



# Association between cyberchondria and the use of complementary and alternative medicine (CAM) – a cross-sectional study

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## Abstract

**Introduction and Objective.** Cyberchondria has been described relatively recently as a behaviour characterized by excessive Internet searching for medical information related to increasing levels of health anxiety. Complementary and alternative medicine (CAM) refers to a broad set of health care practices that are not part of a country's traditional or conventional medicine, and are not fully integrated into the dominant health care system. The aim of this study is to evaluate the relationship between cyberchondria and the use of complementary and alternative medicine.

**Materials and method.** A cross-sectional study was conducted from 25 April – 25 December 2022. A computer-assisted web interviewing (CAWI) survey technique was used. The study population consisted of 626 respondents who took part in the study.

**Results.** The severity of cyberchondria is associated with 'a greater number of CAM products used' ( $\beta = 0.101$ ;  $p = 0.043$ ), 'a greater number of self-help techniques used' ( $\beta = 0.210$ ;  $p < 0.001$ ), searching for knowledge about CAM on the Internet ( $\beta = 0.199$ ;  $p < 0.001$ ), using sources other than books ( $\beta = -0.114$ ;  $p = 0.025$ ), younger age ( $\beta = -0.170$ ;  $p < 0.001$ ) and worse education ( $\beta = -0.101$ ;  $p = 0.033$ ).

**Conclusions.** The research results indicate that there is a link between cyberchondria and the use of CAM. However, since some components of the CSS-PL scale and self-rated health were not associated with more frequent use of CAM, it is likely that these results may not be fully reliable. The association between cyberchondria and CAM use should be investigated in further studies using comprehensive medical interviews.

## Key words

complementary and alternative medicine, cross-sectional study, cyberchondria

## INTRODUCTION

The Internet, where communication takes place via giant digital social media platforms where exchanges of information take place at high transmission speeds, and has become the primary global source of health information [1]. Cyberchondria has been described relatively recently as a behaviour characterized by excessive searching of the Internet for medical information related to increasing levels of health anxiety [2, 3]. Cyberchondria is a relatively new phenomenon, and there is still debate as to whether it represents a new and independent form of mental disorder or a modern manifestation of hypochondria.

Excessive searching for health information on the Internet may itself constitute a safety-seeking behaviour (e.g., checking whether symptoms are a sign of a given disease) and, as a result of potentially disturbing information, may trigger or reinforce these behaviours and exacerbate feelings of severe anxiety (e.g., further/excessive Internet use) [2, 4]

Complementary and alternative medicine (CAM) is a wide range of products and practices that are not part of a

country's traditional or conventional medicine, and are not fully integrated into the dominant health care system [5].

Research by Jędrzejewska et al. [6] showed that during the COVID-19 pandemic, each study participant used at least one CAM method. The blocking measures resulting from the SARS-COV-2 may have caused patients to use CAM methods more frequently instead of formal health care facilities [5, 6].

Previous research on cyberchondria mainly focused on assessing the increase in the number of people showing symptoms of cyberchondria during the COVID-19 pandemic [7–9], or assessing the relationship between cyberchondria and Internet and/or smartphone addiction [10–12]. However, it has not yet been investigated how severe symptoms of cyberchondria affect CAM.

To assess the use of CAM, the International Questionnaire for Measuring the Use of Complementary and Alternative Medicine (I-CAM-Q) [13] is recommended. Although the I-CAM-Q provides a comprehensive and well-conceived set of items and measures a wide range of products and practices, it has its limitations. It is essentially descriptive in nature and was not designed with the intention of providing a single dimensional (or multidimensional) quantitative indicator of CAM use. For this reason, the I-CAM-Q form cannot be used to measure overall CAM use. To address the above issues, Bryden et al. [14] developed the R-I-CAM-Q questionnaire

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as a tool for a quantitative and summative measure of overall CAM use. This research tool is recommended for examining why some people use CAM more than others, without having to delve into the complex specifics of each individual practice.

This study aimed, therefore, to assess the relationship between cyberchondria and CAM use.

## MATERIALS AND METHOD

**Study design and participants.** Completing online questionnaires is an established method in the health care research field [15]. A cross-sectional research was conducted from 25 April – 25 December 2022, at the time when the state of epidemic ended in Poland. It was decided to use the computer-assisted web interviewing (CAWI) technique, which enabled the distribution of surveys in a simple and direct way. An online survey available on Facebook was conducted in 13 thematically diverse groups.

