Relationship Between Intolerance of Uncertainty and Cyberchondria: A Systematic Review and Meta-Analysis

Belirsizliğe Tahammülsüzlük ve Siberkondri Arasındaki İlişki: Sistematik Derleme ve Meta-Analiz

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ABSTRACT

Cyberchondria is a phenomenon characterized by individuals engaging in excessive and repetitive online searches for health-related information to alleviate their concerns, which can lead to anxiety and behavioral disorders. Recent studies have shown that intolerance of uncertainty is an important psychological factor that increases cyberchondria, however, there is a notable lack of systematic reviews and meta-analyses examining the relationship between these two variables. The aim of this study is to systematically review and meta-analyze quantitative research published between 2020 and 2025 that investigates the relationship between intolerance of uncertainty and cyberchondria, in accordance with the PRISMA guidelines. Following a comprehensive search in the Web of Science, ScienceDirect, PubMed, Scopus, Google Scholar, and DergiPark databases, 21 studies meeting the inclusion criteria were included in the meta-analysis. The analyses revealed a moderate and significant positive relationship between intolerance of uncertainty and cyberchondria, with no significant effect of moderator variables such as year and country. The findings contribute significantly to the literature by enhancing the understanding of the impact of individual psychological characteristics on online health information-seeking behaviors and highlight the need for future research to consider different methodological approaches and moderator variables.

Keywords: Intolerance of uncertainty, cyberchondria, systematic review, meta-analysis

ÖZ

Siberkondri, bireylerin sağlıkla ilgili endişelerini gidermek amacıyla internet üzerinden aşırı ve tekrarlayan bilgi arayışına girmesiyle ortaya çıkan, kaygı ve davranışsal bozukluklara yol açabilen bir olgudur. Son yıllarda yapılan araştırmalar, belirsizliğe tahammülsüzlüğün siberkondriyi artıran önemli bir psikolojik faktör olduğunu göstermektedir, ancak bu iki değişken arasındaki ilişkiyi sistematik olarak inceleyen derleme ve meta-analiz çalışmalarının eksikliği dikkat çekmektedir. Bu çalışmanın amacı, 2020-2025 yılları arasında yayımlanan ve belirsizliğe tahammülsüzlük ile siberkondri arasındaki ilişkiyi nicel olarak inceleyen araştırmaları PRISMA rehberine uygun şekilde sistematik olarak derlemek ve meta-analiz yöntemiyle genel eğilimleri ortaya koymaktır. Web of Science, ScienceDirect, PubMed, Scopus, Google Scholar ve DergiPark veri tabanlarında yapılan kapsamlı tarama sonucunda, dahil edilme kriterlerini karşılayan 21 çalışma meta-analize alınmış. Analizler sonucunda, belirsizliğe tahammülsüzlük ile siberkondri arasında orta düzeyde ve anlamlı bir pozitif ilişki saptanmış, yıl ve ülke gibi moderatör değişkenlerin bu ilişki üzerinde anlamlı bir etkisi olmadığı görülmüştür. Bulgular, bireysel psikolojik özelliklerin çevrim içi sağlık arama davranışları üzerindeki etkisinin anlaşılması açısından literatüre önemli katkılar sunmakta ve gelecekte yapılacak araştırmalarda farklı metodolojik yaklaşımların ve moderatör değişkenlerin dikkate alınmasının gerekliliğine işaret etmektedir.

Anahtar sözcükler: Belirsizliğe tahammülsüzlük, siberkondri, sistematik derleme, meta-analiz

Introduction

Cyberchondria can be defined as repeated and compulsive online health information search for reassurance seeking by people due to baseless medical fear (White and Horvitz 2009, Starcevic et al. 2020, Infanti et al. 2023). A number of studies have indicated that information load, exposure to information sources, low health literacy, and intolerance of uncertainty (IU) are significant antecedents which increase levels of cyberchondria (Erdoğan and Hocaoğlu 2020, Laato et al. 2020, Gu et al. 2025, Wang et al. 2025). Cyberchondria may cause many negative results in individuals due to its fear and behavioural disorder nature. Thus far, previous studies have found that repetitive and excessive internet searches may increase negative psychological states such as anxiety, stress, panic and fear (Starcevic and Berle 2013, Jungmann and Witthöft 2020, Laato et al. 2020). Similarly, recent evidence has shown that cyberchondria may decrease trust in health professionals (Abdulrahman et al. 2024, Wang et al. 2025) and trigger health anxiety, depression, stress and, the suicidal thoughts (McElroy and Shevlin 2014, Błoch and Misiak 2025, Xu et al. 2025). Overall, these studies show that cyberchondria may increase the burden and costs of healthcare services. However, when focusing on cyberchondria, it is necessary to pay attention not only to its consequences but also to the factors that trigger these behaviours.

