. There appears to be a clear connection between NGA and negative emotions as well a clear connection between PA and health awareness, yet the connection between appraisal and knowledge was mixed. To begin, many patients who appraised their diagnosis negatively described themselves as fearful because of their diagnosis. This is consistent with Brashers (2001) and other scholars (Rains & Tukachinsky, 2015; Rauscher et al., 2019), who suggest that NGA aligns with the idea that a patient feels their situation has a high amount of uncertainty attached to it which leads to feelings of fear and danger.

For many, this fear manifested psychologically. Many patients stated that this fear led to psychological problems, just as existing literature suggested (Witek-Janusek et al., 2007). To

elaborate, there is evidence that many patients experience diagnosis-induced psychological distress (i.e., anxiety, depression)(Witek-Janusek et al., 2007) because of fibroadenoma(s). Many patients in this study presented with these problems. This ranged from some patients experiencing anxiety or depression while undergoing diagnosis (Table 10 Comment A-L) to others experiencing long-term mental health problems (i.e., Generalized Anxiety Disorder)(Table 10 Comment M) as a result of the diagnosis.

In other cases, patients' fear manifested physically. That is, many of those who negatively appraised their diagnosis ended up suffering physically. In this study, patients reported experiencing health issues such as gastrointestinal problems and cardiovascular palpitations (Table 10 Comment M) as a result of the anxiety and fear caused by the diagnosis. This echoed the existing research that suggests that those who are fearful can end up suffering physically because of their mental turmoil (Witek-Janusek et al., 2007). To expand on this, previous literature has found that patients endure health problems such as immune health dysregulation (i.e., diminished natural killer cell activity and cytokine dysregulation because of the anxiety and psychological distress the diagnosis causes (Witek-Janusek et al., 2007).

Further, while the physical effects found in the literature were not abundantly reported in the current study, the physical manifestations of fear are significantly plausible (Clouse, 1988; Demyttenaere et al., 2008; Henningsen et al., 2003; Mayer et al., 2001; Sobel & Markov, 2005), especially since both gastrointestinal and cardiovascular symptomologies have been both observed as physical manifestations of anxiety and other Functional Mental Health Disorders (Clouse, 1988; Mayer et al., 2001; Sobel & Markov, 2005). Thus, findings from this study add to the list of physical fear manifestations caused by the initially benign diagnoses of fibroadenomas.

However, NGA was not only linked to fear. Patients also perceived their diagnosis uncertainty negatively because of how it affected their livelihood and served as an interruption. For example, some explained that their diagnosis served as an interruption to their day-to-day life because of the overwhelming anxiety it caused (Table 10 Comment G & H). Because uncertainty itself is seen as an interruption to individual goals especially when it is largely negative, this finding was also comprehensible (Brashers, 2001; Rains & Tukachinsky, 2015; Rauscher et al., 2019). In addition, this aligned with the concept of illness biography since this level of uncertainty leads to patients experiencing biographical disruption (Bury, 1982). Thus, this data further confirms that NGA is correlated with negatively perceived experiences of life interruptions.

While NGA appears to be related to negative emotions or experiences, the present findings suggest that NGA is related to increased knowledge as well. Patients explained that their NGA stemmed from the diagnosis information their health providers gave them. That is, many patients reported that when they gained knowledge of their fibroadenoma, they became distressed or more anxious about their diagnosis (Table 10 Comment I and J). This was an especially interesting finding since gaining knowledge on whatever is causing uncertainty typically is associated with minimizing uncertainty (Rains & Tukachinsky, 2015). In fact, UMT literature often highlights how gaining knowledge correlates with a decrease in uncertainty and anxiety (NGA)(Rains & Tukachinsky, 2015). This claim stems from the research pertaining to risk information-seeking that states that those who experience negative affect are more likely to search out information to reduce those negative feelings (i.e., anxiety)(Yang & Kahlor, 2013). Moreover, this suggests that information seeking and gaining knowledge helps individuals to feel less uncertain and more in control of their scenario (Griffin et al., 2008; Kahlor, 2010; Rains &

