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Is There Any Difference between Bipolar and Non-bipolar Individuals in the Use of Facebook?

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Abstract

Objective: To access how individuals with and without bipolar disorder differ in the use of Facebook, using the Mood Disorder Questionnaire (MDQ) as a screening instrument for Bipolar Disorder (BD). The bipolar spectrum group will be analyzed in another paper.

Method: One questionnaire containing 54 questions about social and demographic variables, aspects of Facebook usage and the MDQ was applied. The sample consisted of 672 Facebook users. Participants were classified into three groups: 1 – individuals with BD (n=73); 2 –individuals without BD (n=402); 3 - bipolar spectrum (subjects whose scores were not enough to fulfill the complete criteria for BD) (n=197). Data analysis was performed using the chi-square test (χ^2) among the three groups. When this result was statistically significant, pairwise comparisons were performed using ANOVA (with Sheffé correction) tests. Bonferroni test was used to reduce type I error of multiple comparisons. This paper present differences between individuals with without BD.

Results: Individuals with BD presented higher percentage than individuals without BD in the following aspects related to the use of Facebook: a) the amount of friends (more than 1,000 friends: 1=20.5%; 2=10.0%); b) the number of people excluded (excluded more than 30 friends: 1=24.7%; 2=14.4%) or blocked from their contacts (blocked more than 30: 1=5.5%; 2=1.7%); c) increased privacy exposure online (excessive exposure on the internet: 1=6.8%; 2=3.2%); d) problems in private life (1=52.1%; 2=19.4%); e) influences of emotional status on online behavior (1=65.8%; 2=41.5%); f) use when worried/anxious (1=49.3%; 2=29,4%).

Conclusions: Individuals with BD are more sensitive, excluding and blocking more frequently and use the internet more often when they are more emotional.

Keywords: Bipolar disorder; Internet; Facebook; Behavior

Introduction

The internet is a fast and easy way to obtain information and to communicate with others anywhere in the world, and has become an important tool both in the professional and entertainment context as well [1]. In 2011, 2.7 billion people worldwide have access to wired broadband internet, with 5.9 billion connecting via mobile devices [2]. Developing countries have increased their share of the world total number of internet usage to 62% in 2011; in these countries, 30% of users are under the age of 25 [2].

In 2013, the Brazilian Government Data Institute released a survey on internet access in Brazil. At the time of the survey, there were 77.7 million Brazilian internet users above the age of 10, equivalent to 46.5% of the Brazilian population [3]. From 2005 to 2011, the population above 10 years grew by 9.7%, while the total number of internet users increased by 143.8%, a growth of 45.8 million individuals. Women and men above 10 years of age had similar internet use (46.1%, representing 40 million people and 46.9%, representing 37.7 million, respectively) [3].

In a survey with 2,075 Brazilians of varying ages, the internet was considered to be the most important media for 82% of respondents, more than 40% of them stating they spend at least 2 hours per day on the internet, the preferred activity of 62% [4]. Social networks and forums were the website categories that received more visits referred to from general search engines (32.8% of total) [5].

These numbers demonstrate the daily importance of social networking sites; among the most visited websites, there is Facebook. Facebook is a social networking site founded in 2004 in the USA. Currently, it generally houses about 1.23 billion users worldwide and is accessed by roughly 757 million people daily, an increase of 25% per year [6]. Latin America records 1.6 new Facebook registrations every minute [7]. The majority of users are young individuals who attend college [8].

In 2014, Brazil had over 60 million users on Facebook, making it the third-largest country represented on Facebook, only behind the USA and India. In Brazil, 79.1% of internet users are also connected to this social network, totaling 29.8% of the national population [9]. Demographically, the largest group of users (32%) is aged between 18 and 24, followed by those of 25-34 years of age (27.5%). About 47% of users are male and 53% female [9].

Social networking sites are now becoming increasingly important in social life regardless of age, influencing, but not limited to, self-esteem, behavior, and social adjustment [10,11], while also relating to a number of pathological mental conditions [12,14]. Some studies have

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reported concern about the negative overuse of the Internet and its possible association with psychiatric disorders [15-17].

Cyber behavior is far from being well understood; the role of social networks as a mental health assessment tool has on the whole not been largely studied either [18-22]. It is expected that emotions, mood and mental disorders influence interpersonal interaction on the internet [23,24]. A previous study demonstrates similarities between online and off-line social behavior [25]. While several studies have been done associating depression with the use of websites like Facebook [26,27], there is a sparse literature about the relationship between social networks and other mood disorders, such as Bipolar Disorder (BD), for example [28].