In the recent literature, several studies have indicated that one of the significant factors which is underlying cyberchondria is IU (Norr et al. 2015, Bottesi et al. 2022, Vujić et al. 2024). IU is defined as the individual's tendency to find uncertainty unacceptable, regardless of how unlikely a negative event is to occur (Buhr and Dugas 2002, Carleton et al. 2007). Several studies have highlighted that IU is one of the key factors of anxiety disorders, and a critical factor in psychopathologies such as generalized anxiety disorder, obsessive-compulsive disorder, and social anxiety (Dugas et al. 1998, Yığman and Fidan 2021). High levels of IU may cause individuals to perceive uncertain states as threatening, experience excessive worry and anxiety, weaken problem-solving skills, and avoidance behaviors (Freeston et al. 1994, Carleton, 2016). Moreover, recent studies have indicated that IU is related to negative results, such as individuals' continuous search for information, increased online health information seeking, and cyberchondria (Fergus 2013, Norr et al. 2015, Arsenakis et al. 2021).

The existing body of research has extensively explored the relationship between IU and cyberchondria. Bajcar and Babiak (2020) found that IU indirectly mediates the influence of neuroticism on cyberchondria. Arsenakis et al. (2021) observed a moderately to strongly positive correlation among cyberchondria, health anxiety, and IU. Likewise, Batool and Batool (2022) reported positive links between IU and anxiety sensitivity with cyberchondria, noting that anxiety sensitivity mediates this association. Moreover, in their study during the COVID-19 (Coronavirus 2019) period, Infanti et al. (2023) demonstrated that IU, cyberchondria, and the COVID-19 fear have a positive relationship. Moreover, in their study during the COVID-19 (Coronavirus 2019) period, Infanti et al. (2023) demonstrated that IU, cyberchondria, and the COVID-19 fear have a positive relationship. Moreover, in their study during the COVID-19 (Coronavirus 2019) period, Infanti et al. (2023) demonstrated that IU, cyberchondria, and the COVID-19 fear have a positive relationship.

Although the number of studies examining the relationship between cyberchondria and IU is increasing in the current literature (Serafica et al. 2024, Guo et al. 2025), the number of comprehensive reviews that will enable the evaluation of the findings in a general framework is quite limited. Moreover, the significant difference in the measurement tools, sample types, and methodological approaches used among studies makes it difficult to conduct comparisons in the literature.

Accordingly, this study will carry out a PRISMA-compliant systematic review and meta-analysis and appraise study quality with the JBI checklist. The primary objective is to provide a holistic analysis of 2020–2025 research on the link between IU and cyberchondria, thereby filling a gap in the literature. The findings are expected to contribute to both theoretical knowledge and practice in the fields of psychology, health sciences. Significantly, a better understanding of the relationship between IU may enable the development of more targeted and effective

Method

This study aims to systematically evaluate research examining the relationship between IU and cyberchondria. Systematic reviews are scientific research methods that are conducted in accordance with a predetermined protocol and aim to produce evidence-based knowledge. In this context, the systematic review and meta-analysis conducted were carried out in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standard (Moher et al. 2009).

Databases and Search Strategies

To identify studies, published between 2020 and 2025 in the Web of Science, ScienceDirect, PubMed, Scopus, Google Scholar and DergiPark databases were searched between March 4, 2025 and May 23, 2025. Both Turkish and English keyword combinations were used in the search strategy. For Turkish: "siberkondri" VE "belirsizliğe tahammülsüzlük", "sağlık kaygısı" VE "belirsizliğe tahammülsüzlük", "belirsizliğe tahammülsüzlük" VE "çevrimiçi sağlık bilgisi arama"; for English: "cyberchondria" AND "intolerance of uncertainty", "health anxiety" AND "intolerance of uncertainty", "intolerance of uncertainty" AND "online health information seeking".

The collected articles were imported into Rayyan.ai (Rayyan 2016), a web-based tool for study screening and data extraction. Following deduplication, is screened titles and abstracts are screened to remove non-relevant items. Full-text articles that passed screening were reviewed for eligibility, and reference lists were searched to identify further pertinent studies.

