

# The Challenge of Self-diagnosis on Mental Health Through Social Media: A Qualitative Study



Seda Yıldırım

**Abstract** People usually get some health information or read similar health cases from internet and other digital media channels to self-diagnose. The COVID-19 pandemic has spurred self-diagnosis, and people motivated to be self-diagnosis by finding health information on social media. In this context, this study aims to explore how social media influences self-diagnosis behavior and mental health. Firstly, this study will review prior studies and reports to give a holistic approach for the link between self-diagnosis, mental health, and social media. Then, recent news and reports will be analyzed to give qualitative evidence for the significant link between self-diagnosis and mental health and social media based on Turkish cases. As a result, it is planned to compare the positive and negative sides of self-diagnosis when considering its effect on mental health and to give an original model examining the link between social media and self-diagnosis.

**Keywords** Self-diagnosis · Mental health · Cyberchondria · Social media · Fake medicine · Fake news · COVID-19 pandemic

## 1 Introduction

The twenty-first century refers to a digital age in the literature, and it is seen that the internet meets the basic information needs of society during this period [1]. Especially, it can be said that digital transformation leads everyone in society to digital areas as a result of the development of mobile technologies and internet infrastructures [1–3]. Algorithms and machine learning (ML) enable people to do many tasks in their daily lives more easily. With the introduction of this technology into our lives, digital adaptation also increases people's interest in this technology [4]. In this respect, it is seen that the number of people seeking for information on

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S. Yıldırım (✉)

Faculty of Economics and Administrative Sciences, Department of Business Administration,  
Tekirdag Namik Kemal University, Tekirdag, Turkey

disease and health through digital systems has increased, recently [5]. Some patients prefer to use digital tools such as chatbots and other portals with AI (Artificial Intelligence) drivers, and some of them prefer to seek health information on the internet and social media. For example, Ayonrinde and Michaelson (1998) determined that patients receive assistance from electronic resources and allow digital resources to guide them when making health-focused decisions [6]. Fan et al. (2021) investigated employing self-diagnosis by health chatbots in China, and they emphasized that health chatbots should be designed based on patient (consumer) expectations and needs [7]. Ćirković (2020) pointed out that patients can benefit from self-diagnosis applications based on AI systems. He investigated alternative digital applications for self-diagnosis as “Ada (Berlin-based app), Babylon (London-based app), Buoy Health (Harvard Medical School based) and Your.MD (Oslo and London).” However, he determined that healthcare professionals should be careful about the outcomes and threats of using AI application for medical consultant and self-diagnosis in long term [4].

You and Gui (2021) investigated how users perceived chatbot-based symptom checker (CSC) apps based on AI. The chatbot is a computer program that can chat (interactively communicate) with people. CSC applications used for medical diagnostics can evaluate users’ medical symptoms. People get a diagnosis according to their symptoms by talking with the CSC application. Of course, there are expected threats in these applications as well. In cases where users have high-risk diseases, these applications may cause people’s health to be worsened [8].

Nundy and Patel (2020) said that self-diagnosis can be useful implication during unusual conditions such as COVID-19 pandemic. During the COVID-19 pandemic, the “car service test” practices used in the United States have also found their place in other countries. It is thought that the increase in self-testing practices for COVID-19 has allowed physicians and other healthcare professionals to concentrate on more serious cases [9]. Essentially, the use of self-diagnosis during pandemics is a pre-COVID-19 practice. Self-diagnosis is considered as the primary step for disease control and management during pandemic and epidemic periods. In this case, leaflets were distributed to patients during the 2009 pandemic, and the symptoms of the disease were explained. Although pre-diagnosis has an auxiliary effect on epidemic control, there should be a control mechanism within self-diagnosis practices [10]. It is a fact that self-diagnosis is an effective implication during the pandemic such as COVID-19 pandemic when there is a complex management procedure for healthcare services. However, free usage of self-diagnosis so frequently can be harmful for individuals’ health [11]. Lewis (2016) investigated the experience of self-diagnosis of autism spectrum among adults. He determined that most of participations employed self-diagnosis before having a formal medical diagnosis. Individuals used the internet and digital channels to get information and self-diagnosis when waiting for an official diagnosis [12].

