Communication of Family Health History among College Students and Their Families

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Abstract

It is essential that college students are knowledgeable about their family health history to make informed decisions about health behaviors and cancer screening. In the transitional phase from adolescence to adulthood, engaging in healthy behaviors and communication between family members can be challenging for college students. In this study, the Communication Privacy Management theory provided a framework to examine health and cancer communication among college students and their families. **Methods:** A cross-sectional online survey was conducted among college students aged 18 years and over (n = 106). **Results:** Knowledge of participants' family health history was significantly associated with family health and cancer communication, religious beliefs, and higher annual household income (> $75,000). Being young (< 22 years) and female was significantly associated with knowledge of family health history and family health and cancer communication. **Conclusion:** Demographic, socioeconomic, and sociocultural factors may influence college students' level of knowledge about their family health history and communication within their family about general health and cancer risk.

Keywords: family health history, cancer communication, college students, communication privacy management theory, religious beliefs

1. Introduction

Family members often desire constant communication among themselves and yearn to work in partnership for the overall good of the family (Sun, 2016). College students between the ages of 18-25, are considered emerging adults and contend with a physical and/or psychological separation from their family (Jiang, Yang, & Wang, 2017; Rafferty, Coffelt, & Miller, 2022). The building of independence by college students also requires them to make decisions regarding their health and what type of information to share. Sharing of health information is often regarded as a sensitive topic, steeped in privacy (Westerman, Miller, Reno, & Spates, 2015) despite the potential value of that information to the health and wellbeing of other family members. Hence, the sharing of health information and the family health history (FHH) may be a challenge for the college student and the overall health of the family.

Family health history (FHH) has been shown to be an effective tool for risk assessment of many chronic diseases, including cancer, diabetes, and cardiovascular disease (Acheson et al., 2000; Ginsburg et al., 2019). Similarly, knowledge of one's FHH can provide guidance to individuals who are at increased risk of adverse outcomes from diseases that are debilitating to one's physical and mental health. Individuals can make decisions that lead to a healthy outcomes based on the context of their family (Binda et al., 2018). When there is open communication regarding sensitive topics in the family, an improvement in family communications can occur (Theiss & Solomon, 2008), which can lead to an increase in sharing FHH. Obtaining and documenting a complete health history of one's close relatives can yield important clues about hereditary medical conditions. Since family members share many risk factors including the environment, behavior patterns, and genetic makeup (Valdez et al., 2010). FHH is also useful in risk stratification for certain diseases (Berg et al., 2009; Rich et al., 2004). Knowledge of FHH can lead to personalized recommendations for lifestyle changes and screenings tailored to familial risk of diseases such as colon and breast cancer (Acheson et al., 2000; Whittemore, 1999). By identifying patterns of disorders within families, health professionals can utilize FHH to predict disease risk for some conditions in individuals, their family members,

or future generations (U.S. Department of Health and Human Services, 2021). Moreover, FHH can be updated and passed on to future generations, thereby providing a risk profile for a close family member to consult when making health-related decisions (Ginsburg et al., 2019). Mindful of these benefits, the Surgeon General of the United States in 2004 launched an initiative aimed at encouraging citizens to document their FHH and to share that information with relatives and their health care providers (Centers for Disease Control and Prevention, 2022b).