A new account was created on the Facebook platform. After deleting cookies from the web browser (Google Chrome), all browsing history on the Facebook browser related to the most common diseases and terms related to complementary and alternative medicine were input. After searching for each term, the first five groups found in the Facebook browser were joined and a post was placed asking people to complete the survey.

The survey was placed on the Google Forms platform and was shared four times during the study. Additionally, posts with the survey were not deleted and were made available throughout the study period. The study was nationwide, anonymous, and anyone interested could take part. Respondents could fill in the survey only once.

**Study Questionnaires.** R-I-CAM-Q was applied to assess CAM use [14]. This is an amended version of I-CAM-Q [9] in terms of: (1) less time needed to complete, (2) method formatted in a way that favours qualitative analysis, (3) elimination to reduce redundancy and qualitative elements, and (4) preservation of the original thematic scope used specific CAM.

To modify the Polish version of the I-CAM-PL questionnaire [16] into R-I-CAM-PL, the method described by the authors of the R-I-CAM-Q questionnaire was used [14]. After obtaining the consent of Gabrielle M. Bryden (bryden@cqumail.com, email; April 23, 2022), the process was started of modifying the I-CAM-PL questionnaire.

The I-CAM-PL questionnaire consists of four sections: (1) visiting health care providers, (2) complementary treatments received from physicians, (3) use of herbs and dietary supplements, and (4) self-help practices. Similarly to R-I-CAM-Q, section (2) complementary treatment received from physicians, was omitted due to a similar set of items in part (1).

The resulting set of items included a modified version of the I-CAM-PL, organized as follows: (a) CAM providers – physician, chiropractor, herbalist/phytotherapist, homeopath, acupuncturist, spiritual healer, *Znachor/Szeptucha*, other (please specify); (b) CAM products – herbs/plant products, vitamins/minerals, homeopathic medicines, other (please specify); (c) self-help practices – meditation, prayer for one's health, yoga, qigong, Tai Chi, relaxation techniques, visualization, participation in a traditional healing ceremony.

The modified R-I-CAM-PL questionnaire contains three ordered response categories: No (0); Yes (not in the last 12 months) (1); and Yes (in the last 12 months) (2).

**Polish version of the Cyberchondria Severity Scale.** This was employed to determine the Cyberchondria Severity Scale CSS-PL [17]. *The Polish adaptation of the CSS-PL scale* is a 33-point scale enabling a comprehensive assessment of cyberchondria, based on the work of McElroy et al. [18]. The items are arranged in five subscales: Compulsion, Distress, Excessiveness, Reassurance and Distrust of Mistrust of Medical Professionals. The answers are arranged on a 5-point Likert scale. The sum of the scores in the subscales determines the overall cyberchondria index, and the higher the score, the more intensely the symptoms are felt. The study excluded the Distrust towards medical staff subfactor from the CSS general result and considered it a separate construct, albeit related to cyberchondria. Cronbach's alpha for the Polish adaptation was consistent with the original version [14, 18] and ranged from 0.75 – 0.95 [17]. In this study, the Cronbach's Alpha index for the entire scale was 0.926 (in individual subscales, Compulsion = 0.893, Distress = 0.937, Excessiveness = 0.825, Reassurance = 0.786).

The results were divided into the following categories: results  $\leq 25$  – percentile considered low, from  $>25$  –  $<75$  – percentile considered moderate, and  $\geq 75$  – percentile for high severity of cyberchondria.

**Ethical Considerations.** The study was approved by the Bioethical Commission of the Medical University in Lublin (Approval No. KE-0254/29/2022). Participation in the study was voluntary and anonymous. All study participants gave informed consent to participate in the survey electronically. The informed consent page explained the purpose and method of the study. There were two options: choosing whether to participate in the study by selecting 'Yes' or withdrawing from the study by selecting the 'No' option. After completion, each questionnaire was submitted to the survey platform and the final database downloaded.

**Statistical Analysis.** Continuous variables were expressed as mean and standard deviation (SD) or median (minimum and maximum values and percentiles) as appropriate. The Shapiro-Wilk test was applied to assess conformity with a normal distribution. To examine the relationship between socio-demographic variables and cyberchondria, two groups were compared using the Mann-Whitney U test, and to compare more than two independent groups, the Kruskal-Wallis Ranks H test was used. If differences were found, a *post-hoc* test Bonferroni correction for multiple tests was used. Relationships between cyberchondria and CAM methods were examined by Pearson correlation and hierarchical linear regression. The value  $p < 0.05$  was considered statistically significant. All statistical analyses were performed using IBM Corp. (released in 2019) and IBM SPSS Statistics for Windows, Version 26.0. (IBM Corp, Armonk, NY, USA).

