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RESEARCH ARTICLE
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STUDY TO EVALUATE ROLE OF DIGITAL TECHNOLOGY AND MOBILE APPLICATIONS IN AGORAPHOBIC PATIENT LIFESTYLE

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Abstract—Agoraphobia is a mental illness that makes sufferers excessively afraid of succumbing to anxiety or being unable to receive treatment when they need it. Patients who have a strong fear of waiting in line or standing in a bar or unable to leave their homes, entering a crowded area, or even going to the local convenience store, fear strangers, and fear of sudden incidents are called agoraphobic. It is difficult and extremely hard to evaluate, diagnose, and treat someone who has agoraphobia. Smartphones may be helpful in the management and treatment of agoraphobia because of advancements in information and communication technology. Communication, social interaction, health, hyperventilation, and stress problems are all symptoms of agoraphobia. To better understand how technological advancements can help with the early identification and treatment of the illness. Method: the study's purpose is to undertake a detailed literature review of done experiments to treat disease and the usage and functionalities of mobile applications. The biggest literature review we held included 140 articles. After a questionnaire, only those Applications are considered which are found to meet the requirements. The search turned up a total of 50 applications, of which 20 were deemed beneficial for phobias, and 30 were created specifically for phobias (including Informative, Evaluation, and Therapy Apps). Results: a big and deep analysis containing a review of 81 expert articles and 50 mobile applications revealed that future research is required to validate these technologies and needs more controlled experiments with a larger sample size. We conclude that by

providing IT training to the agoraphobic individual, we may aid in their mental transformation, break destructive thinking patterns, and replace their initial apprehensive forecasts with optimistic ideas and self-assured personalities. As practice makes perfect, exposing the agoraphobic individual to such circumstances and things might also aid in helping them get over their anxiety. It's also quite easy to accomplish because modern cell phones provide a wealth of information, communication, and social skills that an agoraphobic person could find valuable. Conclusion: we reviewed literature and a detailed description of the numerous smartphone and desktop apps designed particularly for agoraphobic people to lower their degree of terror and help them feel at ease and protected. We list all gaps and challenges to teach and educate patients who are agoraphobic, through applications anticipating patient requirements and disease levels, assessing communication, and writing abilities, and enabling the recording of various activities or tasks accomplished by the patients.

Index Terms— Agoraphobia, Mobile Phone Applications, Panic Disorder, ICT, Smartphones.

Introduction

1.1. Context and Motivation

The prevalence of agoraphobia, characterized by intense fear and avoidance of places where escape might be difficult, has stimulated significant interest in exploring effective management strategies. This condition profoundly impacts daily functioning and quality of life, necessitating effective interventions. The urgency to address such conditions parallels the broader advancements in the use of information technology and artificial intelligence in healthcare, which offer new avenues for diagnosis, treatment, and management of various medical conditions. Recent technological advancements have introduced the potential for digital tools and mobile applications to provide novel support mechanisms for individuals suffering from this disorder. These digital interventions offer convenient, personalized, and less stigmatizing alternatives to traditional therapeutic approaches.

Informed by the integration of advanced neural network models and quantum computing for medical diagnostics as demonstrated by Shahwar et al. [1], the potential for harnessing sophisticated computational techniques in the study of agoraphobia is evident. This hybrid classical-quantum machine learning model significantly enhanced the accuracy of Alzheimer's disease detection, suggesting that similar approaches could be beneficial for the nuanced diagnostics required in agoraphobia treatment and management [1]. The use of such innovative technologies mirrors efforts across various health conditions where early detection and precise diagnostics are crucial.

Further exploration into the capabilities of deep learning models, as applied by Ouichka et al. for predicting epileptic seizures, highlights the utility of complex neural networks in identifying subtle patterns in medical data which could similarly apply to the predictive modeling of agoraphobia-related behaviors [2]. This progression towards advanced computational models is paralleled in the work of Mohi ud din Dar et al., which utilizes CNN models for classifying different stages of Alzheimer's disease, indicating a broad application of image-based diagnostics in neurological conditions [3].

Moreover, the adaptation of PET neuroimaging with convolutional neural networks by Bin Tufail et al. to categorize early stages of Alzheimer's demonstrates the adaptability of neuroimaging and deep learning in medical diagnostics, a method that could be transferred to the study of agoraphobia [4]. Such technologies not only facilitate improved diagnostics but also enhance monitoring and personalized care, integral aspects of managing conditions like agoraphobia.