Tukachinsky, 2015; Yang & Kahlor, 2013). However, these findings would contradict that. Instead, they argue that gaining knowledge may worsen a patients' anxiety (NGA). This comports with certain research which argues that seeking knowledge can actually lead to patients resorting to fear control because the knowledge they have gained causes them to be fearful and have low efficacy (i.e., there is nothing they can do, hopeless)(Witte, 1994; Yang & Kahlor, 2013). For some individuals, knowledge can be harmful because it can worsen negative affect (Witte, 1994). So, the possibility that increased knowledge can lead to worsening negative appraisal is potentially plausible for these patients. However, because this research is not directly tied to NA, more investigation into how knowledge interacts with negative appraisal should be pursued.

More, it is important to note that gaining knowledge was not always linked to NGA and anxiety about the diagnosis. Those who experienced SA actually reported gaining knowledge as the biggest offset to NA. That is, the same patients who experienced SA oftentimes were coded as such because of the knowledge they sought out. This knowledge was acquired in a multitude of ways including obtaining multiple health provider opinions, physiological testing, health provider information, and recommendations. These observations were more in line with current theoretical concepts about UMT that suggest patients seek out knowledge to decrease or eliminate uncertainty successfully (Brashers, 2001; Rains & Tukachinsky, 2015; Rauscher et al., 2019). Most literature suggests that when individuals have a high level of anxiety (NGA) or negative affect, they seek out information to offset their uncertainty anxiety (Brashers, 2001; Rains & Tukachinsky, 2015; Rauscher et al., 2019). One example of this was given by a patient who worried about having a "bad lump." They sought to gain personal knowledge to ease their

anxiety. Subsequently, they achieved this by seeking multiple doctor opinions and by educating themselves on their family's cancer risk through familial BRCA testing (Table 11 Comment G).

Other patients did similar things and encouraged others on the subreddit threads to do the same. Some patients sought to gain knowledge through the community (Table 11 Comment H, I). While others gained knowledge in an attempt to calm their anxiety by following their doctor's recommendations (Table 11 Comment I). Other patients echoed the sentiment to trust the health professionals to ease their diagnosis anxiety.

With that said, those who were coded as having PA also reported knowledge as a saving grace for their mental health and overall appraisal. Consequently, this was the most in line with the existing UMT literature (Brashers, 2001). In this study's results, patients reported feelings of relief and happiness after gaining knowledge about their diagnosis. Many patients who positively appraised their diagnosis echoed the sentiment that since their diagnosis was not cancerous, it made them not only relieved but also happy (Table 12 Comment B, C).

These findings of PA patients most clearly align with existing theoretical research that would argue that knowledge decreases NGA uncertainty (Brashers, 2001; Rains & Tukachinsky, 2015; Rauscher et al., 2019). However, SA also strongly aligns with existing literature as well. Nonetheless, because patients who experienced NGA stated that gaining knowledge hindered their mental health and caused them to negatively appraise their diagnosis, more research should investigate the influence knowledge has on appraisal.

The present data also suggested a connection between PA and patients' health awareness. This often accompanied or happened after gaining knowledge. For context, the existing literature suggests that those positively appraising their diagnosis sometimes perceive their situation as a time to learn or an opportunity to improve their life (i.e., take better care of their health)(Brashers

et al., 2000; Brashers, 2001; Rains & Tukachinsky, 2015; Rauscher et al., 2019). Within the data, this was reflected. Many patients who positively appraised their diagnosis saw it as an opportunity to become more aware of their and others' health. For example, some patients who chose to remove their fibroadenomas discussed how their diagnosis (and subsequent removal) served as a reminder to take care of their health as well as inform others to do the same (Table 12 Comment A, E).