1.1 Obtaining the Family Health History

The FHH is regarded as sensitive since it is impacted by a variety of demographic and cultural factors within the family. It is also recognized as an intervention for decreasing the presence of cancer within society, as well as promoting healthy behaviors (Li et al., 2022; Moore et al., 2011; Ramsey, Yoon, Mooneshinghe & Khoury, 2006). Despite its clinical utility, there are substantive barriers to obtaining and documenting FHH. Family physicians are in a unique position to identify individuals at risk for certain hereditary conditions given their central role in the provision of health care (Acheson et al., 2000). However, lack of time or proper training to collect and interpret FHH makes this a lower priority in some family practices (Valdez et al., 2010). Literature indicates the FHH is underutilized in patient care, despite its utility as a significant predictor of disease risk and guide for preventive care (Madhavan et al., 2019). Patient populations below the age of 30 are viewed as ideal since risk assessments are typically performed prior to the age of 30, which provides an opportunity to increase awareness of FHH (Madhavan et al., 2019). College students in a recent study reported that the most significant motivator for obtaining their FHH was due to a family member or themselves developing a hereditary condition (Smith et al., 2015). A study on the awareness of FHH as a risk factor for disease by the Centers for Disease Control and Prevention (CDC) (Centers for Disease Control and Prevention, 2004) found that although 96.3% of respondents believed their FHH was important to their own health, few had taken steps to obtain health information from their relatives. In a study that examined FHH awareness among students and employees at a university, despite frequent knowledge of the FHH most participants, did not seek and obtain their FHH or have any record of the FHH (Madhavan et al., 2019). The results of the study seem to indicate a gap in open communication among family members. Several studies have examined factors associated with intrafamilial communication about FHH (Lawsin et al., 2009; Lobb et al., 2006; MacDonald et al., 2007). Nycum and colleagues (2009) found that communication about FHH does not flow seamlessly among family members when there is uncertainty or incomplete understanding of test results, which reaffirm similar findings from another study on communicating genetic test results within the family (Daly et al., 2016). Other barriers to communication of FHH within families include perceived vulnerability or resilience of the relative, maturity level, emotional distance, and assumption that another family member had conveyed that information. Anxiety about personal cancer risk and guilt about passing that risk to children contribute to the low levels of intrafamilial communication on FHH reported in published studies (Daly et al., 2016; MacDonald et al., 2007; McGarragle et al., 2019; Nycum et al., 2009). Furthermore, the complexity and difficulty of understanding and transmitting information about cancer risk factors as well as difficulties in family relationships (Nycum et al., 2009) pose significant barriers to intrafamilial communications about FHH. However, Kaphingst (2012) reported frequent communication of FHH within families with a history of cancer. It would seem as though families value communication of their FHH within their family, which could possibly be to increase awareness of cancer in their family and for other family members to manage their risks of developing cancer. Overall, the family is an important factor in an individual's development of how they manage communication and the privacy of health information (Serewicz, 2013). College students must ultimately learn how to manage their own privacy boundaries and the information that they decide to share (Yang, Pulido, & Kang, 2016).

1.2 College Years

The college years represent an important transitional phase from adolescence to adulthood, when many health-related behaviors and lifestyle habits are formed (Nelson et al., 2008; Yahia et al., 2016). These years are sometimes marked by initiation into risky health behaviors such as smoking, alcohol and recreational drug use and abuse, sedentary lifestyle, and unprotected sex (Viner et al., 2015). However, it is also a formative time for health-enhancing behaviors like regular physical exercise, screening for cervical cancer, and seeking FHH to ascertain susceptibility to hereditary diseases. Awareness of FHH can influence adoption of healthy behaviors during this transitional period and improve health outcomes. Alberti, Benes, and Miles (2018) reported that various health behaviors were impacted by family communication and health-related communication. However, when college students are unaware of their FHH they may be oblivious to potential health threats that could be mitigated by timely health enhancing behaviors (Li et al., 2022). Existing literature indicates that college student's knowledge of their FHH can motivate them to engage in healthy eating, regular exercise, maintaining an appropriate weight, and reducing alcohol intake (Li et al., 2022). However, it is not clear if college students are initiating intrafamilial conversations about FHH and if so, from whom are they comfortable seeking that information. The lack of seeking health information and engaging in health

promoting behaviors may be due to a sense of invulnerability to health risks among college students (Baxter et al., 2010). Additionally, cancer is often considered a disease that develops later in life, and perceptions and communication about this disease among college students and their family members is understudied. The goals of this study were to: (1) examine the association between knowledge of FHH, and demographics, cancer perception, religion, spirituality, and family health and cancer communication; (2) examine the association between family health and cancer communication, and demographics, cancer perception, knowledge of FHH, religion, and spirituality; and (3) explore college student's comfort in sharing health-related issues with family members and others. Therefore, the research questions for the study were:

1. How do demographic factors (i.e., gender and age), cancer perception, religion, spirituality, and family health and cancer communication, impact the knowledge of FHH?

2. What is/are the relationship between demographic factors (i.e., gender and age), cancer perception, knowledge of FHH, religion, spirituality and family health and cancer communication?