Finally, the integration of statistical methods to evaluate diabetes distress in the study by Noman et al. underscores the importance of comprehensive screening and diagnostics in chronic conditions, a principle that is directly applicable to the multi-faceted assessment needs in agoraphobia [5]. The convergence of these advanced technologies in health care emphasizes the potential for significant improvements in the management of agoraphobia through enhanced diagnostic tools, predictive modeling, and personalized therapeutic interventions, thereby transforming the approach to mental health care and support systems.

1.2. Objectives

This study is designed to expand upon the existing knowledge base by focusing on three primary objectives:

- Systematic Literature Review: This research aims to conduct a comprehensive literature review to identify and articulate the key challenges that agoraphobic individuals face in their daily activities. The review will analyze existing studies to uncover gaps in the current understanding and management of agoraphobia, providing a foundation for potential solutions that enhance daily functioning for those affected by this condition.
- Utilization of Information and Communication Technology (ICT): We will explore how the use of smartphones and other digital devices in diagnosing, managing, and assessing the impact of agoraphobia can be optimized. This involves examining how mobile and digital technologies can serve as therapeutic tools, enabling better self-management and monitoring of symptoms, and providing real-time support and intervention capabilities.
- Integration of Technology in Treatment and Education: The study will investigate how integrating technology into treatment plans can improve outcomes for agoraphobic individuals. Specifically, it will focus on the role of technology in enhancing the practice of therapeutic techniques and the education of patients about their condition. The aim is to develop communication, social, and writing skills through interactive apps, virtual reality simulations, and other digital platforms that encourage safe exposure and gradual acclimatization to anxiety-provoking situations.

These objectives are rooted in the innovative use of technology to transform the approach to mental health care, particularly for agoraphobia. By leveraging ICT, this study seeks to provide actionable insights that can lead to more effective, personalized, and accessible treatment options for individuals suffering from agoraphobia.

1.3. Structure of the Study

This article is systematically structured to provide a thorough exploration of agoraphobia and the role of digital technologies in its management. Starting with an Introduction that sets the stage, it progresses into the Background of Disease where the condition is defined and its symptoms discussed. The Methodology section explains the research methods used for the systematic review. The Clinical Background covers medical insights including causes, demographic impacts, and treatment options. Literature Findings and Literature Outputs present key discoveries and analyses from the reviewed studies. Gaps and Find in Tools identifies shortcomings in current methodologies, while the Mobile Application section evaluates specific apps designed for agoraphobia management. The Analysis of Gaps in Applications and Recommendations offers targeted improvements for these tools. The article concludes with a Conclusion section that recaps the findings, provides forward-looking recommendations, and suggests directions for future research. This format ensures a comprehensive understanding of the current landscape and future potential for managing agoraphobia with technology.

Background of Disease

Agoraphobia is a form of anxiety disorder in which the patient has physical and mental disturbances that hinder him from acting normally and engaging in routine activities. The agoraphobic person is unable to act normally. Because an agoraphobic person would respond frightened and avoid eye contact with an interacting person out of fear, the person who is engaging with an agoraphobic person for the first time may see his conduct as disrespectful or hostile. It doesn't matter that an agoraphobic person can't do even the smallest task by themselves; they may still live and work in their house in a very quiet atmosphere if they have the necessary experience. Without agoraphobia or panic episodes, life is normal, and the agoraphobic individual does not blame their eyes, hands, or physical condition. People with agoraphobia struggle to respond appropriately to a novel or shifting environment. A person with agoraphobia will experience a rapid pulse, sweating, trembling, shivering, breathing difficulties suffocating sensations, unexpected fleshing, chest discomfort, stomach issues including pressure or diarrhea, fear of death Loss of control over one's actions and one's thinking [6, 7].

1.4. Symptoms of Disease

Agoraphobia is a neurological illness in which the sufferer is unable to react to or comprehend the situation due to a loss of control over behavior and the brain [8-10]. Patients with such neurological conditions will have poor social and communicative abilities. The agoraphobic cannot afford to make a small adjustment. The patient may be more injured or disturbed by a change in surroundings, which increases the risk of an agoraphobia episode and serious sickness. Due to the agoraphobic patient's dread, neurological dysfunction, and elevated panic levels, it can be exceedingly challenging or impossible to manage them in changing environments when they don't recognize or can't react to unfamiliar or changing people. If they have to leave their house, travel outside, or see someone outside, they must wait in line; board a packed, loud train; and must enter small or confined businesses such as theatres and retail centers [11].

