

SECURITY AND PRIVACY PERCEPTIONS AMONG FEMALE ONLINE SOCIAL MEDIA USERS: A CASE STUDY OF BANGLADESH

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ABSTRACT

Online Social Networks (OSNs) such as Facebook are extremely popular in Bangladesh, not only to the younger generations, but also to the people from other age categories as well. However, due to different socio-technological factors, the security and privacy awareness of Bangladeshi Facebook users have remained questionable. This is also evident in the wake of a number of incidents reported while using Facebook, particularly involving women users. There have been a few research studies to investigate different security and privacy concerns of Bangladeshi users. However, none of the existing has is comprehensive enough focusing only on female users. In this paper, we aim to fill in this gap by presenting a study on security and privacy concerns while using different Online Social Networks such as Facebook among female users in Bangladesh. We conducted an online survey of 203 Bangladeshi female Facebook users. We analyzed the survey statistics to study the general trend of behavior, practices, and expectations pertaining to secure Facebook usage and different privacy preferences. The study reveals that female users are concerned about their data privacy, however, 67% participants feel safe and secure while using Facebook and 33% participants do not think that Facebook takes necessary steps to protect users' data privacy on the web. We suggest that such a study can help researchers identify the privacy concerns in using social networking sites/apps such as Facebook to focus on building secure and privacy-friendly technologies to protect users from online crimes and harassment in developing countries.

KEYWORDS

Online Social Networks, Facebook, Security, Privacy, Survey

1. INTRODUCTION

In Bangladesh, Facebook is the most popular social media application according to the NapoleonCat [1]. In October 2020, there were around 43 million Facebook users in Bangladesh, which was almost 25.3% of its entire population [1]. However, the majority of them were men, i.e. 69.6%; the women users are around 13 million which is huge. Such a big number generally creates a security and privacy concern. The easy access to Internet as well as Online Social Networks (OSNs) also made intruders and offenders easy to promote cyber violence. In Bangladesh, women are disproportionately targeted by online and technology facilitated violence and harassment. This is also evident in the wake of a number of incidents reported while using Facebook, particularly involving women users [2]. There have been a few research studies to investigate different security and privacy concerns of Bangladeshi users. However, none of the existing has is comprehensive enough focusing only on female users. In our study, we aim to fill in this gap by presenting a study on security and privacy concerns while using different OSNs such as Facebook among female users in Bangladesh. We conducted an online survey of 203 Bangladeshi female Facebook users.

This paper has the following contributions:

1. It presents a study on female Facebook users from a number of different age groups as well as different occupations in Bangladesh.
2. The survey allows us to understand the usage of Facebook among female users and how they control the privacy and security settings to protect their data.
3. The survey collects the data on the overall knowledge and corresponding concerns in security and privacy of the female users while using Facebook.

The paper is organized as follows. At first, we have discussed related work in Section 2. Then we have described the overall survey methodology of the study in Section 3. How the survey has been designed, the recruitment process and the limitation of the survey has been presented in this section. Section 4 presents the result of the survey. We have thoroughly presented the data of the result. We have presented an analysis of the finding and an overall discussion in Section 5. A few recommendations have been given in this section as well. Section 6 concludes the paper.

2. RELATED WORK

A number of studies are available regarding privacy and security of online social networks such as Facebook worldwide [3, 4, 5, 6, 7]. However, there are a few numbers of studies exploring the privacy issues among Bangladeshi Facebook users. In this section, we analyze these studies with a brief review for each of them.

In [8], the authors conducted a study investigating different factors which could influence the privacy awareness among undergraduate university students in Bangladesh. The survey was conducted in two phases with around 80 and 200 students in the first and second phase respectively. As per their survey, they identified a number of factors such as picture privacy, sharing preferences, acceptance of friend request, group interactions, blocking unwanted persons, dealing with aggressive comments and so on. Based on their findings, they provided a number of suggestions to improve the user privacy. A major limitation of the study is that the survey was restricted to only one city, Dhaka, the capital of Bangladesh.

In [9], the authors explored different security and privacy threats, such as cyber defamation, cheating and fraudulence, hacking and others, for women of Bangladesh while using social network services such as Facebook. They also conducted a survey which indicated a number of women facing different harassment issues on Facebook. They also provided a number of suggestions to improve privacy issues.

The authors in [10] conducted a survey to investigate different aspects, including privacy issues, regarding the use of Facebook groups. The survey consisted of two parts: survey and interview with 57 and 32 participants respectively. The privacy aspect mostly evolved around the idea of how the users felt to share their information when they joined different Facebook groups. The majority of participants expressed discomfort for sharing some sensitive information such as address, phone number and political views.

There are some other studies which are not directly related to the privacy issues featuring Bangladeshi users while using social networking sites. Even so, we present a brief review of few such studies as they present interesting results and initiate novel discussions.

