Original Research Article

Ethical Issues on Electronic Health Records: Perception from the Medical Record Staff at King Khalid General Hospital, Hafar Al-Batin, Saudi Arabia

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Abstract

Introduction: In realizing the promise of electronic health records, the needs to address the potential ethical issues are of paramount importance. *Objectives:* This research aims to determine the perception regarding the ethical issues in using the electronic health record among the medical staff of King Khalid General Hospital, Hafar Al-Batin, Saudi Arabia. *Method:* This research is quantitative-cross sectional approach. There are 43 medical record staffs who served as the participants. In determining the number of participants, the researcher used simple random sampling. A self-administered tool was used to collect the data. Ethical approval was obtained before data gathering. This research employed frequency and percentage for the demographic profile and weighted mean. In order to determine the differences, exist on the perception of the participants based on the tested variables, t-test was used for gender. Meanwhile, Analysis of Variance (ANOVA) was conducted to determine the differences in the department, level of education, and age. *Results:* The perception of the medical record staff about the ethical issues in the use of electronic health record is positive (x=3.68). Meanwhile, there is no significant difference on the department (Sig: 0.419; *p-val*. 0.5), age (Sig: 0.574; *p-val*. 0.5), level of education (Sig: 0.979; p-val. 0.5), and gender (Sig: 0.156; *p-val*. 0.5). *Conclusion:* The medical record staff in King Khalid General Hospital, Hafar Al-Batin, Saudi Arabia, have a positive perception regarding the ethical issues on electronic health records. As such, it can be used to improve more the practices in safeguarding the records. Moreover, this positive perception can address future ethical issues that may arise. Further, there are no significant differences in the department where these participants are deployed, the age, level of education, and gender.
Keywords: Electronic health record, Medical record staff, Ethical issues.

1. INTRODUCTION & LITERATURE REVIEW

INTRODUCTION

Traditionally, a medical record is in the form of paper used to supply the needs of the research, hospital executive, and for commercial purposes. It has a disadvantage in terms of availability because it can be handed to users one at a time (Poissant, Pereira, Tamblyn & Kawasumi, 2005). Thus, with the requirement of the healthcare delivery in this fast pace changing system, the need to adapt the electronic health record (EHR) is worthwhile. Indeed, there are studies documented putting evidence that care has with value-added with the technology use, and that hospital staff found out to have more satisfaction with electronic health record (McBride, Tietze, Hanley & Thomas, 2017). In fact, with the use of the EHR, it supports patient safety and quality because it alerts the medical team with the correct information, with the right staff and patients through the right course of EHR equipment (Osheroff *et al*., 2012). With the electronic media supports patient care, there are numerous pluses over the traditional paper records (Sanbar, 2004). For example, the ease of access to the records at any given time and place is beneficial (Anderson, 2007). Also, adverse drug reactions decrease considerably when the EHRs are linked to drug banks and pharmacies. This is possible without authorizing prescription and order for medications for which identified adverse reaction is recognized for a known patient (Sanbar, 2007).

The electronic health record entails less storage space and can be stored indefinitely. Using such can decrease the number of missing registers, support research activities, permits for an ample set with further records but low cost, quick record transfer and are economical (Stanberry, 2000; Stone *et al.*, 2003), improved continuum care, reduction of the errors in medication and treatment (Häyrinen, Saranto, Nykänen,2008; Menachemi & Collum, 2011). Conversely, the improvement of patient compliance, quality assurance reduction of medical errors has been shown in the context of electronic health records (Lo, 2006). To date, EHR has been widely used in the hospital; however, the use of it can also bring unintended consequences (Ober & Applegate, 2015).

While there is documented evidence associated with EHR to support patient safety and quality, the medical staffs have confronted many challenges. This includes the ethical issues that require ethical decision making with the appropriate action. Ozair, Jamshed, Sharma, and Aggarwal (2015) suggest that records in the electronic system are challenging for users like physicians and other healthcare stakeholders. For example, the issues on the confidentiality-related challenges frequently recount to ethical difficulties with managing information of significant health or personal value, difficulties concerning keeping patient information private (Gutman, 2005). To this end, ethical dilemmas can exist when everyone determines the care and decision making incongruously. Thus, the need to explore the ethical implications of electronic health is significant to take off.