They will flee or may engage in extremely deviant conduct, such as suicide and other risky behaviors [4]. Patients with agoraphobia share a passion for learning as well as a variety of other interests and aspirations. A variety of authors have discussed agoraphobia in literature, describing it from various points of view regarding personality, agoraphobia with or without panic disorder, and offering their treatment recommendations. Around 0.8 percent of persons over the age of 18 have agoraphobia, which affects 1.8 million people in the country. Agoraphobia is thought to affect 5%–12% of people in their lives [12]. A summary of agoraphobia disease can be seen in given below figure 1.

1.5. Role of Digital Technology in Agoraphobia

The use of digital technologies and mobile applications to provide unique support for those suffering from agoraphobia is investigated through a study that hopes to expand our understanding of practical techniques to improve the lives of persons affected by anxiety illness by doing so [13, 14]. By describing the role of digital technology in agoraphobia diagnosis, treatments, and training, we can make it clear that over the past few years, the importance of technology in our lives has increased and that using computers has decreased costs as well. Thanks to computers and technology, we can provide a variety of diagnoses and treatments at a very low cost [15, 16], thus a patient with agoraphobia can communicate with a machine or computer pleasantly; yet, an agoraphobic individual does not interact with people kindly, especially with a new or unfamiliar person [17].

1.6. Role of Smartphones in Agoraphobia

The use of a smartphone offers a variety of interface customization options, allowing an agoraphobic person to personalize it to suit his interests and needs. Agoraphobic people benefit from information and technology by developing their social and communication skills. Because of the rise in memory load, stress, panic, hereditary factors, and misinterpretation of agoraphobia symptoms, the number of patients with agoraphobia is rising daily. There are several methods for diagnosing and treating patients, but doing it manually takes a long time compared to doing so quickly using technology [18, 19].

1.7. Role of Interfaces

Interfaces, particularly voice-based interfaces, are crucial in agoraphobia therapy, providing key advantages. They enable remote access, which is a lifeline for agoraphobic people who are limited to their safe zones [20, 21]. Voice interfaces promote open and successful therapy by ensuring discrete participation. Real-time assistance aids in the management of panic episodes, while customization tailors' therapy to the needs of the individual. Furthermore, they eliminate mental health stigmas and foster a nonjudgmental, comfortable environment [22, 23]. Continuous monitoring assists healthcare choices, and interactive elements such as gamification increase engagement and adherence. Integration with cutting-edge therapy, such as virtual reality, improves efficacy. In conclusion, interfaces facilitate agoraphobia therapy by bridging gaps and boosting patient well-being [24].

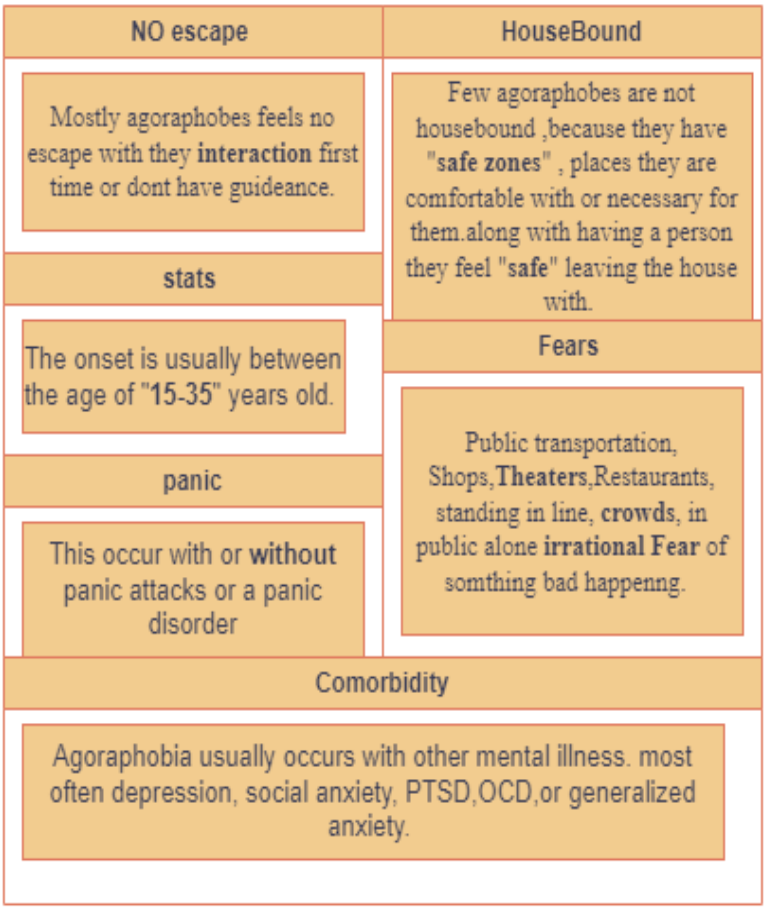


Fig. 1: Agoraphobia Introduction

Methodology

The review is based on a comprehensive review of up to 2023 published research publications, unpublished articles, and dissertation projects. People who are agoraphobic, including both children and the elderly, were the target demographic. 104 Questionnaires were held to classify the apps that are most prioritized by patients to classify the most practical and educational platforms, we used literature concepts and findings to help patients find applications by expanding existing knowledge of literature we divided the applications into these criteria.