Additionally, like those who decided to have their fibroadenomas removed, some patients who decided to keep in their fibroadenomas also positively appraised their diagnoses because it served as a reminder to get checked and take care of their health proactively (Table 12 Comment F). Furthermore, those who positively appraised their diagnoses perceived them as a blessing in disguise because it served as a wake-up call to take better care of themselves, their loved ones, and those going through the same situation (Table 12 Comment E, F). This reaction further supports the existing literature on UMT since many people experiencing PA in cases of highly uncertain health diagnoses often perceive it more opportunistically once uncertainty is diminished through information gaining (Brashers, 2001; Rains & Tukachinsky, 2015; Rauscher et al., 2019).

5.1.2 Factor Influence

A second conceptual implication emerged related to the relevance of factors' influence during the decision to remove a fibroadenoma. Within the current data, many factors suggested by the preliminary data were confirmed (given findings from previous research) as influential, including the two most frequently coded factors, Size and Growth (Klinger et al., 2019) as well as Provider Recommendation (Rippy et al., 2014). There was also support for the factors: Personal History of Cancer or other Breast Disease (Centers for Disease Control and Prevention,

2021; Boughey et al., 2006; Gogas et al., 2003; Yi et al., 2009; Yi et al., 2010), Pain (Klinger et al., 2019), Pathology (Yi et al., 2010; Klinger et al., 2019; Greenberg, Yehuda, & Kaplan, 1998), and Health Anxiety pertaining to a Fibroadenoma (Hughes et al. 1986; Meechan et al. 2005; Dorfman et al., 2018; Hughes et al., 1986; Lou et al., 2015). Therefore, these factors' influence should be heavily focused on because of their prevalence and consistency with existing research (Centers for Disease Control and Prevention, 2021; Boughey et al., 2006; Gogas et al., 2003; Klinger et al., 2019; Rippy et al., 2014; Yi et al., 2009; Yi et al., 2010).

However, within the present data, several new and significant factors that influence decision making emerged as well. This included: Amount, Risk to Current or Future Health, Convenience, and Cosmetic factors. Previous research has not identified these specific factors in decision making, though they were often connected to factors that were the most frequently coded in the literature (i.e., Amount, Size and Growth, Provider Recommendation)(Figure 4). Moreover, the present results suggest that it may be worth considering these factors as distinct influences rather than conceptually and empirically grouping them into other categories.

Figure 4

Factor Overlap

Factor	Amount	Size & Growth	Provider Recommendation
Amount		2	2
Risk	0	1	2
Convenience	3	1	3
Cosmetic	2	2	0
Personal History	3	1	0
Size & Growth	7		7
Pain	2	3	1
Pathology	1	1	4
Provider Recommendation	1	3	
Health Anxiety	0	1	1

KEY

Category with most overlap	
Category with some overlap	
No Overlap	
**Please note some factors experienced equal overlap in multiple factors*	

For example, Pathology overlapped with Provider Recommendation more than with Size and Growth or Amount. The reasoning for this may lie in the fact that when patients are listening to and discussing with their doctors about their fibroadenoma, pathology of them is probably a prevalent topic that is considered when discussing treatment options. Thus, future research which aims to further understand patients' reasoning for the removal of fibroadenomas should consider these factors when conducting their research.

Furthermore, the majority of the conceptual implications found within this study align with the current literature on uncertainty appraisal and reasoning for fibroadenoma removal. Specifically, this research reinforces the conceptual premise that NGA is correlated with heightened fear and anxiety (Brashers, 2001), that knowledge may decrease NGA or increase PA or SA(Griffin et al., 2008; Kahlor, 2010; Rains & Tukachinsky, 2015; Yang & Kahlor, 2013), that PA uncertainty of diagnosis acts as an interruption to patients' lives (Brashers, 2001; Rains & Tukachinsky, 2015; Rauscher et al., 2019), and that PA is connected to perceiving diagnoses as an opportunity to better monitor their health (Brashers et al., 2000; Brashers, 2001; Rains & Tukachinsky, 2015; Rauscher et al., 2019). Additionally, this study also confirmed several factors as influential to decision-making (Centers for Disease Control and Prevention, 2021; Boughey et al., 2006; Gogas et al., 2003; Klinger et al., 2019; Rippy et al., 2014; Yi et al., 2009; Yi et al., 2010) as well as discovered a prevalent link between existing literature factors and emerging factors.