LITERATURE REVIEW

Ethical understanding is defined as someone's capacity to acknowledge the ethical problem. This includes the moral repercussions of someone's decision and how does this affect other individuals (Milliken, 2016). Thus, in the health care system, the need to recognize the implications of use and ethical understanding of EHR are considered by all medical staff regardless of which purpose. To Laskowski (2016) the improvement in the health care system must be unswerving with the moral responsibility of putting patient in the forefront. Apparently, while there is ethical implication of using electronic health record, policies exist. These are policies that acknowledged the high quality of EHR for health in advancing care (National Academic, 2015). To date, the adoption of EHR's causes significant changes in the customer experience of those practicing medicine, however, in realizing the promise, more work is needed (Wright, 2015).

One of the challenges documented in the literature has been focused on the breach of confidentiality and privacy. For example, the position made by Sulmasy, Lopez, and Horwitch (2017) in their study includes privacy and confidentiality that these users need to safeguard. As such, these two issues are needed to keep up with the use of electronic health records. The privacy and confidentiality involve the retrieval of information, remote access improvement care as well as to develop the threat to unauthorized disclosure of the protected health information. Ozair *et al.*, (2015) disclose that patient safety would be jeopardized by the excessive sharing of content by the other parties and that there are ethical challenges relating to record sharing, which have adverse outcomes for the patients. Indeed, many issues have emerged on the excessive sharing, and that can lead to security breaches. Another ethical issue in the electronic health record is the designation of consumer privileges (According to the American Health Information Management Association, 2012), This issue is precarious as it can lead to medical record security concerns. All users have access to the data that requires them to carry their functions and that they are aware of the accountability of its use or misuse of the information they view and change (American Health Information Management Association, 2012). As such, the Health Insurance Portability and Accountability Act security rule demands the institutions to conduct audit trails (Greene, 2012). To address potential ethical issues, the clinician as users and vendors have been operating to intervene software problems that include the screen design and drop-down options to make EHRs both user-friendly and accurate (American Health Information Management Association, 2009). These shared challenges give rise to ethical concerns in the use of electronic health records.

Research Question(s)

What are the perceived ethical issues of the medical staff in using Electronic Health Record at King Khalid General Hospital, Hafar Al-Batin?

How do the medical staffs' perceived ethical issues of the medical staffs in using Electronic Health Record in terms of their:
a. Department,
b. Age,
c. Level of education, and;
d. Gender?

What differences are noted in the level of perception of ethical issues in using electronic health record with the department, age, level of education, and gender?

OBJECTIVES

This research aims to add understanding on the ethical issues in using the electronic health record by the medical staff of King Khalid General Hospital, Hafar Al-Batin. Specifically, it aims to;

a. Understand the ethical implication breaching record privacy to the record staff ethical implications.
b. Identify variables that affect the perception of the medical staffs on the understanding on the ethical issues in using the electronic health record such as their department, age, level of education, and gender.

2. METHODS

Study Design:
This study used quantitative-cross sectional design to determine the perceived ethical issues of the medical staff in using the electronic health record at King Khalid General Hospital in Hafar Al-Batin, Saudi Arabia.

Study Subjects:
The subjects of this study include all the medical records staff at King Khalid General Hospital in Hafar Al-Batin, such as; receptionist, ward clerk, opening files, medical reports, and statistics.

Sampling Technique:
The researcher used a simple random sampling technique to identify the number of participants. This simple random sampling technique was used to ensure the representativeness of the samples.

Sample Size:
With the list of the names of all the medical record staff, the researcher used random numbers assigned to the names of the potential participants. There were 45 participants drawn from the list of names; however, two of the questionnaires were not included due to incomplete data.

Study Area
This research was conducted in King Khalid General Hospital, Hafar Al-Batin.

Data Collection
The data was collected using a self-administered questionnaire. Before data gathering, the researcher sought approval from the hospital authorities and subjected the study protocol to the health affairs of Hafar Al-Batin for ethical approval. After approval, the data gathering commences with the orientation of the medical record staffs. The researcher explained the objectives of the study, the course of participation as well as their expected benefits. Instruction to answer the questionnaire was also explained. Thereafter, the participants were given a questionnaire and instructed to answer during their free time. All questionnaires were collected at once by the researcher.