BD has been observed worldwide in 2.8% of adults [29,30]. It is a serious disorder characterized by recurrent depressive and manic or hypomanic episodes, which causes a huge impact on the quality of life. Still underdiagnosed and poorly recognized by general physicians [31] a large percentage of patients with BD remain unattended to. This reality is even more pronounced in countries such as Brazil [32] where costs are extremely high for both patients and society as a whole [33].

While it is a very common clinical condition, there are no studies of screening BD via a social network. This study is the first we know of that attempts to correlate possible BD behaviors expressed on Facebook.

The objective of this study is to compare the epidemiological profile and patterns of use of Facebook among individuals with possible diagnosis of BD and individuals without BD, screened by the Mood Disorder Questionnaire (MDQ).

Methods

Participants

In this study, the sample was comprised of 672 Brazilian subjects who use Facebook and agreed to the informed consent. Inclusion criteria were: a) to be 18 years of age or older; b) to be a user of the social network Facebook; c) to speak Portuguese. The responses of individuals under 18 (n = 32) were excluded from the statistical analyses. The study was approved by the Ethics Committee of University Hospital Walter Cantídio (Federal University of Ceará, Fortaleza, Brazil). There was no registration of email by which the questionnaire was answered. Therefore, the anonymity of users was fully assured. There was no financial compensation given to the participants.

Instrument

A questionnaire consisting of fifty-four objective questions divided into three parts was applied: 1) demographic data comprised of five questions covering the following aspects: age, gender, marital status, and profession/occupation; 2) 36 items relating to patterns of Facebook use (only the topics statistically significant according chi-square test were presented in this study): duration of Facebook usage, frequency of use, number of friends, quantities of and criteria for addition, blockage and deletion of friends, posting of photos and how it is influenced by mood, restriction of access to personal content, applications ("apps") usage, problems in the private life due to publications, frequency and expectation of "likes"/comments on posts, and means of access; 3) MDQ - a very useful tool developed to quickly track patients with BD. Studies show good accuracy of MDQ, with sensitivity of 70% and specificity of 90% for bipolar patients. The validated Brazilian paper version of MDQ was used [34] for the online questionnaire. Studies in various areas of health research have shown that traditional epidemiologic risk factors can be collected with equal or even better reliability in Web-based questionnaires compared with traditional approaches [35]. A Korean study used MDQ on a smartphone application to screen individuals with BD and showed similar results compared to traditional paper-based questionnaire [36].

Procedure

Data collection was conducted via an online questionnaire, in Portuguese; it was prepared by the free online survey tool Google Docs, and distributed among Facebook users. The sample analyzed in this study was not a random sample. The study included only individuals who actively accessed the link with to the questionnaire available online and who voluntarily answered it. From the responses to the MDQ, participants were classified into three groups: Group 1: "individuals likely to be bipolar" (MDQ≥7, with moderate or serious problems); Group 2: "individuals without BD" (MDQ<7, without moderate or serious problems); Group 3: "bipolar spectrum", comprised two subgroups: a) individuals not fulfilling the MDQ criteria of bipolar disorder (MDQ<7), but with moderate or severe problems due to mood changes (with moderate or serious problems) and b) individuals with MDQ ≥7, but without moderate or serious problems. The questionnaire was available to be answered on http://goo.gl/ITMKKu, during three months. Data analyses related to the group 3 will be presented elsewhere.

Statistical analysis

Data collected was analyzed using SPSS (Statistical Package for the Social Sciences) version 22.0. First, the chi-square test (χ^2) was applied among the three groups. Although all topics about the Facebook usage were analyzed, only those with statistically significant results according to chi-square test were presented in this study. Secondly, when this result was statistically significant, pairwise comparisons including the three groups were performed using ANOVA (with Sheffé's correction) tests. The Sheffe's values presented in this study refer to the comparison between groups 1 (individuals with BD) and 2 (individuals without BD). The Bonferroni test was performed to reduce the number of type I error due to multiple comparisons. The analyses regarding group 3 are going to be presented elsewhere. Statistical significance was $p<0.05$ bicaudade.