3. How do college students differ from other family members in their comfort in sharing health-related information?

1.3 Demographics, Religion and Spirituality in Relation to Communication among College Students

Communicating health information among families has been known to be a challenge within various households (Hovick, Yamasaki, Burton-Chase, & Peterson, 2015). There are many variables that can impact the sharing of health information and this study will examine some of the demographic factors, as well as the factors of religion and spirituality in relation to FHH and sharing health information. The demographic variable of gender is often a pertinent factor among issues of health and raising a family. In considering how various illnesses are approached and shared among family members, the mother is often viewed as a central figure for this information (Petronio, 2002). In fact, mothers are regarded as the gatekeepers for the private information within the family and thereby charged with managing breaches of privacy (Vik & Degroot, 2019). Traditional gender norms in the United States indicate that women have increased disclosure of information and are often sought to disclose information (Dindia & Allen, 1992; Petronio, 2002). Sheldon (2013) indicates that women seem to be more comfortable with discussing sensitive topics, in greater detail, and more frequently compared to men. Similarly, a meta-analysis by Dinda and Allen (1992) reported that women were more likely to disclose information to someone close to them, such as a parent or spouse. The differences in gender regarding the communication of information may also be attributed to the socialization of males and females (Sheldon, 2013). In the United States and other countries with traditional family norms, females are often socialized to be more nurturing, caring, and open when compared to traditional male norms which are closed off and protective (Nies & McEwen, 2018). Trust is another factor that appears to lead women to disclose more information compared to men (Sheldon, 2013). The traditional socialization of women indicates that women place a higher value on trust compared to men, which leads them to disclose more information than men (Sheldon, 2013). Females were found to trust men more than men trusted other men. This may explain why females trust in men and the lack of trust men portrayed might explain why women have increased self-disclosure of information (Foubert & Sholly, 1996). The current study aims to further examine the little-known role of gender in communication of FHH and health history among college students.

Age is a factor within the context of health that can lead to positive or negative health outcomes for an individual (Nies & McEwen, 2018). Young adults in college are in a critical timeframe for seeking FHH information (Li et al., 2022). Combined with the responsibilities of being an emerging adult and navigating a new environment, college students who are younger may feel an increased need for privacy to protect their independence. For example, a study on communication experiences of college students revealed that year one through year-three college students had the most open communication (Baxter et al., 2008). College students in year four had the least amount of open communication (Baxter et al., 2008). The least amount of open communication was further supported by (Arnett, 2000) upon indicating that the time period for emerging adults in their early twenties is less stable as they attempt to navigate securing their own independence. Older adults (i.e., over 30) were also found to have an increased incidence of collecting and being aware of their FHH compared to the age range of 18 to 29 years (Madhavan et al., 2019). Additionally, a study that explored the importance of FHH among a cohort of young Latino adults also reported the importance of culture, which could prevent a young adult from questioning their parents or older family members regarding the health of family members (Corona et al., 2013). Age is a demographic factor to consider when examining FHH and cancer communication remains a factor that needs further research. The current study adds to the literature by examining this understudied factor of age on FHH and cancer communication among college students. The combination of demographic factors and the social factors of religion and spirituality will provide an increased understanding of

motivators and barriers for college students to be aware of the FHH and communicate about the health issues that arise in their families.

Religion and spirituality are concepts that are present worldwide. It is important to note that religion and spirituality are different in that religion is based on rules, a connection to a shared beliefs and rituals, while spirituality is considered as being self-determined and individualistic (Koenig, 2004; Nies & McEwen, 2018). A recent Gallup Poll found that in the U.S., 3 out of 4 Americans indicated they were religious in 2021 (Jones, 2021). The South is known to have the largest percentage of adults who are religious, 62% (Pew Research Center, 2022). Engaging in religious beliefs and practices have historically been found to be a deterrent to self-destructive behaviors (Koenig, 2004). In fact, religion and spirituality are known to be reliable predictors for the health outcomes of individuals (Speed, 2017). There is a gap in the literature in terms of research studies that examine religion and spirituality in relation to college students and their FHH and cancer communication. Understanding the dynamics between religion and spirituality on the one hand and FHH and family communication on the other hand among college students is important as it might illuminate areas of opportunities to improve awareness about seeking and using FHH to enhance healthy behaviors that could last a life time.