Outcome Measures:
The outcome measure and the data from this measure are used to answer the main research questions.

Questionnaire:
The design of the questionnaire for this research included two main parts.

- The first central part consisted of the demographic data
- The second part consisted of 20 questions that were adopted and modified.

The responses were measured on a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Participants were asked to rate their perception to which they agreed or disagreed with each statement. The researcher invited three panels of members to validate the questionnaire. One of the members is a research faculty of one of the universities in the region, and the other two panels were researchers with a focus on information technology. These three panels of members were consistently agreed that the questionnaire measures what it supposed to measure. The questionnaire was subjected to a reliability test that resulted in a Cronbach alpha coefficient of .80.

Ethical Approval
Ethical approval was obtained from the health affairs of Hafar Al-Batin, the participation was entirely voluntary, and the participant was not forced or persuaded to answer the questionnaire.

Statistical Analysis
The researcher used the Statistical Package for Social Sciences version 22 (SPSS, v.22) in the treatment of the data. For the demographic profile of the participants, such as department, age, level of education, and gender, were treated with frequency and percentage. The perception of ethical issues of the medical record staff was computed with the weighted mean. For the differences in the perception in terms of department, age, and level of education, the one-way Analysis of Variance (ANOVA) was used. For gender, the t-test was used.

3. RESULTS

The frequencies and percentages of the sample were calculated according to the following variables; department, age, level of education, and gender.

Table 1: Distribution of sample members by Department, N=43

Department	Frequency	Percentage (%)
File room	20	46.5
Reception	3	6.9
ward clerk	4	9.3
Medical reports	6	14.0
Statistics	3	7.0
Other	7	16.3

Table 1 presents the distribution of sample member by department. The research sample was divided into categories in terms of Department: the category (File room) with the percentage (46.5%), the category (Medical reports) with the percentage (14.0%), the category (ward clerk) with the percentage (9.3%), the category (Reception) with the percentage (6.9%), the category (Statistics) with the percentage (7.0%), and the category (Other) with the percentage (16.3%).
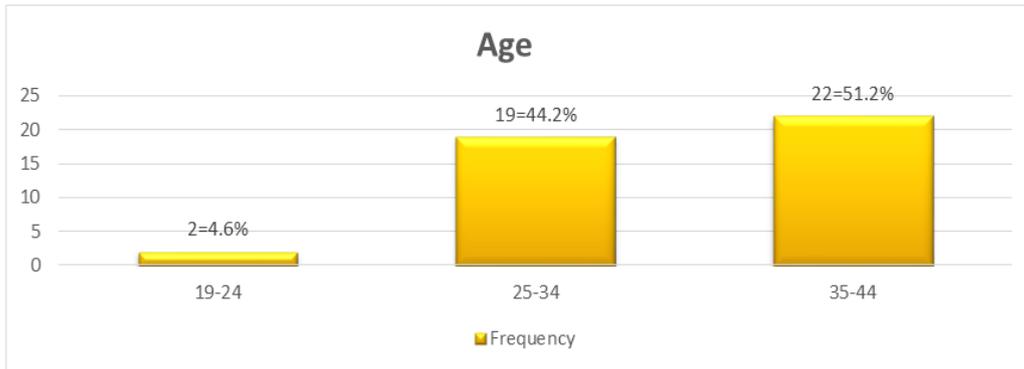

Figure 1: Age

From the above figure, it presents the distribution of the age categories. This includes the age level of 35-44 with the percentage of 51.2%, the age level of 25-34 with the percentage 44.2%, and the age level of 19-24 with the percentage of 4.6%. Figure 2 sample members by Age.
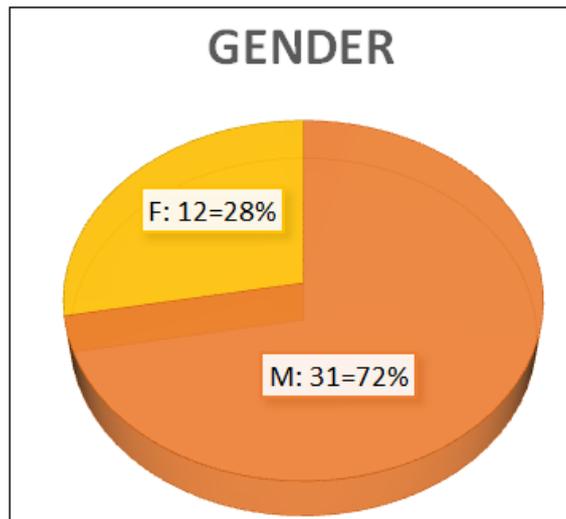

Figure 2: Gender

From the above figure, the research sample was divided into categories in terms of gender: the male category with 72 % and female category 28%.