Inclusion and Exclusion Criteria

Studies qualified for inclusion in the systematic review if they met all of the following criteria:

1. Articles directly examining the relationship between IU and cyberchondria,
2. Original research conducted using quantitative methods,
3. Full-text accessible,
4. Studies published between 2020 and 2025,
5. Studies published in English or Turkish,
6. Studies published in peer-reviewed journals.

Studies were excluded from the systematic review and meta-analysis if they met at least one of the following criteria:

1. Duplicate records (only one copy of each study was included)
2. Studies published outside the 2020-2025 period
3. Studies that did not meet the inclusion criteria in the title, abstract, or full-text review
4. Studies have shown that the full text was not accessible
5. Studies published in languages except English and Turkish
6. Publications that do not constitute original research, such as reviews, editorials, letters, or case reports
7. Studies that are not found suitable for the scope of the review are excluded due to their content.

Study Selection Process

This systematic review reached a total of 972 studies. After excluding duplicates, review articles, and studies not aligned with the study objective, 32 studies were examined. The full papers of these studies were reviewed. Three were excluded because they were in different languages, three because statistical

results were not available, two because they were non-article publications, and three because they did not contain the requested statistical results. Consequently, 21 studies were determined to be suitable for the aim of this study (Figure 1).
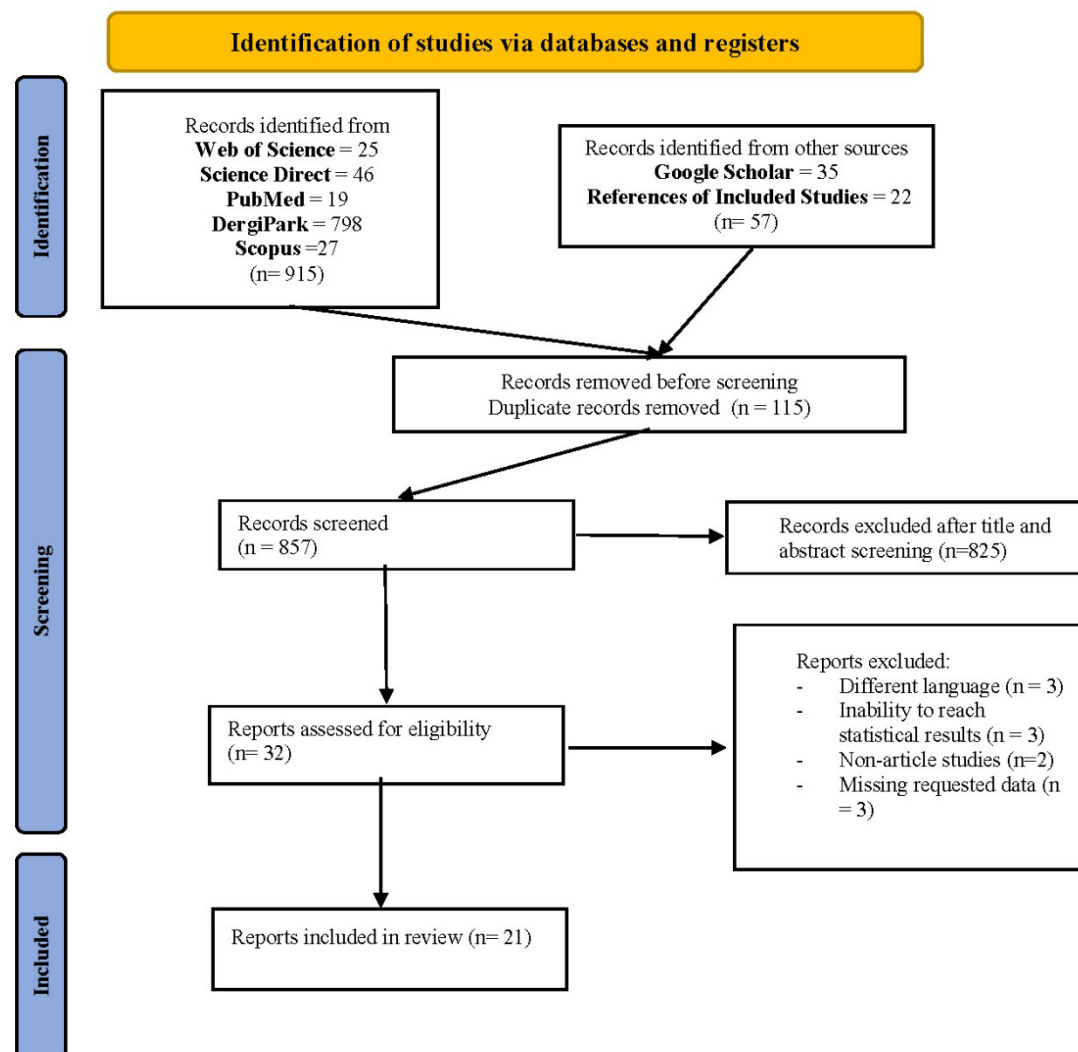
Identification of studies via databases and registers