## RESULTS

**Characteristics of the Study Group.** Table 1 presents the characteristics of the studied group. Of the 626 respondents,

city dwellers accounted for 79.9% of all respondents. The respondents were aged 18–72 years, with an average age of  $37.9 \pm 12.40$ . The majority of respondents were women (88.0%). The most common sources of knowledge about CAM were websites (63.4%), social networking sites (44.1%) and friends (40.1%).

**Table 1.** Characteristics of the researched group (n= 626)

Variables	n (%)
<b>Gender:</b>	
Female	551 (88.0)
Male	72 (11.5)
Non-binary	3 (0.5)
<b>Education:</b>	
Elementary	8 (1.3)
Vocational	17 (2.7)
Secondary	169 (27.0)
Higher	432 (69.0)
<b>Employment status:</b>	
Employed	485 (77.5)
Unemployed	141 (22.5)
<b>Financial situation:</b>	
Very good	57 (9.1)
Rather good	287 (45.8)
Average	244 (39.0)
Rather bad	30 (4.8)
Bad	8 (1.3)
<b>Place of residence:</b>	
City over 250,000 inhabitants	237 (37.9)
City from 100 – 250 thousand inhabitants	81 (12.9)
City up to 100 thousand inhabitants	182 (29.1)
Village	126 (20.1)
<b>Marital status:</b>	
In relationship	483 (77.2)
Single	143 (22.8)
<b>Time since the diagnosis:</b>	
0–1 year	67 (10.7)
2–3 years	77 (12.3)
4–5 years	65 (10.4)
More than 5 years	242 (38.7)
Not relevant, no disease	175 (28.0)
<b>Sources of knowledge about CAM</b>	
Physician	147 (23.5)
Nurse	43 (6.9)
Websites	397 (63.4)
Social networking sites (e.g., Facebook, YouTube, Instagram)	276 (44.1)
Friends	251 (40.1)
Media (TV, newspaper, radio)	120 (19.2)
Books	240 (38.3)
Scientific journals	189 (30.2)
Other patients	71 (11.3)
Not looking for such information	35 (5.6)
Other	5.3)

**Use of CAM among respondents.** Among non-medical CAM practitioners, respondents in the last 12 months most often used the services of a herbalist/phytotherapist (11.3%) and an acupuncturist (Tab. 2). Regarding the most frequently used products, respondents most often chose vitamins (71.7%) and herbs (55.4%). The most frequently used self-help practices in the last 12 months included relaxation techniques (31.6%), prayer (24.6%) and meditation (23.0%).

**Table 2.** Use of CAM methods in the study group

Indicators	NO	Yes (not in the last 12 months)	Yes (in the last 12 months)
	N (%)	N (%)	N (%)
<b>Scope of practice</b>			
<b>CAM service providers</b>			
Physician	28 (4.5)	168 (26.8)	430 (68.7)
Chiropractor	584 (93.3)	26 (4.2)	16 (2.6)
Herbalist/phytotherapist	488 (78.0)	67 (10.7)	71 (11.3)
Homeopath	576 (92.0)	33 (5.3)	17 (2.7)
Acupuncturist	560 (89.5)	50 (8.0)	16 (2.6)
Spiritual healer	581 (92.8)	26 (4.2)	19 (3.0)
<b>Znachor/Szeptucha</b>	598 (95.5)	21 (3.4)	7 (1.1)
Osteopath	609 (97.3)	7 (1.1)	10 (1.6)
Other	592 (94.6)	20 (3.2)	14 (2.2)
<b>Using CAM products</b>			
Herbs	136 (21.7)	143 (22.8)	347 (55.4)
Vitamins	49 (7.8)	128 (20.4)	449 (71.7)
Homeopathic medicines	500 (79.9)	78 (12.5)	48 (7.7)
Other	584 (93.3)	21 (3.4)	21 (3.4)
<b>Self-help practices</b>			
Meditation	436 (69.6)	46 (7.3)	144 (23.0)
Prayer	413 (66.0)	58 (9.2)	155 (24.8)
Yoga	448 (71.6)	56 (8.9)	122 (19.5)
Qigong	608 (97.1)	6 (1.0)	12 (1.9)
Tai chi	602 (96.2)	12 (1.9)	12 (1.9)
Relaxation techniques	353 (54.4)	75 (12.0)	198 (31.6)
Visualization	476 (76.0)	30 (4.8)	120 (19.2)
Traditional ceremony	607 (97.0)	10 (1.6)	9 (1.4)

**Relationship between socio-demographic variables and cyberchondria to the CSS-PL scale.** Males and females differed in their overall cyberchondria score. Statistical analysis showed that females had a higher level of cyberchondria (Tab. 3). The relationship status differentiates the respondents in terms of two factors of cyberchondria – compulsion and distress. People in a relationship showed higher scores compared to single people.