Results

Socio demographic data

Most of the participants was female, 18-30 years old, single, with a family monthly income of greater than 1,500 dollars, and graduate university student (Table 1). Gender and age have reached statistical significance, however, when a more stringent statistical method of multiple comparisons (Bonferroni test) was performed, these variables were no more significant. The group 1 (individuals with BD) is predominantly composed by people between 18 to 21 years old (49.3%, while 36.3% of non-bipolar are composed for the same age - χ^2=14.3; p=0.026) and women (71.2% versus 66.2% of non-bipolar - χ^2=8.1; p=0.017). No significant results were found related to marital status, occupation, family income and education level.

Relationship between mood and use of Facebook by individuals with bipolar disorder

The following results are presented in Table 2. The variables mentioned below remain statistically significant even after the Bonferroni test was performed. When asked about the desire to access the Facebook due to the mood, the percentages of affirmative answers among subjects with bipolar disorder were higher than individuals

	Group 1 (n=73)		Group 2 (n=402)		Group 3 (n=197)		Test; Significance
	n	(%)	n	(%)	n	(%)	
Gender							
Male	21	(28.8)	136	(33.8)	87	(44.2)	χ^2=8.1; **p=0.017** Bonferroni: 1.000
Female	52	(71.2)	266	(66.2)	110	(55.8)	
Age							
18 to 21 years old	36	(49.3)	146	(36.3)	100	(50.8)	
22 to 30 years old	29	(39.7)	201	(50.0)	79	(40.1)	χ^2=14.3; **p=0.026** Bonferroni: 0.363
31 to 50 years old	5	(6.8)	43	(10.7)	14	(7.1)	
More than 51 years old	3	(4.1)	12	(3.0)	4	(2.0)	
Marital status							
Single	33	(45.2)	189	(47.0)	103	(52.3)	χ^2=6.6; p=0.578 Bonferroni: 1.000
Dating/in a serious relationship	32	(43.8)	152	(37.8)	71	(36.0)	
Married/Steady partner	5	(6.8)	51	(12.7)	17	(8.6)	
Separated/Divorced	3	(4.1)	9	(2.2)	6	(3.0)	
Widow(er)	0	(0)	1	(0.2)	0	(0)	
Occupation							
Student	50	(68.5)	282	(70.1)	151	(76.6)	χ^2=7.1; p=0.310 Bonferroni: 1.000
Professional	22	(30.1)	115	(28.6)	42	(21.3)	
Unemployed	1	(1.4)	3	(0.7)	4	(2.0)	
Retired	0	(0)	2	(0.5)	0	(0)	
Family income (in minimum wages)							
0 to 5	30	(41.1)	128	(31.8)	77	(39.1)	χ^2=7.6; p=0.467 Bonferroni: 0.086
5 to 10	24	(32.9)	113	(28.1)	50	(25.4)	
10 to 15	10	(13.7)	81	(20.1)	35	(17.8)	
15 to 25	6	(8.2)	47	(11.7)	20	(10.2)	
More than 25	3	(4.1)	33	(8.2)	15	(7.6)	
Educational level							
Elementary school	0	(0)	0	(0)	0	(0)	χ^2=13.3; p=0.102 Bonferroni: 0.221
High school	7	(9.6)	19	(4.7)	15	(7.6)	
Incomplete Higher School	49	(67.1)	263	(65.4)	143	(72.6)	
Complete Higher School	9	(12.3)	55	(13.7)	20	(10.2)	
Post-graduate	8	(11.0)	65	(16.2)	19	(9.6)	

Minimum wage in Brazil (2013) = $ 169,50
The Bonferroni test was used to reduce type I error due to multiple comparisons.

Table 1: Socio demographic features according to MDQ: group 1 (individuals with bipolar disorder) and group 2 (individuals without bipolar disorder) and group 3 (individuals with bipolar spectrum).

without BD (65.8% versus 41.5% - χ^2=27.2; p=0.000). Individuals with BD feel that Facebook aggravates their sadness in a higher proportion than those without BD (15.1% *versus* 5.0%, respectively) (χ^2=35.6; p=0.000). Facebook is more accessed by individuals with BD than among subjects without BD as a form of distraction (39.7% versus 27.4%, χ^2=35.6, p=0.000) and in times of worry / anxiety (49.3% versus 29.4%, χ^2=27.4; p=0.000). In relation to happiness, it was shown that individuals with BD seek to demonstrate their joy in social networking in a percentage twice as high as individuals without BD (6.8% *versus* 3.2%, respectively) (χ^2=25.1; p=0.001).