1.4 Theoretical Framework

The premise of examining the disclosure of a cancer diagnosis within families of college students was derived from the Communication Privacy Management (CPM) theory. Privacy is a salient issue due to the vulnerabilities that are exposed when there is an unintended communication of information (Nyaga, Hildenbrand, Mattson, Collins & Lumala, 2021). The CPM theory is based on a concurrence of communication interactions between maintaining privacy and disclosing information (Petronio, 2002). Over the years, the CPM theory has been streamlined and conceptualized into three primary tenants (see Figure 1): privacy ownership, privacy control, and privacy turbulence (Petronio, 2013). The tenant of privacy ownership sets the boundaries for what is considered private and who has sole ownership of the information. If that information is shared, it can still be considered private, however, there is now a co-owner of the shared information and extended privacy boundaries (Petronio & Reierson, 2015). Privacy control dictates access and denial of private information (Petronio, 2013). Within privacy control are rules which are formed by one's culture, motivations, and circumstances. Ultimately, these rules govern the transmission or lack thereof for information to be exchanged. Privacy turbulence, as the name suggests, denotes a chaotic manifestation of private information that interferes with privacy and possibly causes a complete disruption in privacy relationships, control, and ownership (Nelson et al., 2008; Petronio & Child, 2020). Literature indicates that individuals first learn about privacy regarding what information should be shared and what should be kept private (e.g., body parts, environment, and observations) from their parents and family members (Serewicz, 2013). The information owner has control of their private information and ultimately must decide who, when, how, where, and if the information will be disclosed (Petronio, 2020). Each family has a culture which influences how easily families share information or present rigid boundaries to deter the sharing of information (Lillie & Venetis, 2020). Research suggests that families with decreased permeability will experience increased topic avoidance compared to families with increased permeability (Lillie & Venetis, 2020). As individuals grow their concept of privacy changes and they incorporate or remove various rules for sharing information that is considered private (Petronio, 2020; Yang, Pulido, & Kang., 2016). Cancer research involving communication within families has utilized the CPM theory as a theoretical framework and its use in the field of health is growing. The CPM theory provides a foundation for examining the processes and interactions of communication transference within the families of college students.

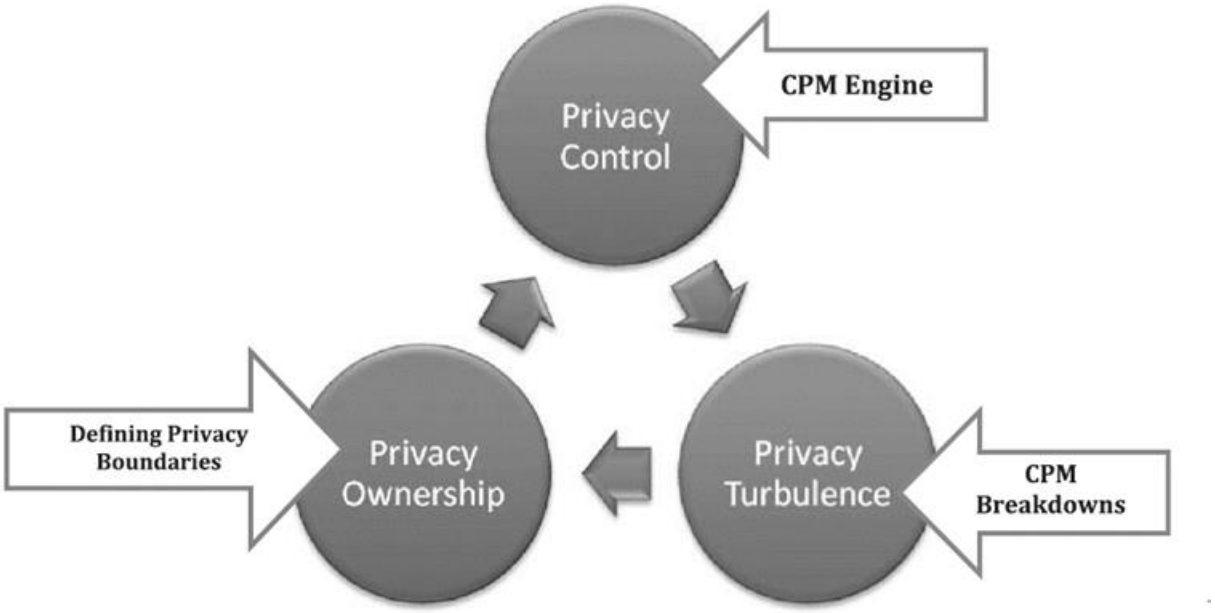

Figure 1. Communication Privacy Management Elements (Petronio, 2013)