Statistical analysis showed that education differentiates the respondents in terms of two factors of cyberchondria, i.e. compulsion and distress (Tab. 4). Differences were also shown in the overall cyberchondria score. It was also shown that the time since the diagnosis of the disease differentiated respondents in terms of the stress, distrust component, and the overall cyberchondria score. Tests showed that people who have been diagnosed for up to five years have a higher level of stress and a higher overall rate of cyberchondria compared to people declaring more than five years since diagnosis. People

**Table 3.** Relationship between gender and relationship status on the severity of cyberchondria to the CSS-PL scale

	Gender	Females			Males			Statistics	
		M	Me	SD	M	Me	SD	Z	P-value
CSS-PL	Compulsion	13,70	12,00	6,17	12,83	10,00	6,08	-1,751	0,080
	Distress	15,60	13,00	7,61	14,78	12,00	7,42	-1,249	0,212
	Excessiveness	23,89	24,00	6,67	22,81	23,00	6,96	-1,137	0,256
	Reassurance	14,04	14,00	5,34	12,97	12,00	5,71	-1,753	0,080
	Cyberchondria (overall score)	67,23	65,00	20,58	63,39	57,50	22,57	<b>-2,099</b>	<b>0,036</b>
	Mistrust of Medical Professionals	6,08	6,00	2,98	6,31	6,00	3,20	-0,429	0,668
CSS-PL	Marital status	In relationship			Single			Statistics	
	Compulsion	13,86	12,00	6,27	12,70	11,00	5,70	<b>-2,143</b>	<b>0,032</b>
	Distress	15,86	14,00	7,72	14,31	12,00	6,97	<b>-2,375</b>	<b>0,018</b>
	Excessiveness	23,99	24,00	6,83	22,97	23,00	6,25	-1,560	0,119
	Reassurance	14,10	14,00	5,46	13,36	13,00	5,14	-1,453	0,146
	Cyberchondria (overall score)	67,80	65,00	21,40	63,34	61,00	18,46	-2,107	0,035
	Mistrust of Medical Professionals	6,10	6,00	2,99	6,14	6,00	3,04	-0,100	0,921

M – Mean; Me – Median; SD – Standard Deviation; Z – Mann-Whitney U test

**Table 4.** Relationship between education and time since diagnosis on the severity of cyberchondria according to the CSS-PL scale

	EDUCATION	Primary/vocational			Secondary			Higher			Statistics	
		M	Me	SD	M	Me	SD	M	Me	SD	H	P-value
CSS-PL	Compulsion	16,80	14,00	7,44	13,89	12,00	6,19	13,29	11,00	6,03	<b>9,318</b>	<b>0,009</b>
	Distress	19,76	18,00	7,47	15,69	13,00	7,87	15,19	13,00	7,41	<b>11,094</b>	<b>0,004</b>
	Excessiveness	26,60	29,00	7,07	23,69	23,00	6,94	23,62	23,00	6,57	5,358	0,069
	Reassurance	13,80	12,00	4,77	13,60	13,00	5,51	14,07	14,00	5,38	1,185	0,553
	Cyberchondria (overall score)	76,96	73,00	21,48	66,86	63,00	21,49	66,16	63,00	20,43	<b>6,417</b>	<b>0,040</b>
	Mistrust of Medical Professionals	6,64	6,00	3,01	6,29	6,00	3,05	6,01	6,00	2,98	2,205	0,332
CSS-PL	Time since diagnosis	Up to 5 years			Over 5 years			N/A			Statistics	
	Compulsion	14,39	13,00	6,58	13,03	11,00	5,82	13,42	11,00	6,03	5,965	0,051
	Distress	16,46	15,00	7,76	14,74	12,50	7,17	15,42	13,00	7,84	<b>8,596</b>	<b>0,014</b>
	Excessiveness	24,53	24,00	6,75	23,20	23,00	6,63	23,61	24,00	6,71	4,952	0,084
	Reassurance	14,45	15,00	5,03	13,75	13,00	5,61	13,55	13,00	5,48	4,041	0,133
	Cyberchondria (overall score)	69,83	66,00	21,34	64,72	60,50	20,38	65,99	64,00	20,54	<b>7,521</b>	<b>0,023</b>
	Mistrust of Medical Professionals	5,72	5,00	2,71	5,97	5,00	2,92	6,77	6,00	3,34	<b>9,459</b>	<b>0,009</b>

M- Mean; Me- Median; SD- Standard Deviation; H- Kruskal-Wallis H test.

who declared no diagnosed diseases declared a higher rate of distrust compared to people who had not been diagnosed with the disease for less than five years.