The expected benefit and ease of use in the adoption of technology affect the adaptation. It can be difficult to evaluate the effectiveness of technologies used in medical services such as medical diagnosis and to determine how effective this technology is for the consumer. As it is known, consumers seem to be inclined to

adapt and use digital services that are easy to use and fast accessible [13]. At this point, excessive use of self-diagnosis practices and the complete abandonment of consulting physicians may result in risky results.

This study focuses on explaining the impact of social media on self-diagnosis and mental health. The main contribution of this study is expected to give a brief view of the link between social media and self-diagnosis. In addition, investigating recent selected cases, there will be useful practical implications. As it is purposed, this study has four main parts as “introduction, literature review, descriptive study and conclusion.” The importance of the related issue, aim, research design, and contribution of the study are all explained in the first part. In literature review, the links between social media usage, self-diagnosis, and mental health problems are explained. Then, the third part explains selected sample cases and includes descriptive findings. In the conclusion part, descriptive findings are discussed by giving some future recommendations.

This study employs qualitative research methodology and uses descriptive content analysis to find answers for the below questions:

- RQ1: What is the link between self-diagnosis and mental health problems?
- RQ2: How do social media influence self-diagnosis?
- RQ3: What does self-diagnosis cause?

## **2 Self-diagnosis, Mental Health, and Social Media**

Historically, medical consultation was a process between patient and doctor during clinical encounters. The basic element required for medical consultation is that the doctor and the patient meet under appropriate conditions. However, in some circumstances, the clinical environment may not be very conducive to the medical consultation process. Long waiting times, difficulties in getting an appointment and other physical restrictions create significant barriers to medical consultation. Digital opportunities, on the other hand, provide an important support in overcoming physical restrictions and obstacles [7].

It can be said that there is a close relationship between self-diagnosis and digital applications. Increasing usage of social media sources and social media makes individuals more awareness of some mental health problems and makes people concern about their health when looking some disease symptoms on social media. In this part, this study explains the link between self-diagnosis, mental health problems, and social media usage.

Social media and internet usage encourage self-diagnosis and consumption of vitamins and dietary supplement. For example, many patients with mental disorders take nutritional supplements, but it is very difficult to establish a precise understanding of the way these patients use nutritional supplements. In the study, it was observed that Twitter users who self-diagnosed with a mental disorder stated that they actively took nutritional supplements on Twitter. In addition, these people were

found to have more negative emotions than those who did not mention their dietary supplement intake [14]. Sadagheyani and Tatari (2021) stated in their study that social media can have negative and positive effects on mental health. In the study, it was seen that as a result of social media use, mental problems such as anxiety, depression, loneliness, bad sleep, self-harm, and suicide may occur. On the other hand, it has been stated that accessing other people's health experiences and expert health information may be beneficial in terms of managing depression more effectively [15].

Increasing self-diagnosis by taking advantage of social media may cause people to attribute simple disease symptoms to larger and more serious diseases. For example, many people who review social media for headaches may self-interpret a diagnosis of brain cancer. Most people suffer from anxiety, stress, and other mental illnesses because they see every illness they see on social media appropriate for themselves. The use of digital tools such as social media mostly by young people may cause young people to be more exposed to self-diagnosis and mental health problems. On the other hand, on social media platforms such as Instagram and TikTok, untrained professionals transfer information to people in the form of life coaching and wellness coaching in increasing numbers. The rise of talk about self-care and health is leading people to more self-diagnosis behavior [16]. As a result of the searches people do on their mental health in the Google search engine, they push many people into the habit of self-diagnosis. Experts state that people who engage in self-diagnosis behavior become vulnerable to some dangers. At this point, according to Micheline Maalouf (A Licensed mental health counselor), many people on social media are asking if they have a mental health problem. A client said she thought she might have obsessive-compulsive disorder (OCD), and she saw that the client diagnosed her by looking at the symptoms in the TikTok video. According to Lindsay Fleming (licensed professional counselor–LPC), people need mental health answers more. According to Kaileen McMickle (licensed professional counselor–LPC), the higher a person's anxiety, the more likely they are to seek information about their experience. Therefore, Google and social media tools are also suitable tools for these people [17]. While it is certain that social media is the most used tool for self-diagnosis and identifying mental health problems, experts have a great job here. In cases where it comes to self-diagnosis, it may be difficult to reveal the true diagnosis of people. People may begin to follow the wrong treatment methods because they attribute the wrong diseases to themselves. Unfortunately, there are videos about various mental health problems in many places on social media such as TikTok, and such videos become more relevant. On popular social media platforms such as TikTok and YouTube, young people exhibit self-diagnosis behavior according to the media content they see. There is a growing influx of people who have been diagnosed with many personality disorders and are seeking treatment. On the positive side, while young people are more aware of the importance of mental health, people are more likely to have depression, anxiety, and suicidal thoughts due to misdiagnosis and treatments [18]. With increasing social media usage, self-diagnosis can worsen an individual's existing mental disorders and complicate the right treatment. In other words, social media can worsen undiagnosed mental health