In light of the various health and psychosocial issues families encounter, decisions regarding privacy management are an essential part of family interactions (Petronio, 2010). The use of the CPM theory in health research has gained attention as a valuable strategy for examining how individuals manage what they consider as private information (Smith & Brunner, 2016). Discussing cancer is often a difficult and complex undertaking, which can ultimately impact the health and relationships of all involved (Donovan-Kicken et al., 2011). The CPM theory provides a context for understanding why cancer patients and survivors may be reluctant to disclose the physical and psychosocial implications of a cancer diagnosis (Venetis et al., 2014). Prior research indicates that college students are often reluctant to initiate conversations regarding their own health with a healthcare provider due to lack of knowledge regarding their FHH (Xu, et al., 2017).

A lack of discussion about FHH among college students and their families within the context of the CPM theory indicates its juxtaposition with maintaining or disclosing private information. The theoretical framework of the CPM theory provides a contextual foundation to examine differences and similarities among the factors of demographics, cancer perception, religion, spirituality, and the sharing of FHH and cancer communication within the families of college students. The CPM can illuminate some of the factors involved in the sharing of FHH within families of college students and its use in research as a conceptual framework is growing (Donovan-Kicken et al., 2011; Ngwenya et al., 2016; Rauscher et al., 2015).

2. Methods

This cross-sectional study was conducted from August to September 2019, at a public university in the southeastern United States. Institutional Review Board approval was obtained prior to any study activity. Information about the study was posted on the student electronic information page and required participants to complete a Family Cancer and Health Communication questionnaire via an online link. Only participants who signed the study consent form were allowed to participate. The study questionnaire had five subsections: (1) cancer perception, (2) religion, (3) spirituality, (4) knowledge of FHH, and (5) family health and cancer communication. Details about the study instrument can be found elsewhere (Dickey et al., 2019). Response options included Likert-type scales, multiple-choice items, and open-ended responses.

2.1 Study Variables

Demographic variables included age, gender, ethnicity, race, language, marital status, college classification, study major, and family income. Participants were asked to state their age and this variable was categorized into two groups (18–22 years and above 22 years). Gender was dichotomized into male and female, and ethnicity indicated if a participant was of Hispanic origin. Marital status was divided into three categories: never married, divorced, and

married. College status was classified into five strata (freshman, sophomore, junior, senior, and graduate), while study major was divided into four categories (public health, nursing, exercise science, and other major). Parental educational level was classified into four levels (high school graduate, some college education, college graduate, and graduate school). Annual household income was dichotomized as either below $75,000 or $75,000 and above.

Cancer perception refers to an individual's attitudes and beliefs about cancer in terms of diagnosis, quality of life, pain, and their comfort level in interacting with a cancer survivor. Nine items assessed this variable and participants were asked to indicate the degree to which they agreed with the items on a Likert-type scale which ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Responses to the first item were reverse coded to conform to the rest of the questions that indicated a negative connotation of cancer. The total score was obtained by summing the individual items. Scores for this variable ranged between 9 and 45. The variable was dichotomized into scores below the median, implying a positive perception, and scores above the median, indicating a negative perception of cancer.

Religious belief represents a strong belief in the role of supernatural powers that control human destiny and the importance of various socio-behavioral rules and practices. Participants responded to four items indicating the degree to which they rely on religious beliefs for physical, mental, and emotional health, using a Likert-type scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Total scores were obtained by summing the score of individual items that ranged between 4 and 20. This variable was dichotomized into scores below the median, implying low reliance on religious beliefs, and scores above the median, indicating strong reliance on religious beliefs.

Spiritual belief corresponds to one's sense of connectedness to the world and an overall presence on earth and beyond. Participants responded to four items indicating the extent to which they rely on spiritual beliefs for physical, mental, and emotional health. Response options followed a Likert-type scale format of 1 (*strongly disagree*) to 5 (*strongly agree*). Total scores for this variable were computed by summing the score of individual items that ranged from 4 to 20. This variable was dichotomized as below the median, implying low reliance on spiritual beliefs, and above the median, indicating high reliance on spiritual beliefs.