Records identified from
Web of Science = 25
Science Direct = 46
PubMed = 19
DergiPark = 798
Scopus =27
(n= 915)

Records identified from other sources
Google Scholar = 35
References of Included Studies = 22
(n= 57)

Records removed before screening
Duplicate records removed (n = 115)

Records screened
(n = 857)

Records excluded after title and abstract screening (n=825)

Reports assessed for eligibility
(n= 32)

Reports excluded:
- Different language (n = 3)
- Inability to reach statistical results (n = 3)
- Non-article studies (n=2)
- Missing requested data (n = 3)

Reports included in review (n= 21)

Figure 1. PRISMA flow chart

Quality Assessment

The methodological quality of included studies was appraised using the Critical Appraisal Checklist for Analytical Cross-Sectional Studies developed by the Joanna Briggs Institute (JBI) (Joanna Briggs Institute 2017). This checklist consists of eight core criteria: (a) clarity of the research question/purpose, (b) definition of inclusion criteria for participants, (c) description of participants and setting, (d) accurate measurement of exposure, (e) accurate measurement of outcomes, (f) identification of potential confounders, (g) appropriate control of confounders, and (h) use of appropriate statistical analyses. Each item was scored as "Yes," "No," "Unclear," or "Not Applicable."

However, there are no recommendations regarding threshold scores for this list developed by the JBI. However, Van Ekris et al. (2016) stated that a study with a quality score of at least 0.75 (75%) is considered "high quality," and a study with a score less than 0.75 is considered "low quality." Similarly, Bueno-de la Fuente et al. (2025) stated that cross-sectional descriptive studies should receive a score of 6 out of 8 as an inclusion criterion in systematic reviews. Therefore, in this study, studies scoring 6 or higher were considered high quality.

Table 1. Quality assessment results of descriptive studies (n = 21)									
Study	JBI Quality Score	a	b	c	d	e	f	g	h
Bajcar and Babiak 2020	8/8	+	+	+	+	+	+	+	+
Zheng et al. 2020	8/8	+	+	+	+	+	+	+	+
Arsenakis et al. 2021	8/8	+	+	+	+	+	+	+	+
Al Dameery et al. 2021	8/7	+	+	+	+	-	+	+	+
Wu et al. 2021	8/7	+	+	+	+	-	+	+	+
Yılmaz et al. 2021	8/7	+	+	+	+	-	+	+	+
Batool and Batool 2022	8/7	+	+	+	+	-	+	+	+
Bottesi et al. 2022	8/8	+	+	+	+	+	+	+	+
Boysan et al. 2022	8/8	+	+	+	+	+	+	+	+
Foroughi et al. 2022	8/7	+	+	+	+	-	+	+	+
Nesibe and Ceylan 2022	8/7	+	+	+	+	-	+	+	+
Rashid et al. 2022	8/7	+	+	+	+	-	+	+	+
Infanti et al. 2023	8/7	+	+	+	+	-	+	+	+
Rashid et al. 2023	8/6	+	+	+	+	+	-	-	+
Aydın 2023	8/6	+	+	+	+	+	-	-	+
Bahadır and Dündar 2023	8/7	+	+	+	+	+	+	-	+
Vujić et al. 2024	8/8	+	+	+	+	+	+	+	+
Khademizadeh et al. 2024	8/8	+	+	+	+	+	+	+	+
Ghouri et al. 2024	8/8	+	+	+	+	+	+	+	+
Serafica et al. 2024	8/8	+	+	+	+	+	+	+	+
Guo et al. 2025	8/8	+	+	+	+	+	+	+	+

n: Number of quality-assessed studies, JBI: Joanna Briggs Institute, a: Clarity of research question/purpose, b: Description of inclusion criteria for participants, c: Description of participants and setting, d: Accurate measurement of exposure, e: Accurate measurement of outcomes, f: Identification of potential confounders, g: Appropriate control of confounders, and h: Use of appropriate statistical analyses..