disorders and worsen self-esteem and lead people to engage in self-harming behaviors such as suicidal thoughts [19]. As seen in Fig. 1, various mental illnesses can be increased as a result of excessive usage of social media.

The heaps of advertisements and phenomenon content that present health conditions in a simpler way on social media support the self-diagnosis craze. Users face a great danger. Upon the complaints received, some advertising content on TikTok and Instagram was removed from the broadcast because it provided harmful medical information. However, these practices do not prevent false health referrals. TikTok has stated that it “removes ads that promote self-diagnosis or are intended to discourage you from seeking appropriate medical advice from a healthcare professional.” But there are still many gaps in the control of applications. In addition, as a result of the increased search for health information due to the COVID-19 crisis, social media has been filled with health content. In particular, there seems to be a lot of mental health content. In the last 2 years, the number of phenomena that produce content by focusing on conditions such as OCD, dissociative identity disorder, and autism has increased tremendously. For example, on TikTok, the ADHD hashtag 10.6 billion, anxiety 13.1 billion, neurodivergent has about 3 billion views. While the danger of self-diagnosis mostly covers young people, the tendency of young people to follow peer groups also supports this type of behavior [20].

Table 1 presents views from experts on self-diagnosis. When considering literature and experts’ opinion, it is seen that self-diagnosis is a threat to young people with mental illness. Social media make is more accessible for people who seek for

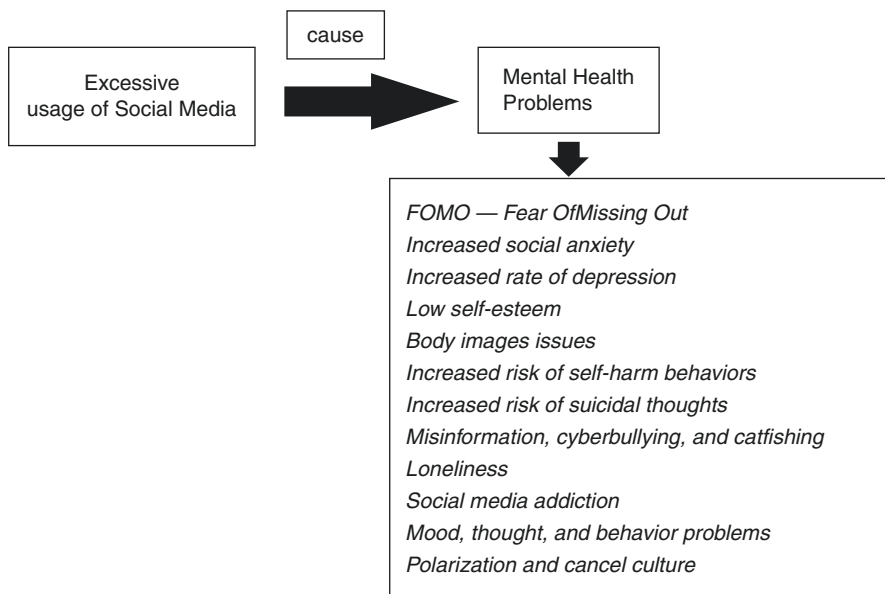


Fig. 1 Social media and mental illness (Source: based on [19] and created by author)