Table 2: Distribution of sample members by Level of education

Level of education	Frequency	Percentage (%)
High School	5	11.6
Diploma	20	46.5
Bachelor	16	37.2
Master	2	4.7

Table 2 presents the distribution of sample by level of education. The research sample was divided into categories in terms of level of education: the category (Diploma) with the percentage (46.5%), the category (Bachelor) with the percentage (37.2%), the category (High School) with the percentage (11.6%), and the category (Master) with the percentage (4. 7%).

Table 3: Perception of the Medical record staffs on the ethical issues of Electronic Health Records

Statement	Weighted mean	SD	Qualitative Equivalent
The chance that EMR privacy may be breached is high	3.12	1.24	Neutral
There is a strong probability that EMR privacy breaches may lead to privacy issues	3.98	1.10	Strongly agree
The use of EMR is likely to cause privacy problems	3.14	1.36	Neutral
Having EMR privacy breaches is a severe problem for me	3.98	1.01	Agree
Losing EMR data is a severe problem for me	4.30	0.80	Strongly agree
Complying with the privacy policy prevents future EMR privacy breaches	4.28	0.98	Agree
The privacy policy can ensure EMR privacy	4.02	1.12	Agree
Complying with the privacy policy prevents the violation of EMR privacy	4.12	1.12	Agree
I am less anxious about EMR privacy breaches if I can comply with the privacy policy	3.91	1.06	Agree
Complying with the privacy policy may interfere with many work activities	2.95	1.27	Neutral
Complying with the privacy policy is difficult	2.84	1.27	Neutral
I am confident that I can comply with the privacy policy	4.09	0.89	Agree
I am confident that I can recognize the potential problems of violating EMR privacy	4.19	0.66	Agree
I am confident that I can comply with the privacy policy even if there is no one around to help me	3.93	0.77	Agree
My hospital regularly distributes newsletters or articles concerning the protection of EMR privacy	2.91	1.31	Neutral
My hospital regularly organizes talks on EMR privacy	2.88	1.29	Neutral
My hospital regularly sends out alert messages regarding EMR privacy	2.72	1.16	Neutral
I intend to protect EMR privacy	3.88	1.05	Agree
I predict I will protect EMR privacy	4.05	1.07	Agree
I plan to protect EMR privacy	4.35	0.61	SA
Average	**3.681**	**0.494**	Agree

2.3-5.00	Strongly agree(SA)
3.5 4.2	Agree(A)
2.7-3.4	Neutral(N)
1.9-2.6	Disagree(D)
1.00-1.18	Strongly disagree(SD)

Table 3 presents the perception of the medical record staffs on the ethical issues of electronic health records. It can be noted that in general, the medical record staff have a good perception (3.68) while having a response of neutral to strongly agree in all of the items. Of note is the response of the strongly agree on the issue stating that "There is a strong probability that EMR privacy breaches may lead to privacy issues" with 3.98, and "Losing EMR data is a severe problem for me" with 4.30.

Table 4: Difference between the answers according to Department

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.249	5	.250	1.023	.419
Within Groups	8.787	36	.244		
Total	10.036	41			

Table 4 presents the differences between the perceptions of the medical record staff on the ethical issues in using electronic health record by department. It can be noted that significant value = (0.419) is more than *p-values* of 0.05, which means that there is no statistically significant difference between perception of the medical record staff on the ethical issues in using electronic health record by department.

Table 5: Difference between the answers according to Age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.282	2	.141	.564	.574
Within Groups	9.754	39	.250		
Total	10.036	41			

Table 5 presents the difference between the answers according to age. The significant value (0.574) is more than *p-values* of 0.05, which means that there is no statistically significant difference between the perceptions of the medical record staffs on the ethical issues in using electronic health record by age.