- Applications useful for Agoraphobia: Applications specially designed for Agoraphobia:
- Information Apps: These provide just information and knowledge for agoraphobia.
- Assessment Apps: Applications used for assessment of diseases and stages.
- Treatment Apps: Application that is used for the treatment of agoraphobia.

1.1. Criteria for Study Selection

Using these search terms in several highly regarded electronic databases listed above, we were able to locate some research publications. There were a ton of research papers that we received. Peer-reviewed studies only in English were allowed for the research papers. A trial search is used to set the criteria for retrieving pertinent data. Research that includes the causes, symptoms, therapies, and other relevant subjects of agoraphobia using technology and information. Studies that offered thorough answers to all the study's queries were included. Studies written in English are also included. Only the complete papers, books, or articles that match the search terms were discovered after scanning all abstracts. For our electronic data, we checked the websites sciencedirect.com, springerlink.com, HEC.edu.com.pk, Ieeeexplore.ieee.org, and ACM.org. The flow chart below (figure 2) explains the complete research process. The flowchart lists the studies included, excluded, or left out, along with the reasons behind each decision.

1.2. Excluded Criteria

Studies that don't have anything to do with agoraphobia are not included. The research that did not cover or explain how information and technology can help someone with agoraphobia condition was also disregarded. The research papers and publications that do not contain original data have been omitted from the study that is given in non-English languages. Studies that describe drugs and those that are included in books were omitted.

1.3. Methods and Materials

To achieve the objectives of the investigation, a systematic review of the literature has been conducted, and biomedical libraries and research articles to gather data for the development of the QAs. The study utilized quality assessment criteria based on the Oxford quality scoring system, commonly referred to as the jaded scoring system, to conduct a scoring analysis. A score of 3 was indicative of a high level of eligibility (See Appendix A for scores). The following steps are followed for the quality assessment of papers (figure 3). Figure 4 presented android application review defines inclusion and exclusion criteria related to android apps.

i. Initially a large list of papers is obtained following the keyboards search.
ii. Publisher-based filtering is performed. Only journal/workshop papers are included.
iii. Only papers from renowned publishers are included like Springer, IEEE, ACM, Wiley, etc.
iv. Papers from non-indexed journals are excluded.
v. Title-based filtering is performed and papers having the keywords in their titles are included rest are excluded.
vi. Then the abstract of the papers is read, and those papers are included which describe performance comparison, and adverse effects of the method. Rest is excluded.
vii. After that, papers are searched for answers to questions, if an answer to any question is found, papers is included else it is excluded.