**Table 1** Some findings: expert opinions based on self-diagnosis, mental illness, and social media association

Elements	What experts say	Key findings
Demographics	Most experts said that young adults had a higher potential to self-diagnose through social media or internet	Teenagers and young adults appear to be more open to self-diagnosis and are more prone to self-diagnosis because of greater peer influence
Health status	Most experts determined that people who have already some mental illness, are more open to self-diagnose rather than healthy people in general	It can be said that patients with mental disorders such as depression or anxiety disorder search more for disease information on the internet. Therefore, they are closer to seeking treatment with self-diagnosis
Social media	Social media content offers a wide variety of disease and treatment information, but their accuracy is unknown	The rise of social media usage makes it easier to self-diagnose for people who search for health and illness info
Health concern	Self-diagnosis can increase health concerns for people	People who self-diagnose have more health concerns in the long run
Information search	Internet and social media present much info about health, treatment, and illness. Access information is so easy through social media contents	As a result of the selection and registration of social media content according to the interests of the people, people who are in search of illness and treatment are unwittingly exposed to more health and treatment content
Advertisements through social media	A large number of social media content makes it very difficult to audit. Pharmaceutical companies can also encourage people to use the wrong drug by publishing their advertisements on social media	Drug advertisements published on social media may cause people who self-diagnose to use these drugs more
Mental illness	The symptoms of some mental illnesses are similar and social media people share these symptoms without being an expert	Even though a person has no mental health problems, most people think they have some illness due to self-diagnosis

health and treatment info to self-diagnose. In addition, the more people self-diagnose, the more anxious they become in long term.

### 3 Descriptive Study

This part explains the link between self-diagnosis, social media, and mental health problems by exploring sample cases from Türkiye. As employing qualitative research methodology, this study collected some sample cases through internet sources and then cases were analyzed by descriptive content analysis. This study employed purposive sampling methodology to select specific cases from Türkiye.

According to prior literature, it is mostly seen that self-diagnosis also cause over-consumption of drugs or vitamins without any physician control and internet usage encourages self-diagnosis. The following criteria were adopted in the purposive sampling method. The study included cases related to self-diagnosis, mental health, and social media and its outcomes in Türkiye. This study selected the below cases:

- **Case 1:** The most common situation in the counterfeit drug market is the introduction of substandard or counterfeit versions of drugs. Products that do not contain the active substance of the original drug or contain other substances are sold. In addition, illegally bringing original drugs to the country, changing the barcode and data matrix information on them and selling them are among the methods frequently used. On the other hand, since there is a high demand for weight loss pills and pills that are claimed to increase sexual power (erection support, aphrodisiac supplements), various supplements are also among the favorites of scammers. According to Prof. Mustafa Cetiner (Acıbadem Hospital, Internal Diseases, Hematology), “the number of buyers of supplements that are claimed to contain aphrodisiacs, increase sexual power and help with erection problems is substantial. This demand can be attributed to the fact that individuals avoid talking about their problems due to the fact that sexuality is seen as a ‘taboo’ in Turkish society.” People who cannot open to a specialist doctor hope to benefit from such drugs [21].
- **Case 2:** Gangs that produce counterfeit drugs open websites with the names of pharmacies and sell on the internet and social media. Food supplements, herbal medicines, vitamins, burn creams, muscle relaxants, eye drops stand out among the most sold products. Products that are forbidden to enter Türkiye from abroad are also offered for sale on these sites, as well as counterfeit products of world-famous drug brands. The vast majority of people who use counterfeit drugs consult a doctor as a result of serious reactions. In the complaints, it is stated that there are side effects such as dizziness, vomiting, high fever, itching, and swelling [22].
- **Case 3:** Pharmacist Şeker Pınar Özcan (Member of the Board of the Istanbul Chamber of Pharmacists) stated that there has been a serious increase in demand for vitamins with the pandemic. This increase is a physical but uncontrolled increase. Some patients order from the internet or buy products from the market or gas station other than the pharmacy, see the side effects of this and get sick or do not see any benefit. Unfortunately, it appears to be a very unconscious use. It is necessary not to be fooled by various images from the internet. Sometimes real product images are used, but a completely different product is delivered to people. The patient who uses it can sometimes be a blood pressure patient. For example, a person thinks that he only bought a simple vitamin or something with herbal ingredients from the internet, but this may have triggered his blood pressure. Some drugs can cause bleeding when used together. Pharmacist Özcan determined that many patients suffered from problems due to the unconscious usage of drugs [23].