Family health history knowledge encompasses knowledge of medical events and health conditions of oneself and that of immediate family members. Participants responded to six items indicating their awareness of the health history of their parents and grandparents. The total score for this variable was obtained by summing the individual items and ranged from 6 to 30. This variable was dichotomized into scores below the median, indicating lower knowledge of FHH, and scores above the median, indicating higher knowledge of FHH.

Family health and cancer communication refers to the sharing of health-related information with family members. Participants responded to nine Likert-type items (five related to cancer and four related to general health), indicating the degree to which they share health-related issues with family members on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Total scores were obtained by summing the score of individual items and ranged between 9 and 45. This variable was dichotomized into scores below the median, implying less willingness to share health-related information, and above the median, indicating more willingness to share health-related information.

2.2 Data Analyses

SPSS version 25 was used to analyze the data. The analyses included descriptive statistics and Chi-square tests of independence. Frequencies and descriptive statistics were used to summarize the demographic characteristics of age, gender, marital status, socioeconomic status, and other study measures. The Chi-square test was used to determine associations between knowledge of family health history and other measures (gender, age, cancer perception, immediate family cancer diagnosis, religiosity, and spirituality). The level of significance for all analyses was set at 0.05. Participants' total scores for the subscales were obtained by summing up the Likert-type scale items corresponding to that subscale.

3. Results

A total of 106 college students completed the survey, most of whom were female (87.7%), young adults (median age 20 years), White (82.1%), and never married (89.7%). Almost all participants (99.1%) were native English speakers, and a plurality were college seniors (37.7%). About half (53.8%) came from families where the annual household income was less than $75,000. Regarding knowledge of FHH, 83% of participants reported knowing their father's health history while 89.7% reported knowing their mother's health history. Slightly more than half (51.9%) of participants reported knowledge of their paternal grandfather's health history, while 60.4% knew that of their paternal grandmother's health history. A higher proportion of respondents were aware of their maternal grandparents' FHH, 75.5% for maternal grandmothers and 67% for maternal grandfathers.

Moreover, 60.4% of participants indicated they would feel comfortable talking about health-related issues or diseases with their mother, while 13.2% said they would feel comfortable talking with their sister. In the event of a cancer diagnosis, 66% of participants indicated that the first person they would tell is their mother, while 9.4% said their sister and 8.5% mentioned their father. Table 1 provides a summary of the demographic characteristics of study participants.

Table 1. Demographic Characteristics (n=106)

Characteristics	n (%)
Age (years)	
Median (Range)	20 (18 – 72)
Gender	
Female	93 (87.7)
Male	13 (12.3)
Race	
White	87 (82.1)
Black or African American	17 (16)
Missing	2 (1.9)
Hispanic or Latino	
Yes	3 (2.8)
No	102 (96.2)
Missing	1 (0.9)
Religiosity	
Christian	96 (90.6)
Non-Christian	10 (9.4)
Class status	
Freshman	7 (6.6)
Sophomore	19 (17.9)
Junior	33 (31.1)
Senior	40 (37.7)
Graduate student	5 (4.7)
Missing	2 (1.9)
Major	
Public Health	53 (50)
Nursing	14 (13.2)
Exercise Sciences	16 (15.1)
Other Majors	23 (21.7)
Parent's highest level of education	
Some high school (grade 9-11)	1 (0.9)
High school graduate / GED	6 (5.7)
Some college or technical school	27 (25.5)
College graduate	43 (40.6)
Graduate school or	28 (26.4)

post-college	
Not sure	1 (0.9)
Household income ($1000)	
Less than $75	57 (53.8)
$75 and more	49 (46.2)
If I had cancer the first person I would tell is	
Mother	70 (66)
Sister	10 (9.4)
Father	9 (8.5)
Husband	6 (5.7)
Other	5 (4.7)
Brother	3 (2.8)
Wife	3 (2.8)
I know my father's health history	
Yes	88 (83)
No	18 (17)
I know my mother's health history	
Yes	95 (89.7)
No	11 (10.3)
I know my maternal grandfather's health history	
Yes	71 (67)
No	25 (33)
I know my paternal grandfather's health history	
Yes	55 (51.9)
No	51 (48.1
I know my maternal grandmother's health history	
Yes	80 (75.5)
No	26 (24.5)
I know my paternal grandmother's health history	
Yes	64 (60.4)
No	42 (39.6)
Who within your family do you feel comfortable talking to about your health-related issues?	
Mother	