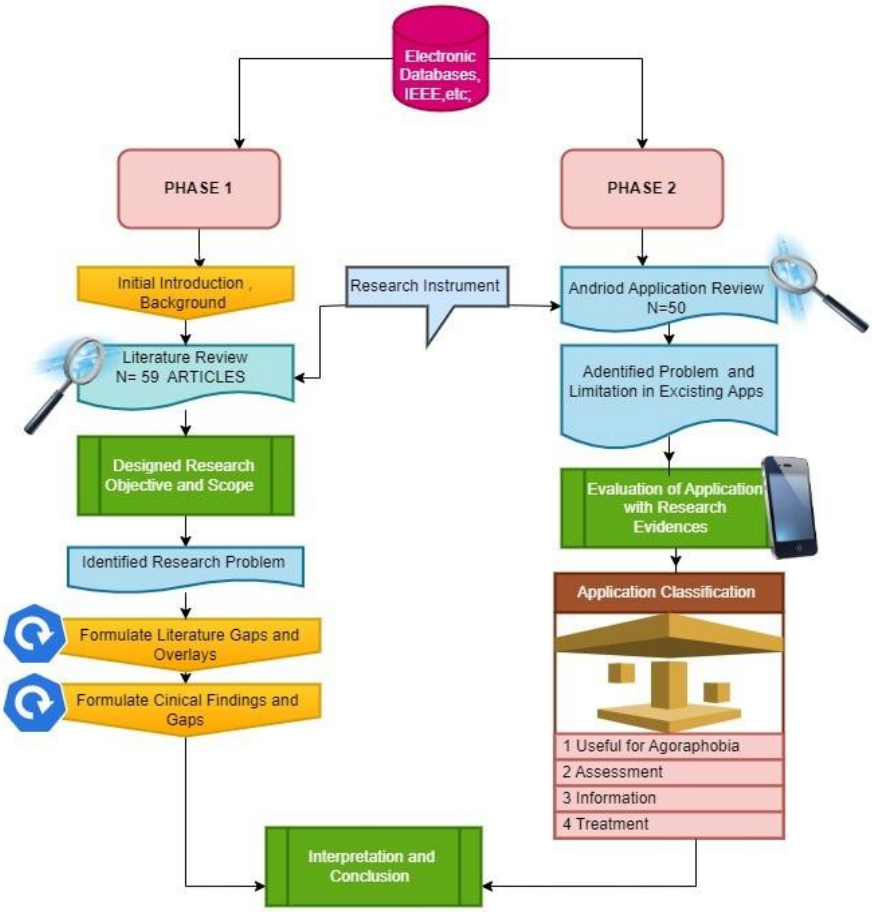


Fig. 2: Research Methodology Diagram

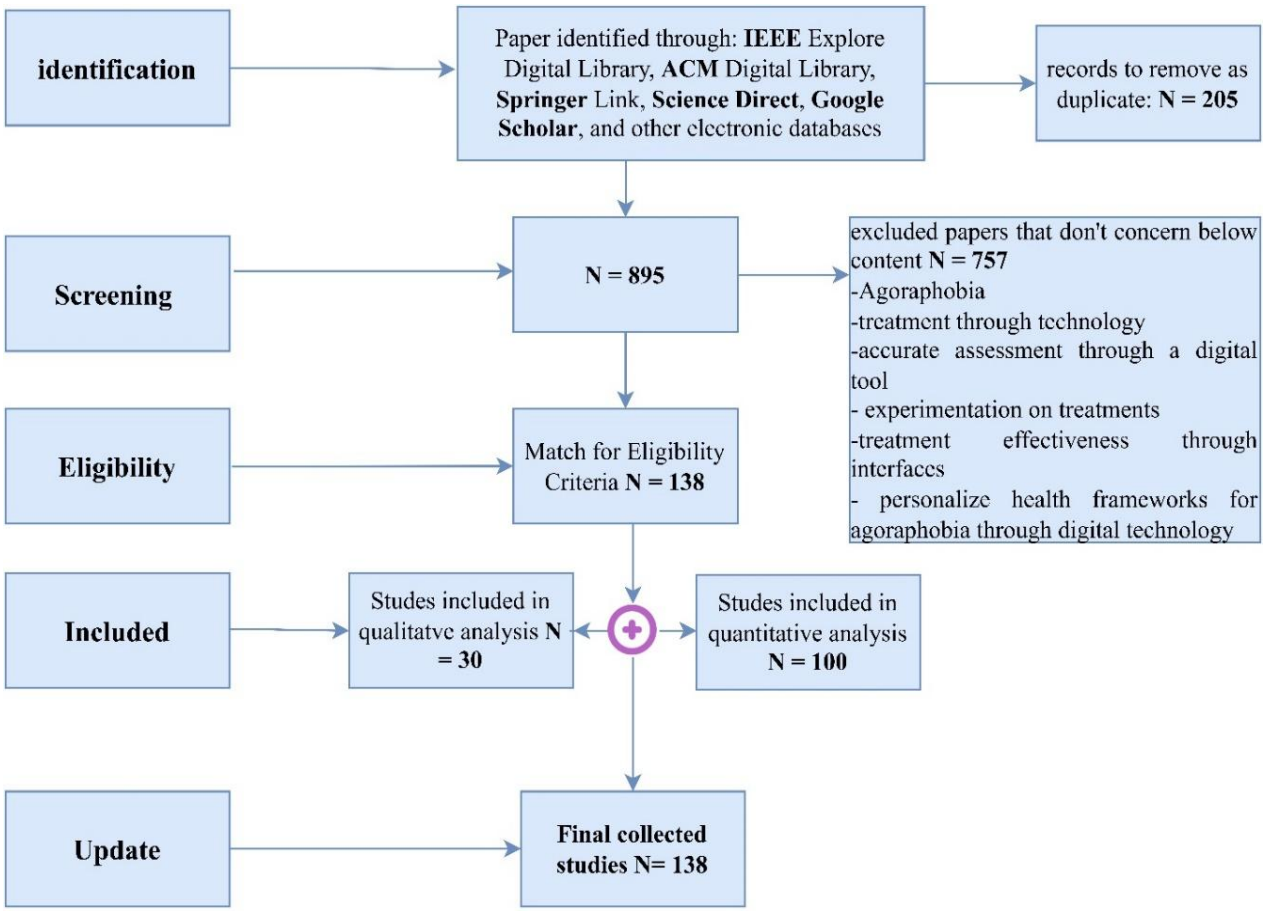


Fig. 3: Prisma Diagram of Literature Review

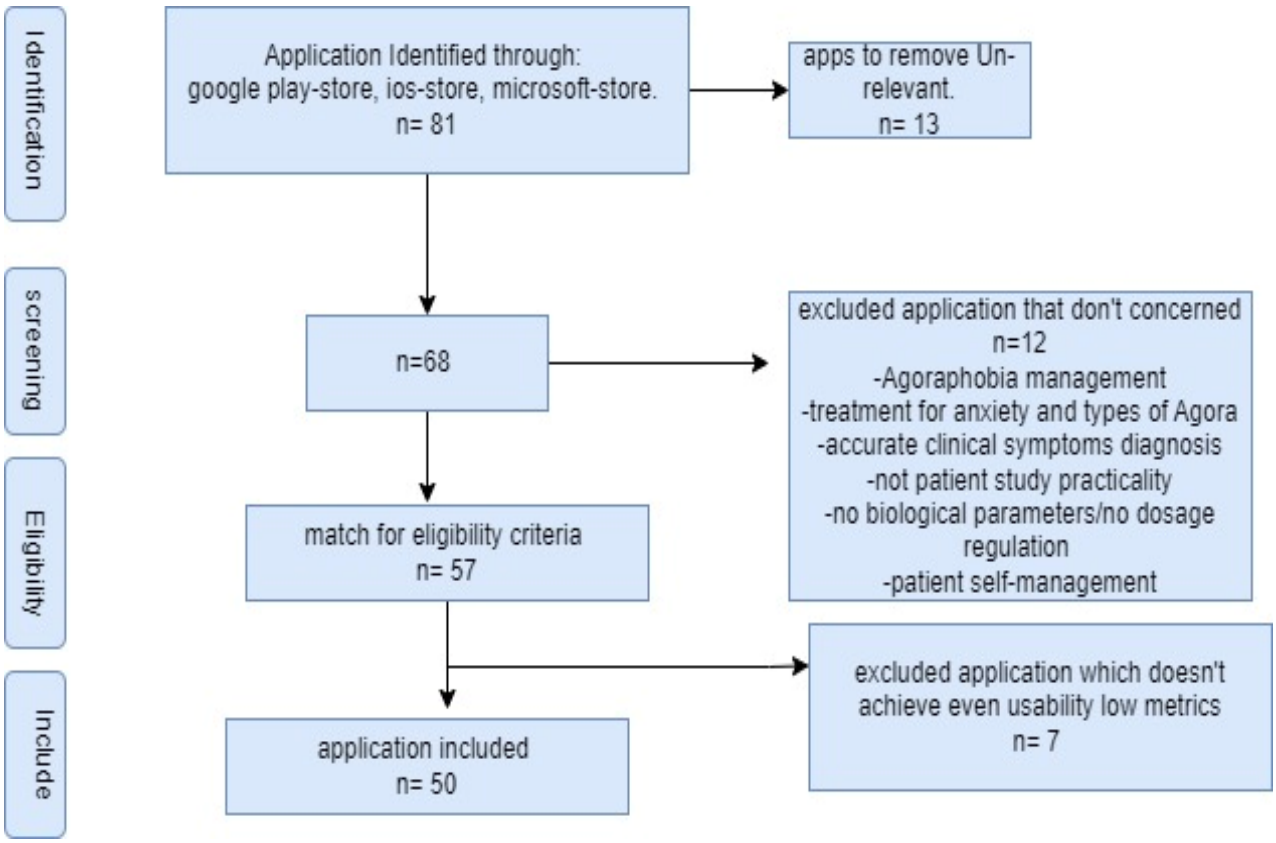


Fig. 4: Prisma Diagram of Android Application Review

Clinical Background

1.4. Causes of Disorder

The following are fundamental genetic elements that might contribute to agoraphobia as shown in given below figure 5. The genetic component: Numerous hints have suggested that a genetic condition may play a role in the neurological disorder, PD, or panic disorder with agoraphobia. inadequate dietary intake during pregnancy, difficulties throughout pregnancy or shortly after delivery, the use of antidepressants during pregnancy, and maternal illness [9]. Several ideas explain the possible causes of agoraphobia. According to one theory, agoraphobia arises as a result of recurrent anxiety-inducing incidents [25]. Agoraphobia disorder is a result of an individual's inability to appropriately respond to their emotional conflicts or sensation of emptiness or unresolved oedipal conflicts, according to mental health theories that assess and define how a person reacts to their internal emotional conflicts. Additionally, agoraphobia disorder has psychological and environmental risk factors, much like other illnesses.