- **Case 4:** Exp. Bio. Çiğdem Üregen stated that vitamin intake was mostly provided by self-diagnosis detection of individuals from pharmacies and digital channels. This situation was extremely dangerous. People did not know by themselves whether there was a vitamin deficiency in their body. A single vitamin cannot make up for the deficiency of another vitamin. Therefore, before taking vitamins, it is necessary to consult a specialist and doctor and use it under his direction. Doctors can recommend the right vitamin to people in the right amounts. Hypervitaminosis occurs when unnecessary vitamins are taken. It is known that vitamins taken from natural foods as much as daily needs do not cause any problems. On the other hand, the need for additional vitamins should be planned according to the doctor's advice [24].
- **Case 5:** Prof. Vefik Arica (Dean of Yalova University Faculty of Medicine) stated that it has been observed that families take vitamins for their children without consulting the physician. For the use of vitamins, the child must first undergo a medical examination. The use of vitamins should be started after the necessary examinations are made and which vitamin deficiency is determined. Therefore, vitamins should not be taken by self-diagnosis without consulting the physician and pharmacist. Prof. Arica stated that during the epidemic period, the vitamins that were taken outside the control of the doctor and without consulting the pharmacist, under the counter and whose effectiveness has not been proven cause some problems. The main problem in unconscious vitamin consumption is seen in children. In unconscious use, vitamin syrup whose effectiveness has not been proven may not have completed the missing vitamin in our body. If the child has iron deficiency, learning difficulties, autism, and retardation in IQ may occur in the future. According to Prof. Arica, the internet threatens individuals' health by selling fake and dangerous medicines, vitamins, etc. [25].
- **Case 6:** Exp. Dr. Filiz Arabacı stated that due to the Coronavirus, people prefer vitamins D and C to protect their body resistance. The unconscious use of vitamins has increased during the epidemic period. However, people have chronic diseases, and unconscious use of vitamins can cause serious systemic problems. For example, unnecessary and irrespective use of vitamin D causes very serious consequences. Before using vitamin D, the blood level should be checked and if the blood level is low, vitamin D should be taken. This should be with the recommendation of the doctor. With self-diagnosis, people go directly to the pharmacy and buy vitamin D. Long-term use of vitamin D and high levels of vitamin D in the blood lead to kidney diseases, kidney stone disorders, and high blood pressure in long term [26].
- **Case 7:** Dr. Aslı Karadeniz (Maltepe University Faculty of Medicine, Infectious Diseases and Clinical Microbiology) stated that if antibiotics and other drugs are not used in the right dose and time, the body may be harmed, unexpected diseases and side effects may occur. For example, allergic reactions may occur, liver and kidney failures may occur, different drug interactions and side effects may occur. In order to prevent the negative effects of excessive, unnecessary and wrong drug use, it is necessary to use drugs at the right time and in the right way,



with the advice of a doctor. Even if there are side effects, the patient will be under control. Physicians have an important responsibility in rational drug use. Unconscious drug use may complicate the control of the disease. Stating that the treatment of cold and flu can mostly be done with rest, plenty of fluids, and simple medicines at home, Dr. Karadeniz stated that unconscious drug use can make it difficult to control the disease. Dr. Karadeniz pointed out that the drugs given in influenza infections should not be used uncontrolled and warned that vitamins should not be taken without a doctor's advice. In some cases, it is seen that patients stop taking the drug on their own [27].

- **Case 8:** The Ministry of Health announced some data on antidepressant drug use in Türkiye on February 2, 2015. Accordingly, 1 out of every 10 people in Türkiye uses antidepressants. These high rates show that there are prescriptions issued by physicians who are not in the field of mental health, drugs recommended by pharmacy staff, drugs used with "neighbor advice," and unconscious use. People may start to use drugs incorrectly, not be able to cope with drug side effects, worry, and withdraw from treatment. During the treatment process related to mental health, people cannot be patient enough and go to frequent doctor changes and frequent drug changes and can cause them to enter a vicious circle again. Sometimes, relapse or chronicity of symptoms and unresponsiveness to treatment can be seen because people stop taking the drug early without consulting their doctor as soon as their symptoms improve [28].
- **Case 9:** Prof. Abdurrahman Altındag (Gaziantep University Faculty of Medicine, Department of Psychiatry), the increase in the pace of life and competition and the weakening of social bonds have isolated people and increased the risk of depression. Psychiatric diseases have a prevalence of 10% in women and 5% in men. When they get depressed, people look for various solutions and start trying other people's drugs. Non-prescription drugs can be easily purchased from pharmacies. Unconscious use of antidepressants can lead to the worsening of the person's mental state or to the emergence of different disorders. The side effects of some drugs are not suitable for the use of the patient. Antidepressants should be used under the supervision of a doctor, in doses that he deems appropriate [29].
- **Case 10:** According to Prof. Karaduman, help should not be sought from people who are not experts in the treatment processes of the low back, neck, and joint pains. Commonly in the community, people talk about their experiences and offer mutual advice for solving illness or pain. The recommended exercises can make people physically sicker. Unconscious sports exercises can worsen the health of patients [30].
- **Case 11:** Evaluating the results of the research in the news of M. Günay from Milliyet newspaper, there is an interview with Dr. Aylin Tutgun Ünal about cyberchondria. According to Dr. Ünal, with the increase in the time spent at home during the epidemic, internet use has also increased. It has brought a new problem in the field of health to the agenda in the new media era. The prevalence of moderate cyberchondria in all generations between the ages of 18 and 75 also revealed the extent of the danger. Twenty-two percent of them stated that they