Father	64 (60.4)
Brother	6 (5.7)
Sister	2 (1.9)
Grandmother	14 (13.2)
Grandfather	1 (1.9)
Significant other	0
Husband	9 (8.5)
Friend	3 (2.8)
Other	5 (4.7)
	2 (1.8)

In terms of family health and cancer communication (FHCC), most participants reported a positive perception of cancer, 63.8%. Despite the positive cancer perception, there was no association between FHCC and cancer perception. Knowledge of FHH and FHCC had a statistically significant association with 57.8% of participants who exhibited higher levels of cancer communication also reported a higher awareness of FHH (χ = 6.15, df = 1, p = 0.013). Additionally, knowledge of FHH and religious beliefs had a statistically significant association. Over half of participants (54.5%) who indicated that they rely on religious beliefs in making health care decisions also exhibited high levels of awareness of FHH (χ = 5.27, df = 1, p = 0.022).

Table 2. Knowledge of Family Health History (n=106)

Characteristics	High n (%)	Low n (%)	p-value
Family income			
$75,000 or more	32 (66.7)	23 (41.8)	0.012
Less than $75,000	16 (33.3)	32 (58.2)	
Cancer perception			
Positive	30 (63.8)	28 (53.8)	0.314
Negative	17 (36.2)	24 (46.2)	
Immediate family member diagnosed with cancer			
Yes	30 (62.5)	30 (54.5)	0.414
No	18 (37.5)	25 (45.5)	
Family health and cancer communication			
High	26 (57.8)	17 (32.7)	0.013
Low	19 (42.2)	35 (67.3)	
Religiosity			
High	18 (54.5)	14 (29.2)	0.022
Low	15 (45.5)	34 (70.8)	
Spirituality			
High	20 (41.7)	25 (47.2)	0.578
Low	28 (58.3)	28 (52.8)	

There was a statistically significant association ($\chi = 6.36$, df = 1, p =0.012) between household income and knowledge of FHH with 66.7% of participants from the higher income bracket exhibiting higher knowledge of FHH compared to 33% of participants from families from the lower-income bracket (Table 2). In terms of gender differences, 48.9 % of female participants reported high family health and cancer communication practices compared to 16.7% of males ($\chi =$ 11.52, df = 1, p =0.001). The above results are presented in Table 3.

Table 3. Family Health and Cancer Communication between college students and their family members

Characteristics	High N (%)	Low N (%)	p-value
Gender			
Female	43 (48.9)	45 (51.1)	0.001
Male	2 (16.7)	20 (83.3)	
Age			
22 years or younger	40 (48.8)	45 (51.2)	0.051
Older than 22	3 (20)	12 (80)	
Cancer perception			
Positive	30 (63.8)	28 (53.8)	0.314
Negative	17 (36.2)	24 (46.2)	
Immediate family member diagnosed with cancer			
Yes	30 (62.5)	30 (54.5)	0.414
No	18 (37.5)	25 (45.5)	
Religiosity			
High	15 (39.5)	9 (22)	0.125
Low	18 (47.4)	24 (58.5)	
Spirituality			
High	18 (18.4)	24 (24.5)	0.725
Low	26 (26.5)	30 (30.6)	

4. Discussion

The goals of this study were to (1) examine association between knowledge of FHH, and demographics, cancer perception, religion, spirituality, and family health and cancer communication; (2) examine the association between family health and cancer communication, and demographics, cancer perception, knowledge of FHH, religion, and spirituality; and (3) explore college students' comfort in sharing health-related information with family members and others. According to Bodurtha and colleagues (2014), FHH communication is the act of obtaining the cancer information from all family members and the act of disseminating that information among family members. Within the context of obtaining and disseminating cancer information, the CPM theory provided a lens for examining the tenants of privacy ownership, control, and management.

The CPM theory tenants of privacy ownership, control, and turbulence, were evident among study participants based on their comfort level in sharing private information, exhibiting few boundaries for information sharing, and available access to private information. Based on the findings that participants with higher levels of FHH also reported high FHCC, it would appear there was a lack of privacy turbulence, lack of chaos, and lack of disruption in privacy. Similarly, the association between a high family income and higher FHH knowledge suggests the previous assumptions regarding comfort and access to disseminate private information among family members. The potentially calming engagement in religion may assist with explaining the lack of privacy turbulence among the participants and the relationship between religion and awareness of FHH.