In [11], the authors explored different positive and negative impacts of using Social Networking Sites by different Bangladeshi users. They analyzed the cause and effect of these impacts and provided suggestions how some of negative impacts could be minimized. However, the article did not have any major focus on the privacy issues involving using different social networking sites.

The authors in [12] explored different factors which could influence the participation of Bangladeshi women in the #MeToo movement via different social networking sites such as

Twitter and Facebook. Based on an online survey consisting of 180 users and an interview with 30 users, the authors found that Bangladeshi women, albeit supporting the movement, did not actively participate. This can be attributed to some factors, also identified by their study, such as other alternative mediating process, perceived lack of hope for any positive outcome, cultural difference and so on.

3. SURVEY METHODOLOGY

The survey methodology has been explained using a flowchart in Figure 1.

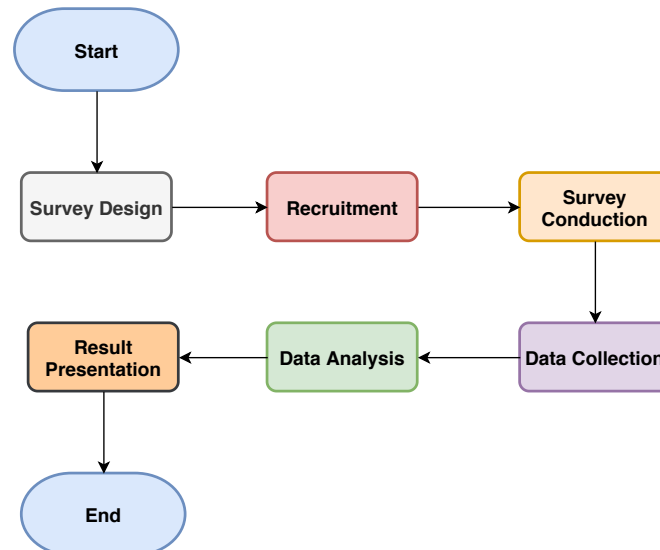


Figure 1. Flowchart of the Survey Methodology

3.1. Survey Design

The survey was designed in Google Form consisted of a total of 27 questions. The questions were designed to collect the respondents' demographic information, their Facebook usage pattern and concerns regarding privacy and security while using Facebook. The survey was conducted using a publicly accessible online form and was available in English. The survey agreement stated that no personally identifiable information (e.g. name, email address, contact number) would be asked or stored, and the opinion would be used as aggregate results and would be used for research purpose only. The survey is available on request from the authors.

3.2. Recruitment

The main criteria to fill up the questionnaire was to be a female, active Facebook user and living in Bangladesh. A total of 203 female participants responded to the survey who were all voluntary participants. Participants were recruited through two primary methods: the authors' personal connections, and snowball sampling where each contact was requested to forward the questionnaire to their known contacts who met the required criteria. Prior to the survey, participants provided their consent to participate in the survey. The survey responses were collected over a period of 10 days.

3.3. Limitations

The primary target of the survey was to collect preferential and behavioral data from female Bangladeshi Facebook users regarding security and privacy policy. The participation in the survey was completely voluntary. The authors' female friends, family members, social network

connections and community groups were utilized for publicity. Due to the nature of publicity, the collected data may have a certain bias towards the demography of the participants. Again, the survey was taken only for 10 days.

4. RESULTS

In this section, the results of conducted survey are presented. The results are categorized in different subsections where each subsection covers a specific category.

4.1. Survey Demographics

The respondents were inquired with the age, educational background and occupation in the demographic section. The survey included respondents from the age of 18 and above in five different age groups and excluded minors (below 18). The column diagram of the respondents in five different age groups is shown in Figure 2. The age distribution shows that most of the users who participated in the survey were rather young and in between the age range of 18-24 years.

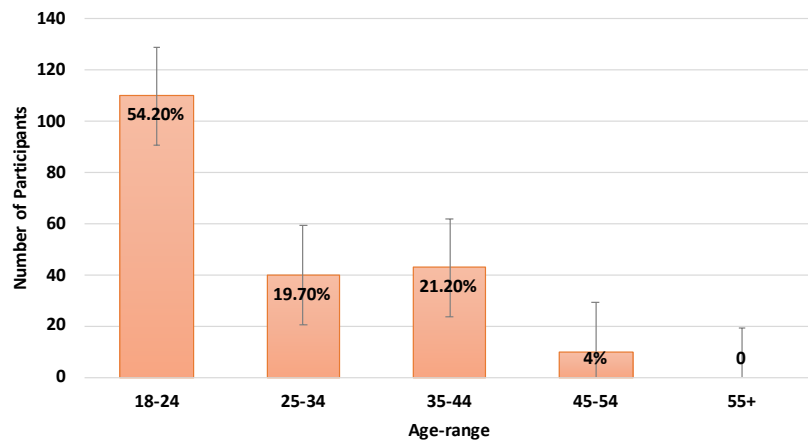


Figure 2. Age Group Distribution

Figure 3 also shows the occupation of the respondents where the major respondents were students and job holders.