### Cyberchondria severity according to the CSS-PL scale.

The average overall cyberchondria score of all respondents was 66.78 (SD=20.84). However, the overall result of the severity of cyberchondria in the study group, assessed in percentiles, indicates that in 75% of all cases the result was equal to or above 79.0 points (scale range: Min 30, Max 135.0) (Tab. 5).

**CSS-PL and correlation analysis of CAM use.** In the study group, a significant positive correlation was found between cyberchondria and the sum of the CAM methods used,  $r = 0.137$ ;  $p < 0.001$  (Tab. 6). Accordingly, CSS is positively correlated with using CAM products ( $r=0.144$ ) and self-help techniques ( $r=0.140$ ). Moreover, the CSS Compulsion

**Table 5.** Results of the severity of cyberchondria according to the CSS-PL scale

	M	SD	Min	Max	Percentiles		
					25	50	75
Compulsion	13.59	6.16	8.00	39.00	9.00	12.00	16.00
Distress	15.50	7.58	8.00	40.00	9.00	13.00	19.00
Excessiveness	23.76	6.71	8.00	40.00	19.00	23.50	28.00
Reassurance	13.93	5.39	6.00	28.00	9.00	14.00	18.00
Cyberchondria (overall score)	66.78	20.84	30.00	135.00	51.00	63.50	79.00
Mistrust of Medical Professionals	6.11	3.00	3.00	15.00	3.00	6.00	8.00

subfactor was positively correlated with the number of CAM products used ( $r=0.133$ ), self-help techniques ( $r=0.149$ ) and the sum of CAM methods ( $r=0.147$ ), while excessiveness

**Table 6.** Correlation results of CSS-PL and CAM methods

		1	2	3	4	5	6	7	8	9	10
Compulsion [1]	Pearson correlation										
	Significance (two-tailed)	-									
	N										
Distress [2]	Pearson correlation	0.712 **									
	Significance (two-tailed)	<.001	-								
	N	626							1	0	-1
Excessiveness [3]	Pearson correlation	.647 **	.552 **								
	Significance (two-tailed)	<.001	<.001	-							
	N	626	626								
Reassurance [4]	Pearson correlation	.364 **	.386 **	.453 **							
	Significance (two-tailed)	<.001	<.001	<.001	-						
	N	626	626	626							
Cyberchondria (overall result) [5]	Pearson correlation	.857 **	.852 **	.832 **	.653 **						
	Significance (two-tailed)	<.001	<.001	<.001	<.001	-					
	N	626	626	626	626						
Mistrust of Medical Professionals [6]	Pearson correlation	.129 **	.015	.089 *	-.190 **	.023					
	Significance (two-tailed)	.001	.709	.027	<.001	.570	-				
	N	626	626	626	626	626					
CAM practitioners [7]	Pearson correlation	.040	-.030	.076	.001	.025	.235 **				
	Significance (two-tailed)	.318	.449	.059	.986	.527	<.001	-			
	N	626	626	626	626	626	626				
Products [8]	Pearson correlation	.133 **	.055	.213 **	.064	.144 **	.212 **	.420 **			
	Significance (two-tailed)	<.001	.169	<.001	.108	<.001	<.001	<.001	-		
	N	626	626	626	626	626	626	626			
Self-help [9]	Pearson correlation	.149 **	.069	.133 **	.109 **	.140 **	.197 **	.404 **	.279 **		
	Significance (two-tailed)	<.001	.084	<.001	.006	<.001	<.001	<.001	<.001	-	
	N	626	626	626	626	626	626	626	626		
Total of CAM [10]	Pearson correlation	.147 **	.047	.175 **	.087 *	.139 **	.274 **	.755 **	.633 **	.851 **	
	Significance (two-tailed)	<.001	.235	<.001	.030	<.001	<.001	<.001	<.001	<.001	-
	N	626	626	626	626	626	626	626	626	626	

was positively correlated with products ( $r=0.213$ ), self-help techniques ( $r=0.133$ ) and the sum of CAM methods ( $r=0.175$ ). Analysis also showed that the Reassurance subfactor was positively correlated with the use of self-help techniques ( $r=0.140$ ) and the sum of the use of CAM methods ( $r=0.087$ ). In addition, the cyberchondria-related factor Mistrust of Medical Professionals was positively correlated with all CAM components: use of health care providers ( $r=0.235$ ), CAM products ( $r=0.212$ ), self-help techniques ( $r=0.197$ ), and the sum of CAM methods ( $r=0.274$ ).