Table 6: Difference between the answers according to Level of education

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.050	3	.017	.064	.979
Within Groups	9.985	38	.263		
Total	10.036	41			

Table 6 presents the difference between the answers according to level of education. ANOVA test resulted to the significant value of 0.979 which is more than the *p-values* of 0.05level of significance which means that there is no statistically significant difference between the perceptions of the medical record staff on the ethical issues in using electronic health record by level of education.

Table 7: Difference between the answers according to gender

Gender	N	Mean	Std. Deviation	Std. Error Mean	Sig	T
Male	30	2.3117	.52828	.09645	.156	-0.200
Female	12	2.3458	.41912	.12099		

Table 7 presents the difference between the answers according to gender. T-test was conducted to test the difference between the perceptions of the medical record staffs as to gender.

The significant value of 0.111 is more than the *p-values* of 0.05, which means that there is no statistical significant difference between the perception of the medical record staff on the ethical issues in using electronic health record by gender.

4. DISCUSSION

This study aims to determine the perceived ethical issues of the medical staff in using Electronic Health Record at King Khalid General Hospital, Hafar Al-Batin. In general, the medical record staff had a positive perception of the ethical issues of the electronic health record. This implies that the majority or most of them had understood and were aware of the implication of ethical concern in the use of electronic health records. One of the possible explanations on the positive perception of the medical record staff can be attributed to the orientations and training on EHR in the workplace. Dornan *et al*., (2019) discussed that prior assessment of organizational cultures and settings must have an orientation that evaluates the needed technical support. This can be done by exploring staff awareness, skill levels, and willingness to utilize new technologies.

While it is known that some of the technical issues are important in factoring the positive perception of the users, the consideration of the individual barriers (such as resistance to change) must be put in context than other barriers (Miller & Sim, 2004).

On the other hand, Al Sadi and Saleh (2019) argued that the efforts in the preparation of EHR implementation had been directed towards organizational readiness, including staff readiness. Notwithstanding the positive assessment of the perceived benefits of the EHR, still some health professionals felt not prepared to operate the system within their usual work practice (McCrorie *et al*., 2019). Indeed, to have a better appreciation of the staff members, the need to understand the objectives of the EHR and its ethical issues surrounding the use must be well understood. Obviously, addressing staff trepidations in using technology involvements before the application can avert hesitancy to employ new practices (Dornan *et al*., 2019). The present finding is an indicator that ethical issues or concerns on the use of electronic health records are not a barrier to useful and ethical implementation of the EHR.

This study found no significant differences in the variables, which include the department, age, level of education, and gender. This suggests that ethical

issues in the use of electronic health records are all a concern of the participants. Of note, few studies have suggested that there was a variation on the perception of the female participants to that of the male participants regarding the perception of EHR (Wood, 2000; Prior, Rogerson & Fairweather, 2002). To the knowledge of the researcher, the rest of the studied variables have not been explored in the previous studies.

Further, the non –significant results of this study can be attributed to the fact that the participants have been up keeping and maintained the protection of the confidentiality, integrity of the information in the EHR. It is assumed that participants have continuously been oriented and trained on the guidelines that address the ethical issues of the electronic health record. This commendable strength of the participants could have identified earlier prior to implementation of EHR. According to Morton (2009), for the EHR to prosper, therefore, technical and nontechnical issues must be identified and resolved. On the other hand, the dearth in the national guidelines for the exchange of information and the lack of technical assets can have an impact on the ethical issues, which include confidentiality of health information (Healthcare Financial Management Association, 2006). These current findings can contribute to the understanding of the policymakers and administrators the need for continuous improvement in addressing the ethical issues in using EHR in the workplace. As such, this allows a more tailored fit approach to intervening ethical concerns or issues.

5. CONCLUSIONS
The medical record staffs in King Khalid General Hospital, Hafar Al-Batin, Saudi Arabia, have a positive perception of the ethical issues on electronic health records. As such, it can be used to address the future ethical issues that may arise. Moreover, there is no significant difference in the department where these participants are deployed, the age, level of education, and gender. Therefore, the need to have continuous improvement in the practices of these participants in addressing the EHR ethical issues can be more enhance.

6. DECLARATIONS
6.1 Authors' contributions
Humoud Turki Al-Mutairi contributed to carrying out the study, collecting data, interpreting the results and preparing the manuscript. Professor Bakheet Al-Dosari contributed to the concept of study, design, review and final approval.