constantly searched for a disease on the internet, thinking that they had an undiagnosed disease. Unfortunately, when Gen Z realizes something about their body that they can't explain, they search for it online many times. He takes the information he obtains from the internet seriously rather than the opinion of his family doctor or specialist doctor. While researching the symptoms of the disease on the internet, he also visits forum sites where the medical conditions, symptoms, and experiences of people with the disease are discussed. In the study, it was also seen that the generations who applied to the family health center searched more diseases on the internet and were highly cyberchondria [31].

- **Case 12:** The concepts of health and disease are among the most talked about and discussed topics in the digital environment today. According to Dr. Alptekin Çetin, “Shares, comments, different treatment options and results of these treatment options have become easily accessible on the internet.” However, inferences and diagnoses for serious diseases can emerge from simple symptoms. For example, a person who takes over the internet search engines for heartburn may be in a position to diagnose him with stomach cancer at the end of the day. People with symptoms of cyberchondria also have higher levels of health anxiety. People who do not receive professional help for a disease they think they have, or who do not prefer to receive it, believe that they have different health problems based on non-scientific comments on the internet based only on personal experiences [32].
- **Case 13:** Cyberchondriac disorder is a variant of hypochondriasis under the somatoform disorders. Cyberchondria disease is the state of “*trying to diagnose or treat him by searching information, documents and treatment methods on the internet about the diseases he thinks he has.*” Cyberchondriacs do not trust doctors very much. They think that the procedures are insufficient, even though they go to the hospitals many times because of their complaints. Although the physicians exhibit a compelling attitude in the examination and analysis procedures, all the examinations are normal. This situation may make them more ambitious and continue their research on the internet for self-diagnosis. They can browse forums, blogs, or even start researching foreign articles. Worst of all, the cyberchondriac person doesn't deal with just one complaint. They investigate the slightest disruption or discomfort in their bodies, often with exaggerated conclusions. However, it is natural treatments that attract the most attention of cyberchondriac patients. Because they don't trust drugs too much. They do not find it very reassuring because they always read the package inserts of the drugs. For this reason, they can also access expert-level knowledge about medicinal plants over time [33].
- **Case 14:** Çiftçi (2022) interviewed with Clinical Psychologist Cemre Ece Gökpınar about self-diagnosis. According to Gökpınar, cyberchondria increased health concerns, and people try to feel relax when searching health info on the internet without going to any expert or medical doctor. Unfortunately, digital media present many health info and some of them are very dangerous for the health of society. For example, websites that offer some natural and herbal mix-

tures cause people to try these mixtures regardless of whether they are allergic or not, and people's health is worsened [34].

- **Case 15:** Dr. Rıdvan Üney (Psychiatrist/Psychotherapist) has identified some situations related to the behavior of searching for illness on the internet. Health sites on the internet are attracting a lot of attention. When people notice a symptom of a disease in them, they first research on the internet. Some people call this behavior Google doctors. The state of being overly worried about their health is called Health Anxiety (Health Anxiety). This anxiety ranges from simple curiosity to sickness. As the health concern increases, so do searches for the disease on the internet. Now, at the slightest indication, a person spends a lot of time on the internet. This condition is called "Illustration Searching on the Internet" or "Cyberchondria." Searching for a disease on the internet can cause the following types of damage according to Dr. Üney [35]:

- (a) The person can find dozens of diseases as the cause of the slightest symptom.
- (b) While searching for illness on the internet, a person may first feel relief and then be exposed to negative information.
- (c) As people find illness, their health concerns increase.
- (d) People can access wrong disease information from their symptoms.
- (e) Although people have a simple symptom, they may have a fear that it may be fatal.
- (f) Due to the information pollution on the internet, in order to cope with his illness, he receives treatment information from sites that have no scientific basis.
- (g) Due to self-diagnosis, people apply too many vitamins or use nonsensical herbal medicines.
- (h) They shop from completely commercial sites that are not remotely related to health. They endanger their own health.