**Predictors of cyberchondria – multivariate analysis.** Table 7 shows the predictors of cyberchondria in the hierarchical regression analysis model. The model was statistically significant ( $F=44.744$ ;  $p<0.001$ ).

The severity of cyberchondria is associated with 'a greater number of CAM products used' ( $\beta=0.101$ ;  $p=0.043$ ), 'a greater number of self-help materials' researched ( $\beta=0.210$ ;  $p<0.001$ ), 'searching for knowledge about CAM on the Internet' ( $\beta=0.199$ ;  $p<0.001$ ), 'using sources other than books' ( $\beta=-0.114$ ;  $p=0.025$ ), younger age ( $\beta=-0.170$ ;  $p<0.001$ ) and worse education ( $\beta=-0.101$ ;  $p=0.033$ ) (Tab. 7).

Each subsequent block of variables increased the R-squared statistically significantly (Tab. 8). In other words, subsequent variables in the block cause the model to explain the variability of cyberchondria to a greater extent. The variables included in the model explained 19.6% of the entire variability of cyberchondria ( $R^2 = 0.196$ ).

## DISCUSSION

The study aimed to examine the unique relationships between cyberchondria and the use of complementary and alternative medicine, and to determine predictors of cyberchondria in a large sample of Poland's population, examining those recruited via an online survey (in the Polish language).

The average cyberchondria score in results obtained was  $66.78 \pm 20.84$ , which was slightly lower than in the study conducted among  $n=140$  women by Cakir [19], where the average CSS score was  $78.54 \pm 22.09$ .

The results of the current study suggest that there is a correlation between cyberchondria and the use of CAM. In other words, people with higher cyberchondria scores

**Table 7.** Hierarchical regression analysis of predictors of cyberchondria among study participants

Model		B	Beta	t	p	95.0% confidence interval for B		Tolerance
						Lower limit	Upper limit	
RI-CAM	CAM practitioners	-0.699	-0.065	-1.265	0.207	-1.786	0.387	0.709
	Products	<b>1,417</b>	<b>0.101</b>	<b>2,031</b>	<b>0.043</b>	0.045	2,788	0.756
	Self-help	<b>1,496</b>	<b>0.210</b>	<b>4,187</b>	<b>&lt;0.001</b>	0.794	2,198	0.750
Sources of knowledge	Physician	1,646	0.034	0.679	0.498	-3.119	6,411	0.742
	Nurse	0.130	0.002	0.035	0.972	-7.243	7,503	0.777
	Internet	<b>8,669</b>	<b>0.199</b>	<b>3,927</b>	<b>&lt;0.001</b>	4,330	13,008	0.730
	Social media	0.876	0.021	0.408	0.683	-3,339	5,090	0.734
	Friends	0.508	0.012	0.246	0.806	-3.546	4,562	0.817
	Media	0.000	0.000	0.000	1,000	-4.812	4.811	0.875
	Books	<b>-5.001</b>	<b>-0.114</b>	<b>-2.246</b>	<b>0.025</b>	-9.378	-0.624	0.726
	Magazines	-1.219	-0.026	-0.525	0.600	-5.783	3,344	0.745
	Patients	2,432	0.039	0.847	0.397	-3.210	8,074	0.892
Socio-demographic variables	Age	<b>-0.284</b>	<b>-0.170</b>	<b>-3,588</b>	<b>&lt;0.001</b>	-0.440	-0.129	0.838
	Sex	1.119	0.017	0.388	0.698	-4.546	6,784	0.926
	Education	<b>-3,539</b>	<b>-0.101</b>	<b>-2,145</b>	<b>0.033</b>	-6.782	-0.295	0.845
	Employment status	-1,480	-0.029	-0.636	0.525	-6.054	3,094	0.908
	Financial situation	0.389	0.015	0.302	0.763	-2.141	2,919	0.801
	Domicile	-2.696	-0.050	-1.119	0.264	-7,430	2,038	0.945
	Relationship status	3,597	0.072	1,543	0.124	-0.985	8,180	0.872
Health variables	self-rated health	-1.085	-0.060	-1.311	0.190	-2.711	0.541	0.883
	Time since diagnosis of the disease	-0.979	-0.053	-1.148	0.251	-2.655	0.697	0.873