5.2 Practical Implications

Perhaps the most obvious implication discovered in the data was the identification of Longitudinal Negative Appraisal (LNA*)* and its impact on decision-making. A significant portion of patients who negatively or simultaneously appraised their diagnosis explained that their anxiety had cumulated longitudinally. That is, many patients experienced NGA increasingly after their initial diagnosis. This was much more prevalent amongst patients who chose to not remove their diagnosis and instead go another route (i.e., periodic testing, biopsy, self-exams). Some patients stated that the longer they kept their fibroadenoma in, the more anxious they became. The reasoning for this thought process was most likely rooted in the reality of fibroadenoma diagnoses. As explained in the literature review, there is no way to truly know if a fibroadenoma is in fact a fibroadenoma without having it completely removed (Ajmal et al., 2021). While trained health providers can confidently make a diagnosis without removal, it is impossible to be certain (Ajmal et al., 2021; Klinger et al., 2019). Thus, there is always the possibility that the mass is cancerous, and this seemed to make many patients appraise their diagnosis negatively when they chose to not remove their mass.

As a result, this LNA led patients to demand extra testing to confirm their diagnosis after initially feeling confident they were fine (Table 10 Comment M). One patient explained how she had been diagnosed with many fibroadenomas throughout their life and yet always chose not to remove them. They explained how this had since led to health (i.e., cancer) anxiety (Table 10 Comment K). Other patients echoed these concerns (Table 10 Comment L; Table 11 G, H, I,). This included patients who had much worse cases of LNA. One interesting case included a patient that explained how initially she felt indifferent about her diagnosis since her providers explained the masses were noncancerous. Though this was the case, she went on to say that very

shortly after her diagnosis, her health anxiety rained over her and convinced her that she had cancer which led to related physical health problems (i.e., gastrointestinal problems). She went on to say how the diagnosis took over to the point that she had been hospitalized and was diagnosed with an anxiety disorder (Table 10 Comment N).

This discovery of LNA was significant within the data and thus, more research needs to be done to explore the true relevancy and frequency of this phenomenon among patients appraising their diagnoses as negatively or simultaneously. Furthermore, more research needs to be done on this phenomenon to prevent long-term psychological complications that may emerge and continually distress patients who initially were indifferent about their diagnosis. Doing so could prevent additional mental and physical harm caused directly by the diagnosis.

5.2.1 Addressing Longitudinal Negative Appraisal in Patient-Provider Discussions

The data suggests that many patients diagnosed with fibroadenomas experience LNA. That is, these patients increasingly negatively appraise their diagnosis (especially in cases when patients decide to go another treatment route besides removal). This LNA consequentially seems to cause several psychological (i.e., manifestations of anxiety) and physical stressors (i.e., gastrointestinal and heart problems). Further, because this data reinforces that this diagnosis causes these patients health distress (Srivastava et al., 2020), health providers should consider this when discussing fibroadenoma diagnoses, treatment options, and decisions in an effort to decrease LNA, and NGA generally.

This idea is plausible considering research on reducing NGA uncertainty in longitudinal health contexts already exists and has been found to be effective. Gil and colleagues sought to improve uncertainty management in cases of older long-term breast cancer survivors. They found that using an uncertainty management intervention was effective in cognitively reframing

cancer knowledge, patient–provider communication, and several coping skills (Gil et al., 2005). This effective UMT intervention involved health providers giving patients cognitive-behavioral strategies to manage uncertainty as well as providing a self-help manual designed to help comprehend and manage long-term cancer treatment side effects and concurrent symptoms (Gil et al., 2005). Since then, other studies have additionally adapted this intervention to effectively alleviate NGA uncertainty in other health contexts (Dean & Davidson, 2018; Wittenberg et al., 2018). Furthermore, though there is no research on applying this intervention to cases of fibroadenoma diagnoses, these findings do lay the groundwork that will serve to help start preventing LNA in fibroadenoma patients through patient-provider communications. However, this intervention would need to be adapted to apply to fibroadenoma patients' uncertainty and because there is no data specifically on that, research into improving these patient-provider discussions and interventions should be conducted to make this suggestion more feasible.