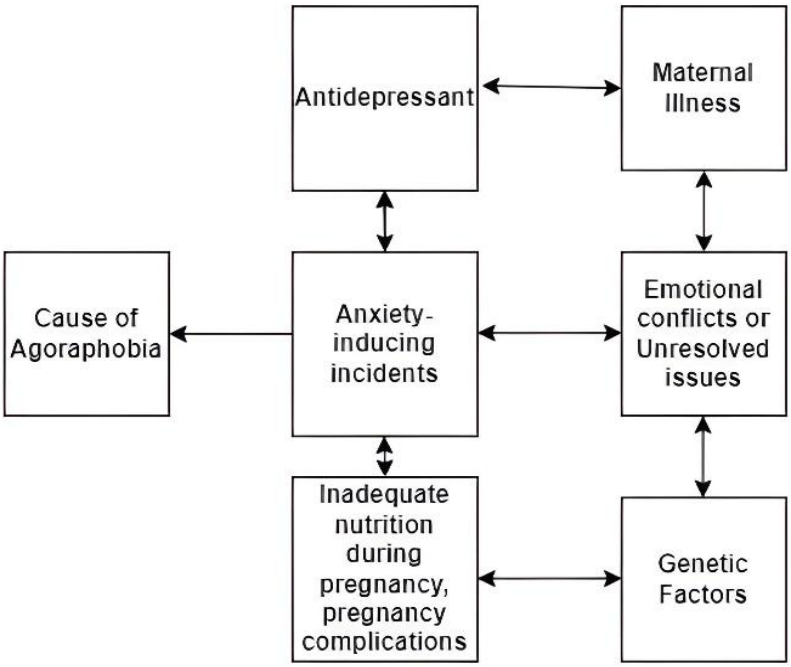


Fig. 5: Causes of Agoraphobia

1.5. Gender Classification Statics

A person who is agoraphobic may also have psychological problems such as early erroneous predictions, panic fantasies, imprisonment, and lack of control. Along with other elements, genetic and family factors have an impact on sickness. Furthermore, statistics indicate that females are more prone than boys to be ill [26, 27]. A person having agoraphobia has common multiple fears, the agoraphobic patient is afraid of open or large spaces and of small or crowded places. The agoraphobic person is afraid while driving alone on a long drive and can’t move or stand on high-height towers or bridges. In public spaces, when speaking to a crowd, or when conversing with an unfamiliar person, they become erratic in their behavior and cognition. Extreme depression, anxiety, and anxiousness are all present in the affected person, and they may even consider suicide. In varied scenarios and settings, such as at home and in offices, large areas, small spaces, or crowded places, the agoraphobic individual reacts differently. It is a result of the illness. On occasion, they show misappropriate behavior while abusing drugs, alcohol, or medications [8, 28, 29] the objective of the study is to conduct a literature review on the utilization and purposes of mobile smartphone applications in the management of agoraphobia. And how technological advances can aid in the diagnosis and treatment of agoraphobia disease [30-34].

1.6. Possible Treatments

We may change the way the agoraphobic person thinks, disrupt bad thought patterns, and replace their original scared predictions with optimistic thoughts and self-assured personalities by educating them. Exposing the agoraphobic person to certain scenarios and objects can also aid in overcoming their agoraphobia because practice makes perfect [35]. For agoraphobic folks, it is made exceedingly simple by the smartphone's plethora of knowledge, communication, and social skills nowadays. There is a thorough comparison of various desktop or mobile apps made specifically for agoraphobic people to help them feel less anxious, at ease, and safe through therapies [36]. These apps are also useful for forecasting patient needs and disease levels, and provide personalized tools to calculate the effects of medicine [37], evaluate communication and writing skills, and keep track of the various activities or tasks completed by agoraphobic patients so that they can be trained and educated. Sports activities are also a part of the treatment to make the patient busy with activities of exercises [38]. Given below figure 6 shows the possible treatments which will be helpful to overcome agoraphobia disease.