The percentage of individuals with BD who have already been alerted "often / always" about overexposure on Facebook (6.8%) is almost twice as high than that found among individuals without the disorder (3.2%) (χ^2=19.1; p=0.014). When compared only the groups composed by individuals with and without BD, a statistically significant was found: those with BD seems more vulnerable to affect their mood due to more prolonged use of Facebook than individuals without the disorder (47.9% versus 30.1%, χ^2=10.7; p=0.005).

The following aspect of Facebook usage have reached statistical significance, however, when a more stringent statistical method of multiple comparisons (Bonferroni test) was performed, these variables were no more significant. The influence of mood in changing of the profile picture was about 2.6 times more frequent among individuals with BD (13.7%) than those without the disorder (5.2%) (χ^2=9.5; p=0.008).

The use of Facebook by bipolar individuals

Table 3 shows the comparison of the pattern of use of Facebook between individuals with and without BD. The variables mentioned below remain statistically significant even after the Bonferroni test was performed. The following differences were observed: It was found that subjects with BD are twice more likely to have more than 1,000 friends than those without BD (20.5% compared to 10.0% of non-bipolar; χ^2=26.5; p=0.001). The percentage of individuals with BD with less than 300 friends (12.3%), in turn, is half of that of individuals without BD (23.1% - χ^2=26.5; p=0.001). The percentage of individuals with BD that excluded more than 30 friends on Facebook (24.7%) is about two-thirds higher than those reported by individuals without BD (14.4%) (χ^2=21.4; p=0.002); the percentage of subjects with bipolar disorder that blocked more than 30 friends (5.5%) is more than triple that shown by those without BD (1.7%) (χ^2=30.2; p=0.000). Only 5.5% of subjects with BD have never deleted friends on Facebook, while the percentage of individuals without BD (20.6%) is nearly 4 times greater (χ^2=21.4,

	Group 1 (n=73)		Group 2 (n=402)		Group 3 (n=197)		Test; Significance
	n	%	n	(%)	n	%	
"Do you change your profile picture according to your mood?"							
"No."	63	(86.3)	381	(94.8)	176	(89.3)	χ^2=9.5; p=0.008 **Bonferroni: 0.037**
"Yes."	10	(13.7)	21	(5.2)	21	(10.7)	
"How often people close to you comment that you are exposing yourself too much on Facebook?" *							
"Never"	43	(58.9)	310	(77.1)	135	(68.5)	χ^2=19.1; p=0.014
"Rarely"	14	(19.2)	51	(12.7)	33	(16.8)	
"Sometimes"	11	(15.1)	28	(7.0)	15	(7.6)	Sheffé = - 0.361 **p= 0.012**
"Often"	3	(4.1)	12	(3.0)	11	(5.6)	**Bonferroni: 0.003**
"Always"	2	(2.7)	1	(0.2)	3	(1.5)	
"Do you associate changes in your behavior to those periods *(when you use Internet for longer)?"* *							χ^2=10.7; p=0.005
"No."	38	(52.1)	281	(69.9)	121	(61.4)	Sheffé = - 0.179 **p= 0.032**
"Yes."	35	(47.9)	121	(30.1)	76	(38.6)	**Bonferroni: 0.009**
"Does your mood influence your desire to access Facebook?" *							χ^2=27.2; p=0.000
"No."	25	(34.2)	235	(58.5)	78	(39.6)	Sheffé = - 0.243 **p= 0.002**
"Yes."	48	(65.8)	167	(41.5)	119	(60.4)	**Bonferroni: 0.000**
"Do you want to access Facebook when you are sad?" *							
"It is indifferent. Sadness does not interfere with my desire to access Facebook."	29	(39.7)	252	(62.7)	94	(47.7)	χ^2=35.6 p=0.000
"No, Facebook makes me sadder."	11	(15.1)	20	(5.0)	28	(14.2)	Sheffé = - 0.433 **p= 0.003**
"Yes, I access Facebook to distract me."	29	(39.7)	110	(27.4)	54	(27.4)	**Bonferroni: 0.001**
"Yes, I access Facebook to chat."	4	(5.5)	20	(5.0)	21	(10.7)	
"Do you want to access Facebook when you are worried/anxious?" *							
"It does not interfere with my desire to access Facebook."	20	(27.4)	224	(55.7)	84	(42.6)	χ^2=27.4; p=0.000
"No."	11	(15.1)	39	(9.7)	33	(16.8)	Sheffé = - 0.540 **p= 0.001**
"Yes, to distract me."	36	(49.3)	118	(29.4)	65	(33.0)	**Bonferroni: 0.000**
"Yes, to chat."	6	(8.2)	21	(5.2)	15	(7.6)	
"Do you want to access Facebook when you are happy?" *							
"There is no relation between my mood and my desire to access Facebook."	20	(27.4)	217	(54.1)	79	(40.3)	χ^2=25.1; p=0.001
"No, I'd rather do another activity."	16	(21.9)	53	(13.2)	34	(17.3)	
"I access Facebook to show my happiness."	5	(6.8)	13	(3.2)	11	(5.6)	Sheffé = - 0.719 **p= 0.004**
"I access Facebook to interact with friends."	17	(23.3)	69	(17.2)	46	(23.5)	**Bonferroni: 0.001**
"Yes, but there is no specific reason for my desire."	15	(20.5)	49	(12.2)	26	(13.3)	