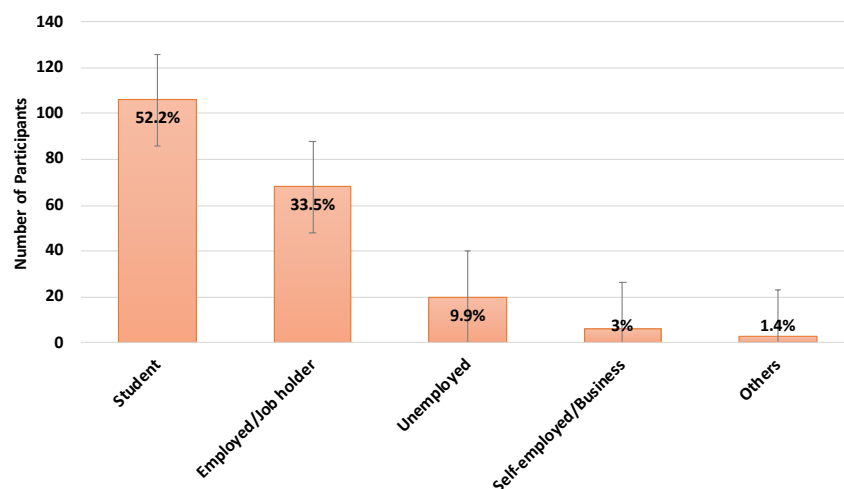


Figure 3. Occupation of the Participants

4.2. Facebook Usage

We surveyed the frequency of using Facebook everyday, varying from less than an hour, 1-2 hours, 2-3 hours, 3-4 hours and 4+ hours. The survey result indicates that 27.6% participants use Facebook 4+ hours daily, while 26.6% participants use for 1-2 hours daily, 21.7% use 2-3 hours, 15.8% use 3-4 hours and only 8.4% participants use Facebook less than an hour. The results imply that Facebook is very popular and most of the participants use Facebook very frequently on a daily basis. Figure 4 presents the result.

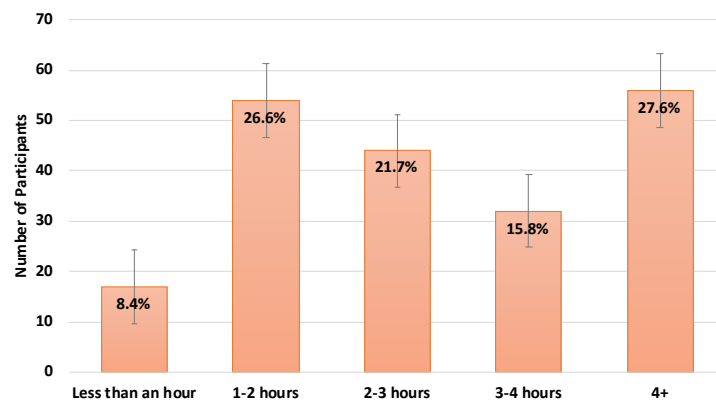


Figure 4. Facebook Usage according to Daily Usage

We also wanted to know how often the participants post status updates or upload photos on Facebook. It is quite interesting to see that the majority (60.6%) of the participants post status/photos less frequently, whereas, 17.7% participants update posts or upload photos once in a week, 14.8% participants share once in a month and only 6.9% participants updates daily. Figure 5 presents the result.

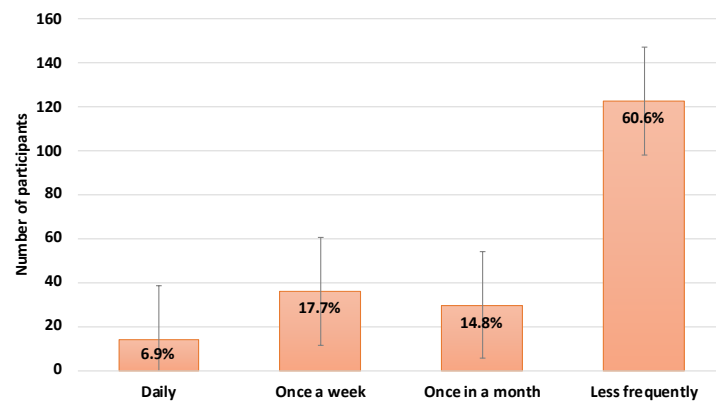


Figure 5. Percentage of Status Updates

To know how active the participants are on Facebook, we also surveyed how many friends they had on Facebook and how many Facebook groups' members they were. 40.9% participants have more than 500+ Facebook friends, whereas, only 3.9% participants have Facebook friends in the range between 0-50 (Figure 6). The participants also seem to be very active members of different groups on Facebook, where we have found that 33.5% respondents are members of 10-25 groups (Figure 7).