This study provides some descriptive findings based on selected cases from Turkey as below:

### ***3.1 Descriptive Evidence***

This study selected some cases related to self-diagnosis, mental health, and social media from Türkiye. Based on selected cases, some descriptive findings can be presented as below:

Table 2 presents main themes related to self-diagnosis, mental health, and social media based on Turkish cases. It can be said that experts mostly determine the link between social media and self-diagnosis by terms of "Cyberchondria, Health concern and anxiety, Internet and Social Media, Fake Treatment, Fake Medicine and Counterfeit Drug, Overdose of Vitamins and food supplement in Türkiye." Self-diagnosis is mostly related to the level of health concern and anxiety, then

**Table 2** Findings about the link between self-diagnosis, mental illness, and social media from Turkish cases

Main titles	Key points
Cyberchondria	As the health concern increases, the addiction behavior of searching illness through internet increases too Cyberchondria mostly depends on health concern, and self-diagnosis is also related with cyberchondria
Health concern and anxiety	Health concerns and anxiety encourage people to search for illness or treatment through internet and social media
Internet and social media	Internet and social media make it easier to access health info for households
Fake treatment	Self-diagnosis can cause fake treatment for people
Fake medicine and counterfeit drug	The industry of fake medicine and counterfeit drug increases through self-diagnosis
Overdose of vitamins and food supplement	During the COVID-19 pandemic, people become to consume vitamins and food supplement more

**Table 3** Risks of self-diagnosis through social media

Variables	Key points	The level during the COVID-19 pandemic
Fake treatment and fake diagnosis	People search some sign of a medical problem by social media and then they self-diagnose. Unfortunately, nobody knows what kinds of treatment or diagnosis will be occurred	Increase
Fake experts	During the COVID-19 pandemic, social media included higher numbers of health contents and many fake experts suggest some health recommendation for households	Increase
Fake news	Fake news increased by social media and people who mostly self-diagnosed, believed this news much more	Increase
Fake medicine consumption	Fake medicine consumption increases due to self-diagnosis, and digital media provides a huge marketplace for the fake medicine industry	Increase
Mental illness	Self-diagnosis causes mental illness such as depression or addictive	Increase
Allergies and health hazard	The consumption of overdose of vitamins and food supplements will make allergies and health hazard	Increase

cyberchondria increases based on health concerns. The vicious circle between self-diagnosis and health concern is dangerous for society's health in long term.

Table 3 shows how self-diagnosis can threaten human health in long term. Unfortunately, social media channels give many fake news and info about health issues. For example, influencers or some fake experts suggest some vitamins or organic mixture for people and people tend to believe them as they self-diagnose through social media. The COVID-19 pandemic made people more anxious about their health and self-diagnosis and cyberchondria increased.

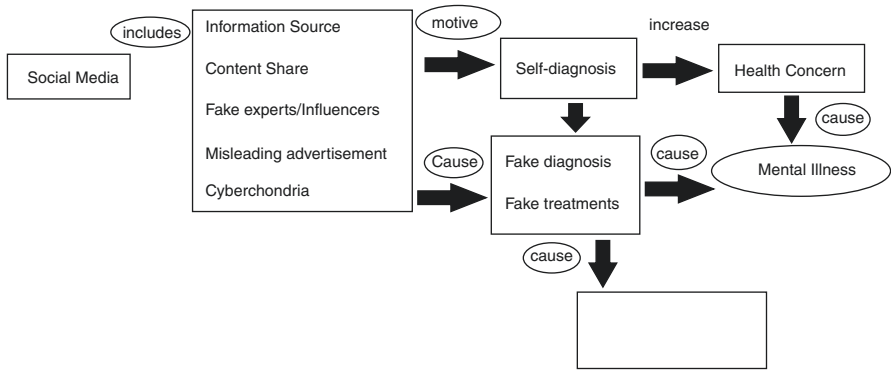


Fig. 2 A conceptual model (Source: created by author)