* when significant differences were observed comparing the three groups by the Chi-square, a secondary analysis was performed using the Sheffé test. The table shows these statistically differences between groups 1 (individuals with bipolar disorder) and 2 (individuals without bipolar disorder) were compared. Data analyses related to the group 3 will be presented elsewhere. The Bonferroni test was used to reduce type I error due to multiple comparisons.

Table 2: Relationship between mood and use of Facebook according to MDQ: group 1 (individuals with bipolar disorder), group 2 (individuals without bipolar disorder) and group 3 (individuals with bipolar spectrum).

	Group 1 (n=73)		Group 2 (n=402)		Group 3 (n=197)		Test; Significance
	n	**%**	**n**	**(%)**	**n**	**%**	
"How many friends do you have on Facebook?" *							
"Less than 300."	9	(12.3)	93	(23.1)	29	(14.7)	χ^2=26.5 **p=0.001**
"301 to 500."	16	(21.9)	134	(33.3)	54	(27.4)	
"501 to 700."	17	(23.3)	80	(19.9)	38	(19.3)	Sheffé = - 0.384 **p= 0.018**
"701 to 1000."	16	(21.9)	55	(13.7)	48	(24.4)	Bonferroni: 0.000
"More than 1000."	15	(20.5)	40	(10.0)	28	(14.2)	
"How many people have you excluded from your list of friends on Facebook?" *							
"Zero."	4	(5.5)	83	(20.6)	23	(11.7)	χ^2=21.4 **p=0.002**
"1 to 5."	23	(31.5)	150	(37.3)	68	(34.5)	Sheffé = - 0.467 **p= 0.002**
"6 to 30."	28	(38.4)	111	(27.6)	67	(34.0)	**Bonferroni: 0.000**
"More than 30."	18	(24.7)	58	(14.4)	39	(19.8)	
"How many people have you blocked from your list of friends on Facebook?" *							
"Zero."	18	(24.7)	200	(49.8)	67	(34.0)	χ^2=30.2 **p=0.000**
"1 to 5."	37	(50.7)	164	(40.8)	97	(49.2)	Sheffé = - 0.442 **p= 0.000**
"6 to 30."	14	(19.2)	31	(7.7)	27	(13.7)	Bonferroni: 0.000
"More than 30."	4	(5.5)	7	(1.7)	6	(3.0)	