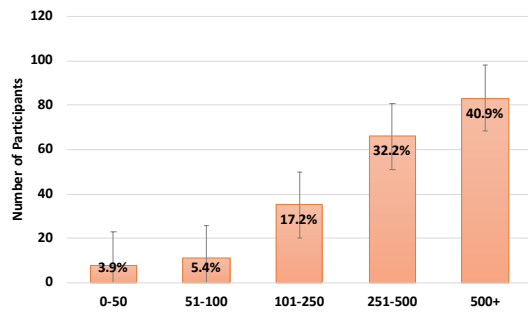


Figure 6: Number of Facebook Friends

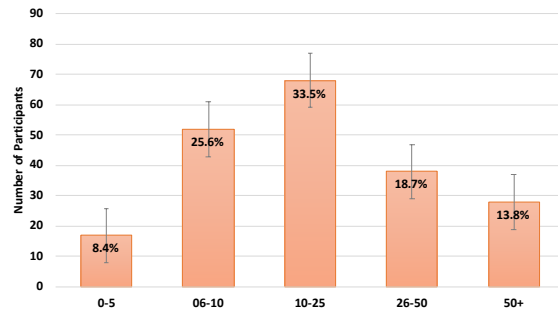


Figure 7: Number of the Facebook Groups

4.3. Facebook Privacy

We surveyed if the posts of the participants were public or shared with only Facebook friends. As per the survey, 90.1% participants do not share their posts public, whereas, only 9.9% participants publicly share their posts.

We also asked why they revealed more or less personal information. This was an optional question and total 122 participants responded. The majority of them answered that they felt unsafe and insecure to share personal information on Facebook. A number of participants mentioned that they were comfortable to share personal information only with trusted people.

However, a few of the participants expressed their positive attitude to share something on Facebook. Some of the comments are:

- *“Sometimes sharing can relief some stress.”*
- *“Facebook is a communication medium. Sometimes if I post something people know about it very quickly, I don’t need to tell them separately.”*
- *“I only reveal my personal infos to my friends. I guess sharing life experiences with friends is fun.”*

One participant mentioned Facebook as *“a friendly environment”*.

4.4. Facebook Privacy Setting Review

We asked participants if they were familiar with Facebook's privacy setting feature that let them control who saw what they shared on Facebook. 91.9% respondents are familiar with the feature while the rest responded “No”.

Those who are familiar with the feature, were further asked if they ever reviewed the setting that let them control who could see what you shared, how people could find them on Facebook and how they could control their ad preferences on Facebook. The response is illustrated in Figure 8.

According to the results revealed in Fig. 8; 89.2% respondents replied that they reviewed the setting to control who could see what they shared and 76.8% reviewed the setting on how people can find them. However, regarding the control setting of ad preferences, 45.4% respondents replied not to review this setting.

4.5. Facebook Privacy Policy

We wanted to know if the participants read the Term of Services (ToS). 57.6% respondents replied that they never read the ToS, whereas 42.4% responded that they read the ToS (Figure 8).

We also asked the same question regarding Privacy policy and the Figure 9 revealed the survey result, where 27.1% read it, 41.4% partially read it and 31.5% never read it.

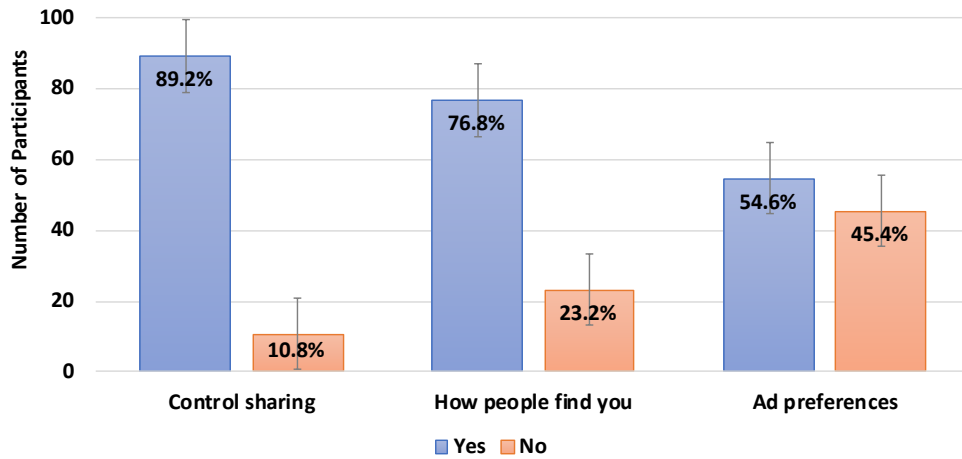


Figure 8. Reviewing in control setting of sharing data, finding you on the Facebook and ad preferences