Data Extraction

For each study, basic information such as author and year, country, study type, sample size, correlation coefficient (r) between IU and cyberchondria, the IU scale, and the cyberchondria scale were systematically included (Table 2).

Meta-Analysis Method

RStudio software (version 4.5.1) was used for statistical analyses. Within the scope of the meta-analysis, correlation coefficients (Pearson's r) obtained from the studies were subjected to Fisher's z transformation to normalize the distribution, and variances were calculated (Borenstein et al. 2009). A random effects model was used to synthesize individual effect sizes into a summary effect size. Fisher's z values were reconverted to Pearson's r values to interpret the results. Differences in effect sizes and heterogeneity among studies were assessed using the Q statistic and I^2 statistic (Borenstein et al. 2017). To identify possible sources of heterogeneity, age and country variables obtained from the studies were examined as potential moderator variables. These variables were selected because age can influence the results due to generational differences (Primastio et al. 2023), and the country variable can play a decisive role in the findings through cultural and socioeconomic differences (Yılmaz et al. 2021, Rashid et al. 2023). To assess publication bias, the funnel plot was visually examined, and Egger's regression test was applied (Egger et al. 1997).

Table 2. Characteristics of the included studies (n=21)						
Reference	Country	Research Type	n*	r*	IU Scale	Cyberchondria Scale
Bajcar and Babiak 2020	Poland	Cross-sectional	381	0.44	IUS-12	CSS-33
Zheng et al. 2020	China	Cross-sectional	426	0.32	IUS-12	CSS-12
Arsenakis et al. 2021	Australia, Switzerland	Cross-sectional	749	0.47	IUS-12	CSS-33
Al Dameery et al. 2021	Oman	Cross-sectional	393	0.442	IUS-12	CSS-12
Wu et al. 2021	China	Cross-sectional	694	0.43	IUS-12	CSS-12
Yılmaz et al. 2021	Türkiye	Cross-sectional	430	0.27	IUS-12	CSS-33
Batool and Batool 2022	Pakistan	Cross-sectional	413	0.41	IUS-12	CSS-12
Bottesi et al. 2022	Italy	Cross-sectional	556	0.34	IUS-12	CSS-33
Boysan et al. 2022	Türkiye	Cross-sectional	1.049	0.23	IUS-12	CSS-12
Foroughi et al. 2022	Iran	Cross-sectional	420	0.53	IUS-12	CSS-12
Nesibe and Ceylan 2022	Türkiye	Cross-sectional	1195	0.299	IUS-12	CSS-33
Rashid et al. 2022	Pakistan	Cross-sectional	300	0.567	IUS-12	CSS-33
Infanti et al. 2023	France, Switzerland, Belgium	Cross-sectional	725	0.32	IUS-12	CSS-12
Rashid et al. 2023	Pakistan	Cross-sectional	411	0.63	IUS-12	CSS-33
Aydın 2023	Türkiye	Cross-sectional	402	0.289	IUS-12	CSS-33
Bahadır and Dündar 2023	Türkiye	Cross-sectional	420	0.39	IUS-12	CSS-33
Vujić et al. 2024	Serbia	Cross-sectional	516	0.44	IUS-11	CSS-33
Khademizadeh et al. 2024	Iran	Cross-sectional	260	0.504	IUS-12	CSS-12
Ghouri et al. 2024	Pakistan	Cross-sectional	509	0.36	IUS-12	SCS-4
Serafica et al. 2024	Philippines	Cross-sectional	100	0.323	IUS-12	CTS-30
Guo et al. 2025	China	Cross-sectional	227	0.62	IUS-12	SCS-4

n: Number of samples in studies, r: Correlation coefficient in studies, IUS-12: 12-item Intolerance of Uncertainty scale, IUS-11: 11-item Intolerance of Uncertainty scale, CSS-33: 33-item Cyberchondria severity scale, CSS-12: 12-item Cyberchondria severity scale short form, SCS-4: 4-item Short cyberchondria scale, CTS-30: 30-item Cyberchondria tendency scale.

Results

Study Characteristics

Following the selection procedure, a total of 21 studies were included in the study (Figure 1). Details of the extracted data for each of the 21 eligible studies are presented (Table 2). All 21 studies included in the meta-analysis were between 2020-2025. Five studies were conducted in Türkiye (Yılmaz et al. 2021, Nesibe and Ceylan 2022, Boysan et al. 2022, Aydın 2023, Bahadır and Dündar 2023), four studies were conducted in Pakistan (Batool and Batool 2022, Rashid et al. 2022, Rashid et al. 2023, Ghouri et al. 2024), three studies were conducted in China (Zheng et al. 2020, Wu et al. 2021, Guo et al. 2025), two studies were conducted in Iran (Foroughi et al. 2022, Khademizadeh et al. 2024), and in Poland (Bajcar and Babiak 2020), Australia/Switzerland (Arsenakis et al. 2021), Oman (Al Dameery et al. 2021), France/Switzerland/Belgium (Infanti et al. 2023), Serbia (Vujić et al. 2024), the Philippines (Serafica et al. 2024) and Italy (Bottesi et al. 2022) one study were conducted.