Regarding knowledge of FHH, we found a statistically significant association between knowledge of FHH and health and cancer communication. Over half of participants (57.8%) who had high health and cancer communication also

reported high knowledge of their FHH. The findings support the results of previous research that reported 82% of undergraduate students with a major in a health science had knowledge of their family medical history (van der Merwe et al., 2022). Additionally, the findings in the current study that indicate general health information is shared within the family was also the results of a study that examined sharing health information among intergenerational family members (Binda et al., 2018).

It is no surprise that among participants who reported high knowledge of their family's health history, also had higher levels of cancer communications. These findings indicate the importance of the FHH in relation to health information that is shared within the family. One might surmise that despite the complexity of health and cancer communication within families, the increased frequency of communication and knowledge of FHH could be the result of the affected individual sharing and disseminating the information out of a sense of responsibility. Additional research is needed to identify other psychosocial factors that may be associated with family health and cancer communication and knowledge of FHH.

While we found no statistically significant association between cancer perception and FHCC in this study, our results indicate a statistically significant association among the demographic (gender and age) and socioeconomic (income) variables and knowledge of FHH. Majority of participants in this study identified their mother as the preferred source for gathering and disseminating family cancer and other health information. Multiple studies have emphasized the role women play as the family's health informant, health motivator, and FHH gatherer (Elrick et al., 2017; Friedman et al., 2012; Koehly et al., 2009; Lin et al., 2018; Ohaeri et al., 1999; Rodríguez et al., 2016; Thompson et al., 2015). Furthermore, previous studies reported that females had higher health communication frequency compared to males (Bowen et al., 2017; Koehly et al., 2009). It is possible that the caregiver role associated with women leads to females being the likely choice for sharing and/or receiving various types of health information. In line with previous research (Kaphingst et al., 2012), we found that younger participants seemed to be more open to health and cancer communication within their families. Thus, younger generations may not perceive the same level of stigma when discussing health issues often found among older generations.

High household income (over $75,000) was associated with higher knowledge of FHH, suggesting that participants from higher income households were more knowledgeable about their health as well as other pertinent details that impact their life. It is worth noting that in general, higher income tends to be associated with a college education (Torpey, n.d.). Therefore, a participant's ability to afford a college education can influence whether that individual is exposed to health information and is knowledgeable about the health of their family. Our results are supported by previous research which found higher levels of income were associated with higher knowledge of one's FHH (Ramsey et al., 2006). Income and education reinforce the concept that knowledge is power, and, in this case, it is the power of knowledge surrounding familial risk factors of cancer and other health conditions.

Religion appeared to influence the level of health and cancer communication that occurred within the families of college students in the current study, as evidenced by a significant relationship between religious beliefs and awareness of FHH. Our study was conducted in the southeast region of the United States, which is part of the "Bible Belt" with strong religious affiliations. Therefore, it was not surprising to note the strong religious sentiments among participants of whom 91% identified as Christian.

4.1 Limitations

The demographic makeup of study participants (87% White) and the fact that 78% of participants were from health science majors (public health, nursing, and exercise science) suggest these participants may already be health-conscious individuals. Therefore, the results of this study cannot be generalized to the general student population. Moreover, the small sample size (106) limited our ability to investigate how all the demographic, socioeconomic, and sociocultural variables collectively affected health and cancer communication.

5. Conclusion

Knowledge of FHH is important for developing health-enhancing behaviors and for cancer control and prevention measures particularly in the case of hereditary diseases. Additionally, knowledge of FHH can serve as a strategy for protecting those with comorbidities, such as cancer, that can negatively impact the health outcome for individuals infected with the coronavirus (Centers for Disease Control and Prevention, 2022a). For college students, awareness of FHH could encourage the adoption of important lifestyle and health-enhancing behaviors that can significantly mitigate the risk for disease later in life. An important finding from the study is that most participants consistently identified their mother as the first individual they would confide in about sensitive health information. This finding indicates that mothers can be effective conveyors of health education messages particularly to college students

regarding the importance of knowledge of their FHH. Findings from the current study also illustrate that younger college students can handle the difficult subject of cancer within the family and should be included in family health communication as they can make important lifestyle choices informed by the health history of their family.

Disclosure

The authors declare that there is no conflict of interest with the research reported herein.

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