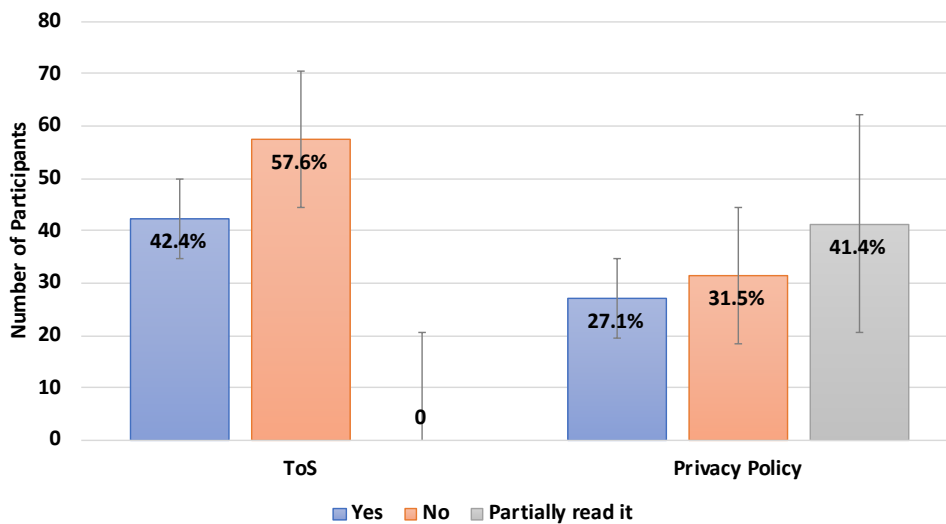


Figure 9. Reading Term of Services (ToS) and Privacy Policy (PP)

The respondents were further asked how they felt about the privacy policy of the Facebook. We found that across the sample:

- 41.4% respondents are “a little bit concerned”
- 31.5% respondents are “concerned”
- 23.6% users have “no problem/issues” at all
- 3.4% respondents answered with “Don’t like at all”.

The result has been showed in Figure 10.

In another related query, we asked the user how concerned they were about the privacy of their data on Facebook. 38.9% participants have responded that they are a little bit concerned. On the other hand, 27.1% are somewhat concerned and 25.1% have been very concerned. Only 8.9% users have expressed that they are not concerned. Figure 11 has revealed the result.

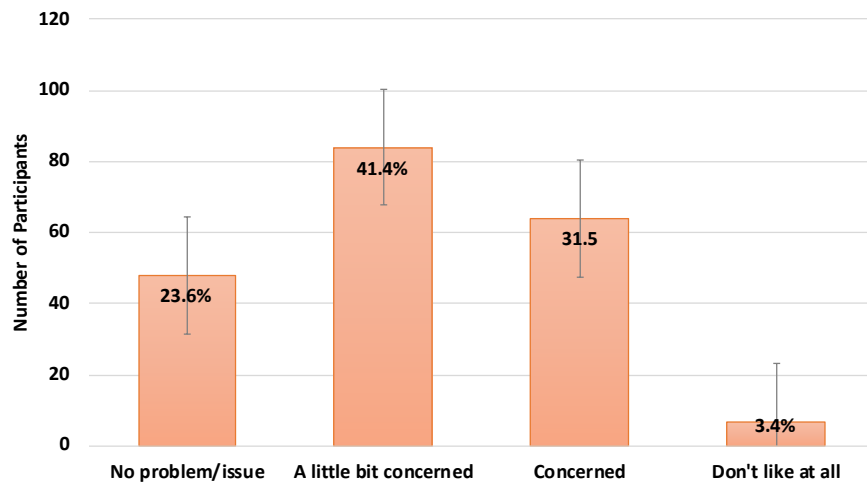


Figure 10. Thoughts on Privacy Policy

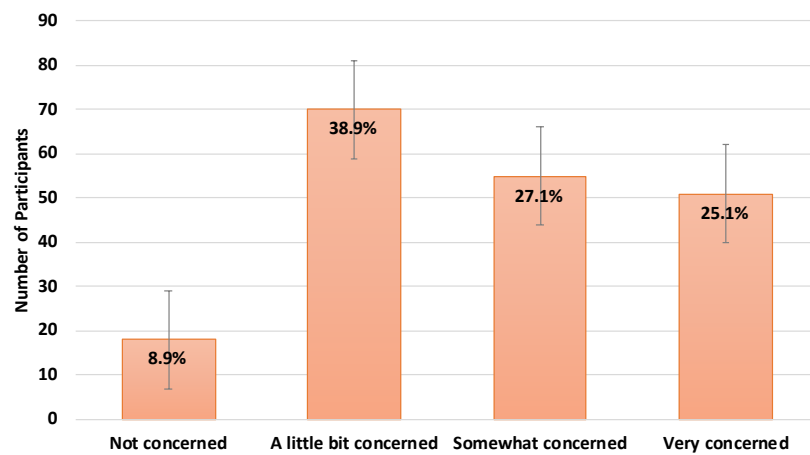


Figure 11. Concerns in Privacy Policy

We have also asked if Facebook does an adequate job in preserving your personal data and the survey result showed that the majority (64.5%) participants are confused about it. 18.2% participants think that Facebook preserve their data whereas 17.1% participants think that Facebook does not preserve the data (Figure 12).