The meta-analysis comprised studies distributed across recent years: two appeared in 2020 (Bajcar and Babiak 2020, Zheng et al. 2020); four in 2021 (Arsenakis et al. 2021, Al Dameery et al. 2021, Wu et al. 2021, Yılmaz et al. 2021); six in 2022 (Batool and Batool 2022, Bottesi et al. 2022, Boysan et al. 2022, Foroughi et al. 2022, Nesibe and Ceylan 2022, Rashid et al. 2022); four in 2023 (Infanti et al. 2023, Rashid et al. 2023,

Aydın 2023, Bahadır and Dündar 2023); four in 2024 (Khademizadeh et al. 2024, Ghouri et al. 2024, Serafica et al. 2024, Vujić et al. 2023); and one in 2025 (Guo et al. 2025).

The evidence base consisted entirely of cross-sectional studies (n= 21). Sample sizes ranged from 100 (Serafica et al. 2024) to 1,195 (Nesibe and Ceylan 2022). Correlational findings varied, with the lowest IU and cyberchondria association reported by Boysan et al. (2022; r = 0.23) and the highest by Rashid et al. (2023; r = 0.63). The measurement of IU predominantly relied on the IUS 12 (Carleton et al. 2007), which appeared in 20 studies, with the IUS 11 (Mihić et al. 2014) appearing in one. For cyberchondria, the leading instruments were the CSS 33 (McElroy and Shevlin, 2014) and the CSS 12 (McElroy et al. 2019). The SCS 4 (Jokić Begić et al. 2019) was reported in three studies, while the CTS 30 (Tatlı et al. 2019) was reported in one.

Meta-Analysis: The Relationship between IU and Cyberchondria

The meta-analysis examining the relationship between IU and cyberchondria (Figure 2) revealed a significant and substantial mean effect size (r = 0.4424, p < 0.001, 95% CI [0.38, 0.50]). This result indicates that IU explains 20% of the variance in cyberchondria. The heterogeneity test was significant (Q(20) = 183.61, p < 0.001), and the I^2 value showed high heterogeneity with 89.69%. When the years of the studies were added to the model as a moderator, an increase of 0.027 units per year in the effect size was observed, although this increase was not statistically significant (b = 0.027, p = 0.26). The year variable explained only 1.4% of the heterogeneity between studies. When the country variable was added to the model as a moderator, no significant difference was found between the effect sizes by country (QM(10) = 12.41, p = 0.26). The country variable explained 13% of the heterogeneity between studies. When the year and country variables were added to the model as moderators, it was found that neither variable had a significant effect on the effect size and that the high level of heterogeneity in the model remained substantially unexplained (R^2 = 1.4% for year, R^2 = 12.9% for country). The heterogeneity in both models remained high (I^2 > 88%). The year and country moderators did not show a significant effect in explaining the heterogeneity between studies.
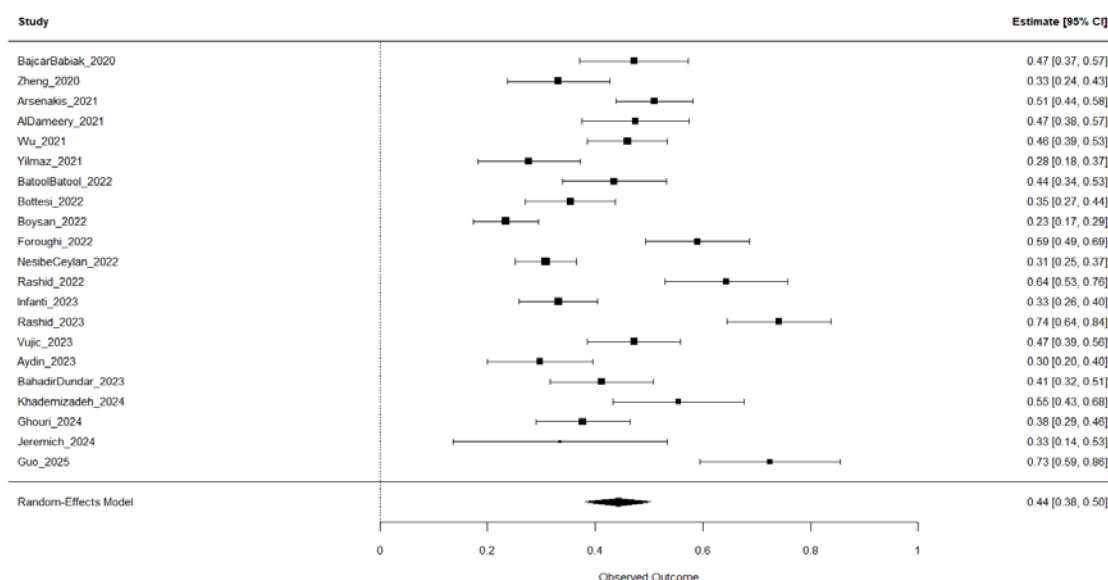