"Why did you block?" *							
"I never blocked."	18	(24.7)	202	(50.2)	65	(33.0)	χ^2=31.9 **p=0.000** Sheffé = - 0.580 **p= 0.001** **Bonferroni: 0.000**
"Due to undesirable content (spam, uninteresting content)."	32	(43.8)	128	(31.8)	82	(41.6)	
"Due to romantic issues."	6	(8.2)	24	(6.0)	21	(10.7)	
"Due to relationship issues, but not romantic."	9	(12.3)	33	(8.2)	19	(9.6)	
"Due to family issues."	8	(11.0)	15	(3.7)	10	(5.1)	
"Have you ever had problems caused by something you published on Facebook about your private life?" *							
"I have never had problems."	35	(47.9)	324	(80.6)	132	(67.0)	χ^2=46.6 **p=0.000** Sheffé = - 0.807 **p= 0.000** **Bonferroni: 0.000**
"Problems related to romantic relationship."	17	(23.3)	39	(9.7)	29	(14.7)	
"Problems related to non-romantic relationship."	7	(9.6)	19	(4.7)	14	(7.1)	
"Work-related problems."	0	(0)	2	(0.5)	4	(2.0)	
"Other problem."	14	(19.2)	18	(4.5)	18	(9.1)	
"How do you feel when people do not 'like' your posts on Facebook?"							
"Indifferent."	30	(41.1)	203	(50.5)	85	(43.1)	χ^2=18.6 **p=0.017** Bonferroni: 0.979
"Sad."	1	(1.4)	4	(1.0)	8	(4.1)	
"I think my post was uninteresting."	38	(52.1)	164	(40.8)	80	(40.6)	
"Disappointed/disgruntled."	3	(4.1)	20	(5.0)	10	(5.1)	
"Alone/ignored."	1	(1.4)	11	(2.7)	14	(7.1)	
"How often do you buy products advertised on Facebook?"							
"Never."	54	(74.0)	345	(85.8)	159	(80.7)	χ^2=13.1 **p=0.041** Bonferroni: 0.336
"Rarely."	18	(24.7)	47	(11.7)	30	(15.2)	
"Sometimes."	1	(1.4)	8	(2.0)	4	(2.0)	
"Often."	0	(0)	2	(0.5)	4	(2.0)	
"Do you add as friends on Facebook people unknown to you?"							
"No."	55	(75.3)	337	(83.8)	139	(70.6)	χ^2=14.7 **p=0.001** Bonferroni: 0.296
"Yes."	18	(24.7)	65	(16.2)	58	(29.4)	
"Do you accept friend requests from people you do not know?"							
"No."	52	(71.2)	320	(79.6)	133	(67.5)	χ^2=11.0 **p=0.004** Bonferroni: 0.378
"Yes."	21	(28.8)	82	(20.4)	64	(32.5)	
"Do you restrict the access of others to information/content that you post on Facebook?"							
"No."	10	(13.7)	77	(19.2)	43	(21.8)	χ^2=18.2 **p=0.019** Bonferroni: 0.648
"I restrict due to privacy."	43	(58.9)	204	(50.7)	111	(56.3)	
"I restrict due to security."	10	(13.7)	89	(22.1)	31	(15.7)	
"I restrict due to fear of being misunderstood."	3	(4.1)	19	(4.7)	2	(1.0)	
"I restrict due to other reasons."	7	(9.6)	13	(3.2)	10	(5.1)	
"What kind of apps do you use?" *							
"I do not use apps."	42	(57.5)	257	(63.9	110	(55.8)	χ^2=19.4 **p=0.013** Sheffé = - 0.243 **p= 0.002** Bonferroni: 0.065
"I mainly use Games."	15	(20.5)	96	(23.9	46	(23.4)	
"I mainly use Quiz."	0	(0)	8	(2.0	2	(1.0)	
"I mainly use Sales."	10	(13.7)	32	(8.0	23	(11.7)	
"I mainly use Phrases."	6	(8.2)	9	(2.2	16	(8.1)	
"How often do you use 'check-in'?"							
"I do not use Check-in."	48	(65.8)	299	(74.4)	116	(58.9)	χ^2=21.8 **p=0.005** Bonferroni: 0.202
"Every 3 months."	8	(11.0)	47	(11.7)	29	(14.7)	
"Every month."	8	(11.0)	29	(7.2)	32	(16.2)	
"Every week."	8	(11.0)	22	(5.5)	14	(7.1)	
"Every day."	1	(1.4)	5	(1.2)	6	(3.0)	

* when significant differences were observed comparing the three groups by the Chi-square, a secondary analysis was performed using the Sheffé test. The table shows these statistically differences between groups 1 (individuals with bipolar disorder) and 2 (individuals without bipolar disorder) were compared. Data analyses related to the group 3 will be presented elsewhere. The Bonferroni test was used to reduce type I error due to multiple comparisons.

Table 3: Use of Facebook according to MDQ: group 1 (individuals with bipolar disorder), group 2 (individuals without bipolar disorder) and group 3 (individuals with bipolar spectrum).

p=0.002). The blockage patterns exhibited by individuals with BD was observed almost 3 times higher than individuals without BD (11% and 3.7%, respectively) as a result of undesirable content (spam) (χ^2=31.9; p=0.000). Regarding the occurrence of problems in the personal life caused by publications on Facebook, individuals with BD answered affirmatively at a rate almost 3 times higher than those without BD (52.1% and 19.4%, respectively) (χ^2=52.6; p=0,000).