This is a positive indication of a good number of online users being aware of their privacy.

4.6. Facebook Security

On Facebook, users share a large range of personal information. While it is necessary to protect the privacy, it is also important to ensure security to protect this personal information. We wanted to survey what participants thought about the security and how they protected the access and information using services provided by Facebook.

We wanted to know how frequently the participants changes their passwords. Quite shockingly, it has been found that 12.8% participants never changed their passwords after creating the account, 25.6% participants changed their passwords only once and 29.6% participants change their passwords once in a year. Finally, 23.6% participants change their passwords once in six months. The result is illustrated in Figure 13.

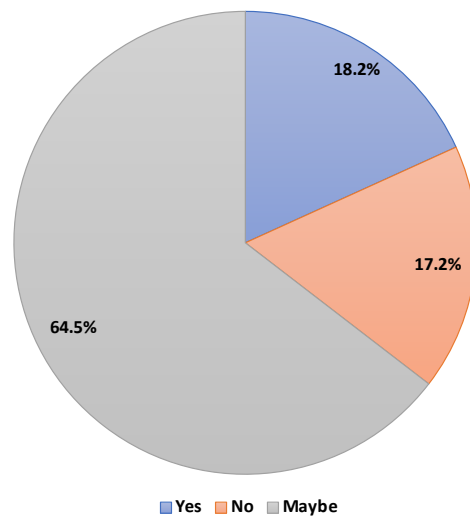


Figure 12. Facebook on preserving Data

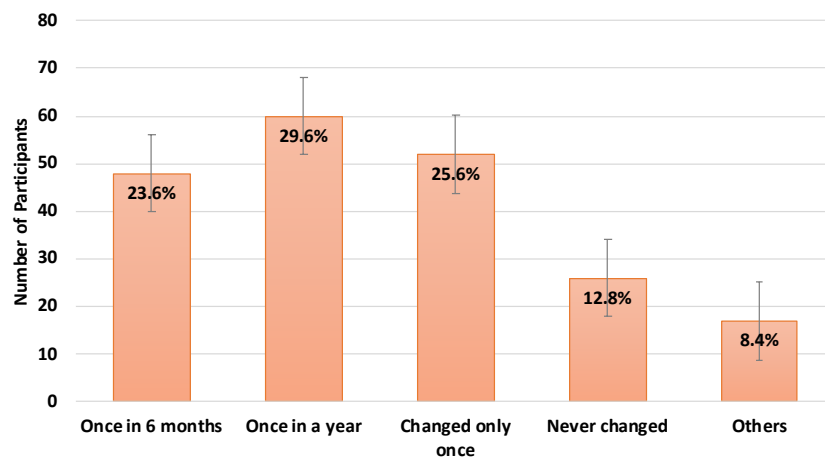


Figure 13. Password changing behavior on Facebook

Facebook provides two-factor authentication methods which can be enabled to ensure better security. However, only 44.8% participants have enabled this service, 26.1% have not enabled the service and 29.1% participants do not know about this service. This result reveals that the most of the participants are not fully aware of the two-factor authentication and even if they know about it, they do not use it.

Facebook also offers extra security such as “get alerts” for unrecognized logins. 57.1% participants have set up this option, whereas 42.9% have not.

Advanced security measures such as encrypted notification emails, recover access to other sites with your Facebook account and check recent emails sent by Facebook are also available on Facebook. Only 38.4% participants have enabled this setup, whereas 61.6% have never setup this option. Figure 14 shows the result of setting these security related features on Facebook.

From another question, it has been revealed that 10.8% participants’ Facebook accounts have been hacked. Regarding harassment, 29.1% participants have faced harassment on Facebook which is quite alarming (Figure 15).