5.3 Limitations

Like all studies, this one had limitations. To start, a discussion about data collection must be conducted. As reported in the results section, no significant correlation between appraisal and treatment decisions was found. However, this correlation should still be investigated. The reasoning for this lies in the data collection for this study. Within the literature, the most common method of treatment for fibroadenoma diagnoses is removal (i.e., excisional biopsy)(Greenberg et al., 1998; Klinger et al., 2019). However, this study coded more cases of going other treatment routes (i.e., FNA, core biopsy, ultrasound). This is not to say that national statistics are incorrect, but instead, this discovery demonstrates that this study's results do not completely encapsulate the entire narrative related to fibroadenoma decision-making. One main reason for this could lie in the fact that only a small sample of 300+ Reddit comments out of the

possibly thousands were coded and analyzed. Further, some additional comments were disregarded because they did not meet the 50% Upvote threshold criteria. Because of this, further insight into uncertainty appraisal and decision-making may have not been recognized. Thus, because a small sample was taken, larger samples of patients' appraisal experiences and resulting treatment decisions should be conducted before a definitive conclusion can be made about whether there is a correlation between appraisal and decision-making about fibroadenoma diagnoses.

In addition to the limitation that a lack of data collection may have potentially influenced a lack of correlation between appraisal and treatment decision-making, another limitation of this study was the mode of analysis. While utilizing content analyses yielded significant results, coding for appraisal, specifically, was challenging. Though codebook rules and procedures were put in place and thorough discussions were held to improve the coding of comments for appraisal, some comments were still challenging to code because of the lack of social cues within the content, which would have provided more insight into patient appraisal (Bambaeeroo & Shokrpour, 2017). This is because nonverbal cues oftentimes can reveal more information related to appraisal and emotion, in general, than verbal cues alone (Bambaeeroo & Shokrpour, 2017). For example, some patients would allude to a type of appraisal, but they would not explicitly say anything that gave away how they appraised their diagnosis. One patient who reported removing it highlighted how it was removed because of its risk of malignancy, however, because they did not explicitly say that this diagnosis caused them NGA (i.e., no mention of anxiety or other negative affect emotion), it was not coded for appraisal. This was the case for multiple comments. Moreover, had the coders known the tone of voice or been provided with other nonverbal cues (i.e., body language, eye contact), we may have been able to infer more

conclusively about their appraisal. However, this lack of nonverbals may have led to the low correlation between appraisal and decision-making.

5.4 Future Research

While the results from this study were insightful, more studies and research related to this topic should be conducted. Specifically, more research should be conducted within the area of patients' appraisal of stress-inducing diagnoses like fibroadenomas as well as how they correlate to treatment decision-making. Findings from this study provide some indication of the direction the research should go. This includes, as previously mentioned, further research into appraisal and its correlation to treatment decision-making for fibroadenoma treatment using larger sample sizes.

Additionally, understanding appraisal as it relates to decision-making may be improved by collecting from different sample sources. Because of the inability to code some comments for an appraisal because of the lack of nonverbal cues (i.e., tone of voice), collecting data through an in-person or virtual interview may be a better route for the collection of this information. By doing so, researchers and coders would be able to witness more nonverbal cues which may help them comprehend the appraisal held by patients. Additionally, by using this method of data collection, researchers could more explicitly investigate appraisal through additional and case-specific questioning.

Third, there is a significant disconnect between the current literature pertaining to knowledge gaining and uncertainty management. Data analysis from this study suggests that increased knowledge does not always directly correlate with decreased uncertainty or NGA and instead may actually increase uncertainty. This goes against the general literature consensus that gaining knowledge acts as an inhibitor to increased NGA (Griffin et al., 2008; Kahlor, 2010;

Rains & Tukachinsky, 2015; Yang & Kahlor, 2013). However, because of this significant disconnect within this study, future research should explore this relationship more in-depth.