The following aspects of Facebook usage have reached statistical significance, however, when a more stringent statistical method of multiple comparisons (Bonferroni test) was performed, these variables were no more significant. Individuals with BD have a greater tendency to add friends (24.7% *versus* 16.2% - χ^2=14.7; p=0.001) as well as to accept an invitation to be friends from people unknown to them (28.8% *versus* 20.4% - χ^2=11.0; p=0.004). Subjects with BD restrict the access to what

they post on Facebook in a higher proportion than individuals without the disorder (86.3% and 80.8%, respectively) (χ^2=18.2; p=0.019), most of them due to reasons such as privacy, security or misunderstood fear (9.6% versus 3.2% - χ^2=18.2; p=0.019). The use of apps was more frequent among those with bipolar disorder (42.5%) than individuals without BD (36.1%) (χ^2=19.4; p=0.013). Approximately one third of subjects with BD bought some product advertised on Facebook, percentage 84% greater than among individuals without BD (26% and 14.2%, respectively) (χ^2=13.1; p=0.041).

Discussion

The main finding of the current study was: individuals who are most likely to have BD (screened by MDQ) have Facebook usage heavily influenced by their mood. They tend to seek this social network when they are sad, worried/anxious and happy, primarily as a form of distraction in these emotional moments. These findings are supported by several other studies that demonstrate the influence of mood on how individuals use many forms of media, suggesting, for example, a relationship between depression and excessive text messaging, e-mailing, and chattering [11,35-38].

The results showed that bipolar individuals have a larger number of friends on Facebook, displaying a percentage twice as high than that of individuals without BD. This finding is confirmed by a study that correlated more friends on Facebook with more clinical symptoms of mania [39]. It was also shown that more friends on Facebook diminished signs of depression and dysthymia, suggesting that there is some value in a social network use when one is feeling down [39]. This fact was also observed in this current study, where individuals with BD expressed their willingness to access Facebook when they felt sad, worried or anxious.

However, while these individuals have more friends on Facebook, they also exclude and block more often than individuals without BD. This behavior could be explained by the clinical course of BD, in which patients fluctuate between periods of mania and depression. When depressed, they tend to have greater irritability and/or loss of interest in things that previously were pleasurable. When in periods of mania, they also demonstrate high impulsivity. Thus, in both periods they may become more sensitive to what is external to them and have a low threshold of tolerance for frustration, taking extreme measures like excluding people who dislike them in some way from their friends list.

It was also seen that these individuals are cautioned more often about overexposure via social networking. This could be explained by the difficulty for these individuals to effectively select what should or should not be disclosed, also drawing on the idea that everything that pertains to their life is important for people with whom they relate to in some way, and therefore must be shared. This relationship between media and mental health has been likened to cause "iDisorders," and Facebook usage to predict these psychiatric disorders [39,40].

This study has some limitations. First, it cannot be ensured through the anonymous online questionnaire that the questions were answered as truthfully as possible, or that each individual answered the questionnaire only once. Although, two totally identical answers were noted and each was excluded, reducing the "n" from 674 to 672. Second, the instrument used to screen cases of bipolar disorder (MDQ) does not allow the diagnosis of the disorder, so all comparisons in this study were made between individuals most likely to be bipolar and non-bipolar individuals. Finally, the sample analyzed in this study was not a random sample. The study included only individuals who actively accessed the link with to the questionnaire available online and who voluntarily answered it. Thus, a possibility of selection bias should be considered and the findings cannot be generalized to all Brazilian Facebook users.

The findings of this study show how a web-based questionnaire could be used as a method of data collection for epidemiologic research and as a screening tool for BD among internet users. The patterns of cyber behavior found in this study could be used to develop in the future a new instrument to early identify individuals likely to have BD, as for example web surveys that give a result to the participant and suggest the individual to search for a health professional help.

In summary, bipolar individuals demonstrate a strong influence of their mood on how they behave on Facebook. This influence was found in activities such as posting of messages and photos, prolonged access of the internet, publication of the private life, having more friends, and higher volatility of friendship online, compared with non-bipolar persons. Therefore, bipolar disorder expressed via Facebook may correlate with clinical symptoms, seen in the clinical setting.

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