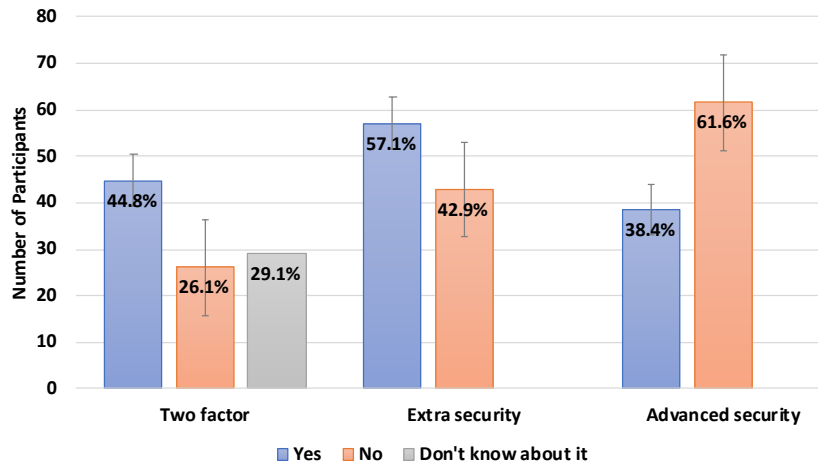


Figure 14. Setting Security features on Facebook

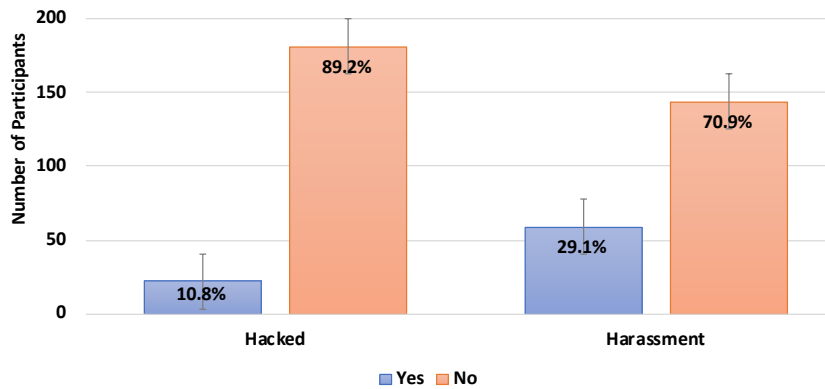


Figure 15: Information regarding Hacking and Harassment on Facebook

We further asked if the participants felt safe while using Facebook. The results reveal that 67% respondents feel safe using Facebook however 33% do not feel safe during their Facebook use. This somehow tells us that the female users still feel unsafe and insecure while using Facebook.

4.7. Overall

Finally, we have asked the participants an open question about their general perception of Facebook security and privacy. Some interesting comments are provided below:

- *“I feel like continuously someone is watching me, my every activity in Facebook. Facebook is very creepy and sneaky now a days.”*
- *“I don't like facebook and it's privacy much. I don't like facebook letting people share disturbing staff and messaging option for unknown people who are not friend. Though there's spam or request msg option People can download other people's picture, make fake accounts which is totally inappropriate. Also, I don't trust facebook, maybe our personal information is not safe with facebook. That's why I personally avoid sharing personal information.”*
- *“Facebook is good for the people who use it for good purpose. But many people harass others by using their pictures and texts which is very upsetting. Moreover, the STORY with privacy setting as "PUBLIC" doesn't show the people (followers) who has seen the*

picture/STORY. This creates a suspense that who is watching or stalking, you don't know. I think this matter should be looked.”

- *“The privacy settings and options are quite alright and getting better with each updates but since there are still quite a huge number of reports of people being harassed in the comment sections, through messages or even fake accounts everyday, these matters should be taken in consideration as well as strong actions against the owners of the respective abusive accounts should be taken.”*
- *“Privacy is not maintained after setting or resetting of repeated newer version.”*
- *“I think Facebook should not be collecting our information and giving it to third parties. Even if we disable this setting, they continue to share the information with third parties, but just does not link that information directly to our account. That really does not change much. Our information is still being indirectly given out, and we have no control over what information gets shared. So, I use Facebook carefully and do not share anything that I wouldn't share in public.”*
- *“It's not trustworthy at all. Facebook keeps an eye on every single activity we do through the phone. It collect every information and I think this single app violates our entire data privacy on mobile phone.”*
- *“I've faced hacking twice. I've informed the authorities but they didn't take any actions so I had to change my account twice they should be more responsive in this matter.”*
- *“I think it needs more clarity. As we all know privacy policies are a bit tough to handle for non-techy person, I think explaining in clear words what actions lead to what kind of info reveal - is quite necessary.”*
- *“Policy should be more rigorous, sharing and tagging options should be clearly defined, should be extra careful about data breaches, download of the content without prior permission of the content owner should be strictly prohibited.”*

From the study, we can see that a number of respondents urge for taking necessary steps to stop harassment and take actions against those who shared the abusive comments and harass others. It also has been found that one of the respondents account has been hacked twice and she informed the proper authority however any actions have not taken. It is also one of the concerns that privacy policy is not clearly explained on Facebook and it should be explained in layman's term.