Figure 2. Forest plot showing correlation coefficients (r) for the association between IU and cyberchondria with confidence intervals and study weights for contribution to overall effect size.

Publication Bias

Various statistical and visual analyses were assessed for publication bias. First, the funnel plot was visually inspected, and no significant asymmetry was observed in the distribution of studies (Figure 3). This finding indicates that the meta-analysis results were not significantly affected by publication bias. Statistically,

the rank correlation test proposed by Begg and Mazumdar (1994) revealed a significant asymmetry (Kendall's tau = 0.3580, p = 0.0235). This result can be considered an indicator of the possibility of publication bias among studies. However, the regression test results developed by Egger et al. (1997) (z = 1.4527, p = 0.1463) were not statistically significant and did not provide strong evidence of publication bias. Therefore, there appears to be an inconsistency between the Begg and Mazumdar test and the Egger test. Additionally, a fail-safe N analysis was performed, and it was calculated that 875 ineffective studies would be required for the meta-analysis result to lose statistical significance. This high fail-safe N value indicates that the current findings are not significantly affected by publication bias and that the meta-analysis results are relatively robust (Rosenthal 1979).
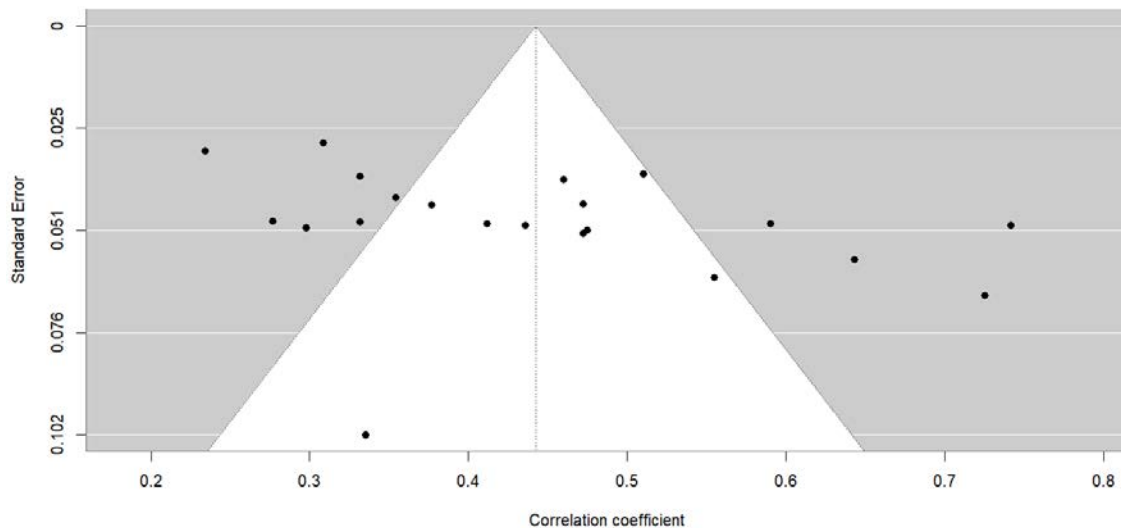
Figure 3. Funnel plot chart