Also, the factors that influence treatment decision-making should be further investigated. A number of factors, including Size and Growth and Provider Recommendation, were seen to significantly influence patients decision to remove their fibroadenomas. Thus, future research that discusses decision-making and influence should heavily focus more on these factors because of their prevalence and consistency with existing research. By contrast, a number of factors initially predicted to be influential in the decision to remove a fibroadenoma were not significantly present within the data (i.e., age, family or personal history of breast cancer, personal history of cancer treatment, ethnicity, presence of BRCA mutation, level of education about fibroadenomas). However, it must still be mentioned again that this could be due to the limited data coded in this study. Therefore, these factors should still be considered and coded for in future research until more data suggests their minimal influence over treatment decision-making. This, especially, should be done considering numerous scholars and providers-alike consider them relevant to this discussion (Centers for Disease Control and Prevention, 2021; Boughey et al., 2006; Gogas et al., 2003; Klinger et al., 2019; Rippy et al., 2014; Yi et al., 2009; Yi et al., 2010).

Next, findings that were not previously mentioned because of their lack of connection to the current study also provide some insight for future research. For example, many patients within the subreddits discussed appraisals of similar health diagnoses to fibroadenoma (i.e., other types of benign tumors, other breast diseases such as cysts). While no analysis was conducted about these situations, discussions during open coding and the creation of coding procedures did touch on these comments because of their frequency within the subreddits. More, the discussion

suggested that patients experiencing similar diagnoses may be appraising their diagnoses similarly to those with fibroadenomas. Some research conducted by Srivastava and colleagues (2020) has already partially suggested that patients with benign breast disease (i.e., cysts, fibrous tissue) negatively appraise their diagnoses. Specifically, they suggested this possibility by arguing patients diagnosed with benign breast diseases were affected by anxiety and depression (Srivastava et al., 2020). However, because this has not been studied significantly or on large scales, more research needs to be done for a more comprehensive understanding of this phenomenon. By establishing a better understanding of the appraisal of these diagnoses, improvement of patient-provider communication about these diagnoses as well as enhanced mental health of patients may be achieved.

However, before moving on from independently addressing appraisal in cases of fibroadenoma diagnoses, investigating males diagnosed with fibroadenomas may be warranted. While fibroadenoma diagnoses are most common in females, males can also have them (Agarwal & Kohli, 2016; Klinger et al., 2019). Though these cases are exceptionally rare (Agarwal & Kohli, 2016), they may still be worth investigating especially when looking at uncertainty appraisal. Because of their rarity, males diagnosed may have a unique perspective and associated uncertainty appraisal. Thus, a final recommendation for future research involves the investigation of men's experiences in appraising their health uncertainty related to fibroadenoma diagnoses.

5.5 Conclusion

The current study provides valuable information to create a building block for future research about appraisal and decision making as they pertain to benign but psychologically and physically distressing diagnoses. Research on this topic will hopefully encourage more studies to

look into these diagnoses so that better patient-provider communication regarding these diagnoses can be informed. Furthermore, by doing so, health providers could potentially improve the overall health outcomes of their patients diagnosed with these lesions. This may also concurrently help providers to better understand the decision-making process of their patients, thus improving providers' communication about treatment in light of their patients' uncertainties.

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VITA
Hayley M. K. Stahl

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Department of Communication

Education

M.A. **University of Kentucky (Present)**

Communication (focus in interpersonal and healthcare)

Advisor: Allison Scott Gordon

B.A. **University of Kentucky (2021)**

Major: Communication (focus in healthcare)

Minor: Psychology

College of Communication, College of Arts & Sciences

Academic Appointments

2021-Present **Graduate Teaching Assistant**

Department of Communication, University of Kentucky

2021-Present **Graduate Research Assistant**

Department of Communication, University of Kentucky

2020-2021 **Undergraduate Teaching Assistant**

Department of Communication, University of Kentucky

2020-2021 **Undergraduate Research Assistant**

Department of Communication, University of Kentucky

2019-2020 Undergraduate Research Assistant

Department of Communication, University of Kentucky

Publications

Occa, A., **Stahl, H. M.,** & Julien-Bell, S. (2022). Helping Children to Participate in Human Papillomavirus–Related Discussions: Mixed Methods Study of Multimedia Messages. *JMIR Formative Research*, *6*(4), e28676.