F=44.744; p&lt;0.001; R 2 =0.155; DW=1.938

**Table 8.** Stepwise hierarchical regression model of predictors of cyberchondria among study participants

Model	R	R-squared	Adjusted R-squared	Change statistics				
				R-squared change	F changes	df1	df2	Significance F change
1	0.254	0.065	0.058	0.065	10,293	3	447	<0.001
2	0.358	0.128	0.102	0.064	3,199	10	437	0.001
3	0.436	0.190	0.152	0.062	4,667	7	430	<0.001
4	<b>0.443</b>	<b>0.196</b>	<b>0.155</b>	<b>0.006</b>	<b>1,618</b>	<b>2</b>	<b>428</b>	<b>0.049</b>

are more likely to use CAM. This is a new and important discovery, because it indicates that people with cyberchondria, when they do not receive the diagnosis and/or treatment they expect from a qualified medical doctor, look for a way to meet their needs by using CAM. People with high levels of cyberchondria may, therefore, have different expectations from general health care practitioners, such as clarification and tailoring of medical treatment to their individual needs [20]. The study indicates that people with higher rates of cyberchondria use more CAM products and are more likely to employ self-help techniques.

An interesting phenomenon is the high rate of mistrust observed among people who declared no diagnosed diseases. There is a risk that people who mistrust medical professionals do not undertake preventive testing, or deny the results of medical tests that confirm the presence of a disease. Mistrust of Medical Professionals was also most highly correlated with overall CAM use rates. People with a higher Mistrust index were also characterized by Compulsion. These results may be related to the large amount of misleading, ambiguous and false information available on the Internet, and a feeling of a false sense of insecurity leading people to

constantly search the web in an excessive and compulsive manner [2, 17].

The findings of this study show that websites (63.4%) and social networking sites (44.1%) were the most common sources of searching for CAM-related information. Moreover, searching for CAM knowledge on the Internet or in sources other than books was associated with greater expression of cyberchondria symptoms. In more sensitive people, searching for health-related information on the Internet may be compulsive, repetitive, difficult to resist, and associated with negative consequences representing the pathological behaviour of cyberchondria [17].

Compared to research by Fionda and Furnham [20] aimed at examining the influence of hypochondriacal attitudes and beliefs on the use of CAM, the current study did not show that a feeling of poor health was more likely in people who showed higher symptoms of cyberchondria. Additionally, Distress component scores were not correlated with higher rates of CAM use. These results may suggest that patients with cyberchondria do not use CAM methods, mainly due not to health anxiety, but to excessive compulsivity and lack of trust in qualified medical staff.

**Strengths and limitations of the study.** The presented study has certain strengths which should be considered:

- 1) to the best of the authors' knowledge, this is the first study to assess the relationship between cyberchondria and CAM use;
- 2) the Polish version of the I-CAM-PL questionnaire was modified [6] into R-I-CAM-PL;
- 3) the study was conducted shortly after the COVID-10 pandemic, and made possible the investigation of patients' attitudes after the ending of the lock-down measures that restricted access to formal health care facilities.

The study also has several limitations:

- 1) the cross-sectional study design allowed inferences to be made about relationships between variables, rather than establishing cause-and-effect relationships;
- 2) the study was limited to a self-report technique on a non-representative group due to the CAWI research method. Therefore, it was not possible to collect data from people who refused to participate in the study and no refusal rate was recorded. Moreover, in the recruitment process, only the social networking site Facebook was used, therefore there are no participants in the surveyed population who did not use this site, or were not members of the groups selected for participation. Nevertheless, the results of the study may constitute a valuable reference point in further research on the relationship between cyberchondria and the use of CAM.

## CONCLUSIONS

In summary, it was found that there is a link between cyberchondria and the use of

CAM methods. Determinants associated with the severity of cyberchondria include 'a greater number of CAM products used', 'a greater number of self-help books' referenced, 'searching for knowledge on the Internet', 'using sources other than books', younger age and lower education.

However, since not all components of the CSS-PL scale and self-rated health were associated with increased use of CAM, it is likely that these results may be false positives. The association between cyberchondria and CAM use should be investigated in further studies using comprehensive medical interviews.