5. DISCUSSION

The study presented in this paper provides an insightful information regarding the knowledge of the security and privacy policy, security-oriented behaviors, experiences on attacks and harassment and overall perception regarding security and privacy of Facebook from female users in Bangladesh. The survey population comprised of considerably active Facebook users with varying types of educational background and occupations services. In next subsections, we have presented the key findings of the study, the main observations from the study and a few recommendations are advised.

5.1 Key Findings

The key findings from the study are summarized in the Table 1.

5.2 Observations:

After thorough analysis of the findings, we have addressed the following critical observations from our study.

5.2.1 Uncertainty about data safety and privacy policy

It is evident from the Facebook usage percentage of the study that almost all of the participants use Facebook heavily, however, there is a limited awareness of participants in terms of data safety and privacy policy of Facebook. A significant number of participants are unsure regarding their data preservation if Facebook is protecting them. Moreover, participants shown concern about the privacy policy but they are reluctant to read the ToS and the privacy policy provided by Facebook.

5.2.2 Lack of knowledge regarding data sharing to third party

Despite Bangladesh being a developing country, the high percentage of responses came from young generation shows awareness regarding privacy control setting on Facebook. However, they lack the knowledge in data sharing to third party by Facebook. Almost half of the participants do not control their setting of ad preference.

Table 1. Summary of key findings from the survey

Key Findings
Participation: Among 203 participants, 54.2% was between the age range of 18-24 years.
Type of users: The majority of the participants were students (52.2%) and the 2nd highest participants were job holders (33.5%).
Number of Facebook friends and groups: 40.9% participants have more than 500+ Facebook friends and 33.5% participants have 10-25 groups which reveal their connectivity on Facebook.
Facebook Usage: The participants are active Facebook users which revealed by the 27.6% of users use Facebook daily more than 4+ hours and only 8.4% users use Facebook less than an hour daily.
Facebook Post: 60.6% participants post or share less frequently which reveals that female users are not very comfortable or feel to share their thoughts or pictures with others frequently. Even if they share anything, 90.1% participants do not share their post in public. The reason behind this is due to privacy and security concern.
Facebook Privacy Setting: 91.9% respondents are familiar with the Facebook privacy setting feature.
Sharing Control: 89.2% users review their sharing control on who could see what you share
Control on finding you: 76.8% users review the setting on how people could find them on Facebook.
Control ad preference: 45.4% participants do not control the ad preferences.
Reading ToS and Privacy Policy: 57.6% users do not read the ToS and 31.5% users do not read PP at all.
Concerns on Privacy Policy: The users are either very concerns or somewhat concern regarding the PP. Again 64.5% users are confused whether Facebook does an adequate job on preserving its users data.
Password change: 12.8% participants never changed their Facebook password after creating the Facebook account.
Two-factor Password Authentications: 29.1% users do not know about the two-factor password authentication.
Advance Security: 42.9% participants have never set the extra security feature and 61.6% participants have never set the advance security feature on Facebook.
Harassment: 29.1% participants experienced harassment on Facebook and among them 71% are students and in the range of 18-24 years.
Hacked: 10.8% participants' Facebook accounts got hacked.
Facebook Security and Privacy perception: 67% participants feel safe and secure while using Facebook, however 33% participants are concerned about their data privacy on Facebook and they do not think that Facebook takes necessary steps to protect users data privacy on web.

5.2.3 Password Security

We found that the knowledge on password security was not generally high irrespective of the frequency of changing their passwords once in six months or once in a year. As a result, a tendency of overconfidence usually leads to people being reluctant towards using two-factors password or setting up extra or advance security setting. However, using these extra features of Facebook could improve security and reduce hacking of the accounts.

5.3 Recommendations

To protect the privacy over Facebook, there are a number of recommendations available in the literature as well as in the web [8, 9, 13]. Setting all the available privacy options, regularly check the exposure, making ‘unpublic’ of your wall, turn off the *Tag* suggestion, block the strangers, proper enforcement of the laws and social awareness are some common practices to minimize the privacy threats [8, 9, 13]. Female users also can activate two factor authentications to secure their accounts. General awareness regarding privacy and security is crucial.

Online guidelines [14, 15] are available to provide hands in practice on how to enable Facebook privacy settings.

6. CONCLUSIONS

This paper presents an online survey on female Facebook users of Bangladesh. A total of 203 users participated in the survey. In our study we found that female users are exercising a mixed behavior in terms of privacy and security-awareness. In one way, they feel secure and safe while using Facebook, on the other hand, they are concern regarding their security and privacy over Facebook. Measuring the privacy settings such as controlling the features that allow users to control of sharing data, finding users on the Facebook and the ad preferences may help female Facebook users protect their privacy. Moreover, enabling two-factor password and regular reviewing of extra and advance security settings of Facebook also can improve the security measures.

Overall apprehensions and open-ended responses regarding the Facebook security and privacy reveal that female users are concern about their data privacy. Now it is time for Facebook to ensure its users that it is indeed protecting users’ data privacy and security.

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