### 3.2 A Model: The Link Between Social Media Usage, Self-diagnosis, and Mental Health

As determined by the literature review and selected Turkish cases, some key points can guide for the link between social media, self-diagnosis, and mental illness. Figure 2 shows an alternative model as below:

## 4 Conclusion and Discussion

The COVID-19 pandemic has changed the lifestyles of people globally and almost forever when considering its effect on the rapid digital transformation. In other words, the COVID-19 pandemic has accelerated digital adaptation from younger to older. However, it has been expected that digitalized world would be the new universe for people since the beginning of twenty-first century [36, 37]. As accessing information in an easy and fast way through digital media, people challenge with over-information, too. The main trouble is finding or accessing real information from digital media channels. Unfortunately, there are lots of digital media channels and information in the digital world. In this point, self-diagnosis is another problem related to rising digitalization in recent days. In this context, this study aims to explore how the internet influences self-diagnosis by analyzing its impact on mental health. Accessible applications for physicians and specialists can deliver efficient results in healthcare. On the other hand, self-diagnosis practices used by people who are not healthcare professionals can have dangerous consequences. Therefore, it is necessary to pay attention to the use of AI-based digital health applications [4]. The internet can cause wrong diagnosis and misunderstanding by decreasing the belief in healthcare professionals [12]. Self-diagnosis can provide some benefits but digitalization has caused individuals to overuse the internet and social media channels, and accessing false information through digital channels has brought serious

health problems. In particular, people can make themselves sick as a result of unconscious consumption of vitamins and supplements through self-diagnosis. Exp. Bio. Cigdem Üregen stated that when fat-soluble vitamins (vitamins A, D, E, K) are taken in excess, they cause accumulation in the body. Due to the uncontrolled usage, it causes an excess of vitamins called “hypervitaminosis” [25]. Hypervitaminosis can occur acutely and chronically. Acute hypervitaminosis occurs as a result of the use of one or more vitamins, depending on the high dose. Chronic hypervitaminosis occurs when clinical symptoms occur with a latent course. The toxicity of water-soluble and fat-soluble vitamins causes poisoning syndrome [38].

When considering the link between self-diagnosis and social media usage, it is seen that using fake drugs or overconsumption of vitamins are critical threats for sustainability of society’s health in long term. The counterfeit drug market which is exceeding 300 billion dollars worldwide continues to grow day by day due to the development of social media channels. According to the 2021 data of the World Health Organization, 10–15% of the pharmaceutical market is in the hands of the counterfeit medicine market and more than one million people die every year due to counterfeit medicine [21]. During the COVID-19 pandemic, it has been seen that many people turn to vitamins and food supplements to strengthen their immune systems. Citizens started to buy vitamins through websites, not pharmacies, as they met many of their needs by shopping online due to the epidemic. However, when talking about clothes, shoes, and electronic materials, now fake vitamins are offered for sale on e-commerce platforms. Recently, the number of people complaining in consultation with their pharmacist that the vitamin they buy online is different from the ones they bought before has increased [23].

While using the internet for reliable information about mental health problems, the following may be recommended [18]:

- Information can be obtained from sites ending with the “.gov” suffix because they are supported by the federal government.
- Sites ending in “.edu” may be more reliable because they are managed by medical schools or universities.
- Information on health sites ending with “.org” may be more reliable because they are maintained by non-profit organizations.
- Articles from scientific journals or medical journals can be read.
- Diagnoses themselves can be complex. Therefore, mental health problems should not be solved by self-diagnosis alone without professional help.
- Many people who are not licensed and educated on social media present themselves as experts and give health advice. Therefore, it is important to check whether the people from whom health advice will be sought are truly experts.

While social media channels support the counterfeit drug market [1], self-diagnosis has also become a driving force for the vitamin market and other supplement markets. Economically, self-diagnosis has become a profit tool for digital platforms, but it is a threat to the sustainability of public health. As it is known, the COVID-19 pandemic has increased health concern and people tend to self-diagnose much more than ever. When considering digital transformation in health industry

[39], digitalized tools and digital media channels will be core source in the future. In this point, people should be aware of fake news [40, 41] fake medicines, fake experts [1], and fake treatments to save their health.

This study has some limitations such as data selection, case selection, sample, and methodology. Future studies can explore the impact of self-diagnosis on mental health for different countries by using different methodologies. However, this study is thought to guide future studies by giving some descriptive evidence for the link between self-diagnosis, social media, and mental health as a result of investigating Turkish cases.

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