6.2 Scientific and Ethics approval
Ethical approval was obtained from the health affairs of Hafar Al-Batin, the participation was completely voluntary, the participant was not forced or persuaded to answer the questionnaire questions.

6.3 Sources of Funding
No funding was requested nor received.

6.4 List of abbreviations

Table 8: List of abbreviations

Abbreviations	Meaning
EHR	Electronic Health Record
SPSS	Statistical Products and Services Solution Program
ANOVA	Analysis of Variance
EMR	Electronic Medical Record

7. APPENDIX
Reliability Test
❖ Cronbach Alpha
For the purpose of checking the reliability of the tool used the researcher equation Cronbach Alpha,

and the value of the reliability factor of the total degree according to the equation Cronbach Alpha (0.800), which is a high value. The objective of this analysis is to obtain the same data when re-studying, using the same study tool under the same conditions.

Tool reliability

Tool domain	No of tool phrases	Cronbach Alpha value
	20	0.800

phrase	Correlation	phrase	Correlation	phrase	Correlation	phrase	Correlation
1	0.241	6	.346*	11	.343*	16	.785**
2	.493**	7	.503**	12	.330*	17	.674**
3	.576**	8	.491**	13	0.156	18	.489**
4	.390*	9	.584**	14	.538**	19	.588**
5	0.065	10	.381*	15	.594**	20	.417**

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).
Phrases no (1, 5, 13) are not significant

Appendix A: Questionnaire (if applicable)

Ethical Issues on Electronic Health Records: Perception from the Medical Record Staff at King Khalid General Hospital, Hafar Al-Batin, Saudi Arabia.

N0	Questionnaire	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	The chance that EMR privacy may be breached is high	☐	☐	☐	☐	☐
2	There is a strong probability that EMR privacy breaches may lead to privacy issues	☐	☐	☐	☐	☐
3	The use of EMR is likely to cause privacy problems	☐	☐	☐	☐	☐
4	Having EMR privacy breaches is a severe problem for me	☐	☐	☐	☐	☐
5	Losing EMR data is a severe problem for me	☐	☐	☐	☐	☐
6	Complying with the privacy policy prevents future EMR privacy breaches	☐	☐	☐	☐	☐
7	The privacy policy can ensure EMR privacy	☐	☐	☐	☐	☐
8	Complying with the privacy policy prevents the violation of EMR privacy	☐	☐	☐	☐	☐
9	I am less anxious about EMR privacy breaches if I can comply with the privacy policy	☐	☐	☐	☐	☐
10	Complying with the privacy policy may interfere with many work activities	☐	☐	☐	☐	☐
11	Complying with the privacy policy is difficult	☐	☐	☐	☐	☐
12	I am confident that I can comply with the privacy policy	☐	☐	☐	☐	☐
13	I am confident that I can recognize the potential problems of violating EMR privacy	☐	☐	☐	☐	☐
14	I am confident that I can comply with the privacy policy even if there is no one around to help me	☐	☐	☐	☐	☐
15	My hospital regularly distributes newsletters or articles concerning the protection of EMR privacy	☐	☐	☐	☐	☐
16	My hospital regularly organizes talks on EMR privacy	☐	☐	☐	☐	☐
17	My hospital regularly sends out alert messages regarding EMR privacy	☐	☐	☐	☐	☐
18	I intend to protect EMR privacy	☐	☐	☐	☐	☐
19	I predict I will protect EMR privacy	☐	☐	☐	☐	☐
20	I plan to protect EMR privacy	☐	☐	☐	☐	☐

Dear Colleagues

I invite you to participate in a research study to see the extent to which medical records personnel understand patient privacy. Since you are an employee of the department, I am very interested in your opinions. On this, there is no immediate or expected risk. It will benefit you for your participation in this research study. Of course, your participation in the study is completely voluntary and you can withdraw from the study any time after you receive this survey. It will cost you nothing to participate, and you will not be paid for your subscription. If you agree to participate in this study, you will be asked to complete it. The attached questionnaire, which should take about 5-10 minutes to complete. There will be no names or email addresses associated with your answer.

Rest assured that your rights as respondents will be fully observed such that your name will not be disclosed; your privacy and confidentiality are well fully observed.

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