Manuscripts under Review

Occa A., **Stahl H**., Francis D., & Grumbein A. (2021). **(Second revise and resubmit)** *Improving African Americans' intentions to enroll in a health registry: Message development and evaluation.*

Conference Participation

Stahl H. (2022). A Content Analysis of Reddit Posts About Fibroadenoma Appraisal, Decision Making, and Other Factor Influence. Presented at the 2022 Kentucky Conference on Health Communication: Communication Strategies to Promote Comprehensive Well-being, Lexington, KY.

Occa A., **Stahl H**., Francis D., & Grumbein A. (2021). Improving African Americans' intentions to enroll in a health registry: Message development and evaluation. Presented at the 71st International Communication Association, Virtual.

Occa A., **Stahl H**., & Bell S. (2020). Having fun while getting louder: A feasibility study of theory-based multimedia messages to help children participate in HPV-related discussions. Presented at the 106th annual conference of the National Communication Association, Indianapolis, IN.

Zelaya C. M., Santiago J. E., & **Stahl H.** (2020). The Intersectionality Between Social Media Influencer's Fitness YouTube Videos and Young Women's Efficacy: A Content Analysis. Presented at the Kentucky Conference on Health Communication 2020.

Honors and Awards

Summa Cum Laude (2020-2021)
Department of Communication, University of Kentucky

Outstanding Senior (2020-2021)

Department of Communication, University of Kentucky

Was given the award for Outstanding Senior for the Department of Communication from the University of Kentucky. This is awarded to one undergraduate senior that demonstrates overall academic, professional, and leadership excellence.

University Scholar (2020-2021)

The University Scholars Program offers particularly gifted and highly motivated students the opportunity of integrating their undergraduate and graduate courses of study in a single continuous program culminating in both a baccalaureate and a master's or doctoral degree.

Academic Excellence Scholarship Recipient (2020-2021)

Office of Academic Scholarship, University of Kentucky

Academic Excellence Scholarship Recipient (2018-2019)

Office of Academic Scholarship, University of Kentucky

Research Assistantships

Graduate Research Assistant to Aurora Occa (2022)

Television news coverage of clinical trials before and during the COVID-19 pandemic. Department of Communication, University of Kentucky

Graduate Research Assistant to Allison Gordon (2021-2022)

Medicaid MCO Strategies to Address Enrollee Unmet Social Needs Using Community Partnerships. Department of Health Management and Policy, University of Kentucky

Undergraduate Research Assistant to Aurora Occa & Diane Francis (2020)

Improving African Americans' intentions to enroll in a health registry: Message development and evaluation. Department of Communication, University of Kentucky

Undergraduate Research Assistant to Aurora Occa (2020)

Having fun while getting louder: A pilot study of multimedia messages to help children participate in HPV-related discussions. Department of Communication, University of Kentucky

Undergraduate Research Assistant to Allison Gordon (2020)

Are Cost-of-Car Conversations Best Practice? A Qualitative Study of Oncologists' Attitudes and Practice. Department of Communication, University of Kentucky

Undergraduate Research Assistant to Carina Zelaya & Joshua Santiago (2019)

The Intersectionality Between Social Media Influencer's Fitness YouTube Videos and Young Women's Efficacy: A Content Analysis. Department of Communication, University of Kentucky

Teaching Assistantships

COM 319: Communication, Health Disparities and Social Change (2022)

Assignment grader

Department of Communication, University of Kentucky

COM 313: Communication in Close Relationships (2021)

Assignment grader

Department of Communication, University of Kentucky

COM 313: Communication in Close Relationships (2020-2021)

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