Discussion

This study identified a moderately strong positive association between intolerance of uncertainty and cyberchondria in individuals. This finding shows that the meta-analysis results are consistent with the cognitive-behavioural literature, suggesting that the search for certainty against uncertainty leads individuals to seek repetitive and excessive online health information (Clark et al. 2020). In this context, it can be stated that IU is related to cyberchondria, and IU is a driving factor in the development of cyberchondria. In this direction, in his study, Fergus (2013) reported that IU is linked to cyberchondria and that individuals with higher uncertainty tend to engage in excessive, repetitive health information seeking driven by anxiety. Furthermore, the presence of high and significant heterogeneity among studies is another issue that should be discussed. In this regard, although the year and country variables in the studies included analyses as mediators, no significant relationship was found. This result shows that different variables or moderators should be examined in the relationship between IU and cyberchondria. Indeed, several studies in the literature show that women search for health-related information more frequently and perceive more anxiety and threat in this process than men (Percheski and Hargittai 2011, Ahadzadeh and Sharif 2017). Moreover, in his study, Fergus (2013) shows that variables such as information overload and health anxiety differentiate the magnitude of the effect between IU and cyberchondria. Therefore, to reveal the reasons for the high heterogeneity in the relationship between IU and cyberchondria, different demographic variables should be included.

Although the meta-analysis results revealed a moderately significant relationship, the fact that the studies acquired for the study revealed relationships at different levels in another issue suggests that this should be discussed. In this context, in this study of Boysan et al. (2022), a significant and weak relationship (r= 0.23) was observed between IU and cyberchondria, while in the study of Rashid et al. (2023), a significant

and strong relationship was observed (r= 0.63). In this regard, it is observed that Rashid et al. (2023) reached different levels of relationship using the five-dimensional Cyberchondria Severity Scale (CSS-33) and Boysan et al. (2022) using the four-dimensional Cyberchondria Severity Scale (CSS-12), among the studies included in the meta-analysis. Therefore, these different results may have been affected due to the use of different measurement scales. Nevertheless, the fact that Yılmaz et al. (2021) used the CSS-33 scale in their study and found a weak relationship between IU and cyberchondria (r= 0.27). This finding indicates that different cultural contexts, as well as different measurement tools, may affect this relationship. Therefore, the differences in this relationship may be influenced by different variables such as demographic characteristics (age, gender, education level), contextual factors (trust in health systems), methodological characteristics (sampling method and sample size), and psychological factors (health anxiety, anxiety sensitivity).

Beyond interpreting the present findings, it is crucial to address the limitations of the studies included in the study. First, the existing literature lacks evidence on the directionality of the IU and cyberchondria relationship. While several studies suggest that IU predicts cyberchondria (Fergus, 2013; Arsenakis et al., 2021), the temporal nature of this association remains uncertain. For example, Dugas et al. (2013) reported a bidirectional relationship between IU and anxiety over time. However, the lack of longitudinal research between IU and cyberchondria continues to create ambiguity regarding the long-term consequences of these concepts. Therefore, longitudinal and causal research is required to clarify the directionality of the relationship between IU and cyberchondria. Significantly, considering the possible effects of these two concepts, determining whether IU plays a causal role in the development and sustenance of cyberchondrial disorder in individuals may be important in terms of the treatment methods to be applied.

Second, all studies included in the study assessed the IU and cyberchondria relationship using questionnaires. Although this method is effective for large samples, it may be insufficient to fully elucidate the relationship between CT and cyberchondria due to respondent bias and conceptual scope limitations (Podsakoff et al. 2003). The fact that the exclusion of the "distrust of physician" dimension in cyberchondria scales in some studies (Arsenakis et al. 2021, Bottesi et al. 2022) prevents the concept from being addressed holistically and may ignore the impact of trust in health professionals on cyberchondria. Therefore, although a moderately strong and positive relationship was found between IU and cyberchondria, the existing literature should move beyond relying solely on self-report measurements and test this relationship with objective, behavioral, and developmental methods. For instance, in their study, Krain et al. (2008) examined the relationship between IU and anxiety, while additionally examining neural responses to certainty and uncertainty. Examining such studies on this relationship may provide more objective data.

Conclusion

This study revealed a significant and moderately positive relationship between IU and cyberchondria. Year and country variables were considered as moderators in the analyses. However, there was no significant moderator effect between IU and cyberchondria. Furthermore, this study identified some important limitations found in the literature. In particular, increasing sample diversity and considering potential moderators such as different age groups, sociodemographic characteristics, gender, and geographic dynamics in future research are necessary. Moreover, it is recommended that the relationship between cyberchondria and IU be examined not only with self-report scales but also with different measurement tools such as structured interviews. Future studies will contribute to a more extensive understanding of this relationship and to the development of effective prevention and intervention strategies in this field.

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