## REFERENCES

1. Bagarić B, Jokić-Begić N. Cyberchondria–Health Anxiety Related to Internet Searching. *Socijalna psihijatrija*. 2019; 47(1): 28–50.
2. Starcevic V. Cyberchondria: Challenges of Problematic Online Searches for Health-Related Information. *Psychother Psychosom*. 2017;86(3):129–133. doi:10.1159/000465525
3. Vismara M, Caricasole V, Starcevic V, et al. Is cyberchondria a new transdiagnostic digital compulsive syndrome? A systematic review of the evidence. *Compr Psychiatry*. 2020;99:152167. doi:10.1016/j.comppsy.2020.152166
4. Laato S, Najmul Islam AKM, et al. What Drives Unverified Information Sharing and Cyberchondria during the COVID-19 Pandemic? *Eur J Information Sys*. 2020;29(23):288–305. <https://doi.org/10.1080/0960085X.2020.1770632>
5. Traditional, Complementary and Integrative Medicine. Available online: [https://www.who.int/health-topics/traditional-complementary-and-integrative-medicine#tab=tab\\_1](https://www.who.int/health-topics/traditional-complementary-and-integrative-medicine#tab=tab_1). (Accessed on 14 May 2023)
6. Jędrzejewska AB, Ślusarska BJ, Jurek K, Nowicki GJ. Translation and Cross-Cultural Adaptation of the International Questionnaire to Measure the Use of Complementary and Alternative Medicine (I-CAM-Q) for the Polish and Cross-Sectional Study. *Int J Environ Res Public Health*. 2022;20(1):124. doi:10.3390/ijerph20010124
7. van der Werf ET, Busch M, Jong MC, Hoenders HJR. Lifestyle changes during the first wave of the COVID-19 pandemic: a cross-sectional survey in the Netherlands. *BMC Public Health*. 2021;21(1):1226. doi:10.1186/s12889-021-11264-z
8. Moraliyag H, De Silva D, Ranasinghe W, et al. Cancer in Lockdown: Impact of the COVID-19 Pandemic on Patients with Cancer. *Oncologist*. 2021;26(2):e342–e344. doi:10.1002/onco.13604
9. Quandt SA, Verhoef MJ, Arcury TA, et al. Development of an international questionnaire to measure use of complementary and alternative medicine (I-CAM-Q). *J Altern Complement Med*. 2009;15(4):331–339. doi:10.1089/acm.2008.0521
10. Bryden GM, Browne M. Development and evaluation of the R-I-CAM-Q as a brief summative measure of CAM utilisation. *Complement Ther Med*. 2016;27:82–86. doi:10.1016/j.ctim.2016.05.007
11. Buchanan EA, Hvizdak EE. Online survey tools: ethical and methodological concerns of human research ethics committees. *J Empir Res Hum Res Ethics*. 2009;4(2):37–48. doi:10.1525/jer.2009.4.2.37
12. Whitaker C, Stevelink S, Fear N. The Use of Facebook in Recruiting Participants for Health Research Purposes: A Systematic Review. *J Med Internet Res*. 2017;19(8):e290. doi:10.2196/jmir.7071
13. Bajcar B, Babiak J, et al. Self-Esteem and Cyberchondria: The Mediation Effects of Health Anxiety and Obsessive–Compulsive Symptoms in a Community Sample. *Curr Psychol*. 2021;40, 2820–2831. <https://doi.org/10.1007/s12144-019-00216-x>
14. McElroy E, Shevlin M. The development and initial validation of the cyberchondria severity scale (CSS). *J Anxiety Disord*. 2014;28(2):259–265. doi:10.1016/j.janxdis.2013.12.007
15. Markham A, Buchanan E. Ethical Decision-Making and Internet Research: Recommendations from the AoIR Ethics Working Committee (Version 2.0). Available online: <https://pure.au.dk/ws/files/55543125/UN%20Declaration%20of%20Human%20Rights> (accessed on 19 March 2023).
16. Turhan Cakir A. Cyberchondria levels in women with human papilloma virus. *J Obstet Gynaecol Res*. 2022;48(10):2610–2614. doi:10.1111/jog.15354
17. Fionda S, Furnham A. Hypochondriacal attitudes and beliefs, attitudes towards complementary and alternative medicine and modern health worries predict patient satisfaction. *JRSM Open*. 2014;5(11):2054270414551659. doi:10.1177/2054270414551659