Fig. 6: Possible Treatment

Literature Findings

The subsequent categorizations of agoraphobia are as follows:

1.7. Social Anxiety with Agoraphobia

Also known as social phobia, it is a mental health condition characterized by intense feelings of fear and anxiety in social situations. Those who have been diagnosed with social anxiety disorder often experience excessive self-consciousness, fear of being judged or negatively evaluated, and avoidance of social situations may encounter considerable distress and functional impairment in their everyday activities because of their apprehension of being assessed, evaluated, or scrutinized by others [36,37]. The phenomenon can present itself in diverse forms, including complete avoidance of social circumstances, manifestation of physical symptoms such as perspiration or tremors, or encountering challenges in verbal communication or social engagement. Social anxiety disorder is a prevalent

psychiatric condition that can have a substantial impact on an individual's well-being if not adequately addressed. Individuals diagnosed with social phobia exhibit fear and anxiety in one or multiple social contexts, leading to notable distress and functional impairment in their daily lives [38].

1.8. Depression with Agoraphobia

Depression is a widely prevalent mental health disorder that is typified by a persistent emotional state of sadness, hopelessness, and disinterest in activities. Such a condition is categorized as a significant depressive disorder and is linked to an interruption in the typical operation of the brain. The negative impact of behavioral or control impairments on an individual's daily functioning has been documented in previous studies [39].

1.9. Claustrophobia

A psychological disorder is marked by an intense and irrational fear of enclosed spaces, such as small rooms or stores, where the individual may experience a sense of confinement and an inability to exit. The frequent occurrence of panic attacks is often observed in individuals with claustrophobia, which is typically classified as an “anxiety disorder” [40].

1.10. Obsessive-Compulsive Disorder

A psychiatric disorder that is distinguished by the occurrence of repetitive behaviors and persistent, intrusive thoughts that result in substantial distress and impairment in daily activities. Individuals diagnosed with “obsessive-compulsive disorder” (OCD) exhibit compulsive behaviors, Compulsions can be characterized as repetitive behaviors or mental acts that an individual feels compelled to perform in response to an obsessive thought or to mitigate perceived harm or danger. Frequently, these compulsions are characterized by a significant investment of time and have a disruptive impact on routine activities. The term "rituals" denotes the performance of recurrent actions, whereas "obsessions" pertain to the persistent contemplation of specific thoughts or concepts.
Due to the prevalence of these behaviors, an OCD sufferer's daily life is adversely affected [40].

1.11. Generalized Anxiety Disorder

(GAD) is characterized by excessive, often unreasonable, and uncontrollable concern about things that are going to happen. Such a state of excessive worry has a significant impact on daily life and negatively impacts patients' routines because they have to deal with a variety of issues. having troubles with your health, death, finances, mental health, panic attacks, family, friends, obligations at work, and interpersonal relationships [40, 41].

1.12. Sexual or Physical Abuse

A background of sexual or physical abuse: It may also entail physical violence, as implied by the type's name, which covers both physical assaults and sexual abuse [42, 43].

1.13. Family History of Agoraphobia

Much research has examined the relationship between genetics and agoraphobia and has identified genetics or family history as the primary cause of the condition. Additionally, several factors may change either before or after the patient's delivery [43].

1.14. Drug and Alcohol use Disorder

Drug use disorder, often known as substance abuse, is a condition in which drug use results in a clinically significant impairment disorder [9].

1.15. Treatment Summary Grabbed from Literature:

Treatment summary of agoraphobia disease is given below in figure 7.

1.15.1. Education and Practice

The two main and crucial components that will enable patients to recover on their own from their diseases. There is no doubt that patients with agoraphobia condition are interested in learning. Education can also help people shed their harmful beliefs and replace them with positive ones. People with agoraphobia can benefit from education, which can also improve their ability to connect and communicate with others. A patient with agoraphobia is fragile and mentally ill. Education can enhance their capacity for self-improvement as well as their concentration, learning, and decision-making skills. The practice will increase patient confidence [15, 44].

1.15.2. Social Skills and Comprehension of the Environment

The acquisition of social skills and comprehension of the environment. Individuals with agoraphobia tend to exhibit limited social behavior and have minimal interpersonal interactions, resulting in a lack of genuine companionship. The patients exhibit an inability to comprehend the world or demonstrate atypical behavior compared to the general population concerning the social and infrastructural manner of societies [44]. Through the utilization of educational and practical interventions, it is possible to instruct individuals with agoraphobia. Its implementation will result in social enhancement and is expected to result in the advancement of individuals' social, communication, and managerial proficiencies [45, 46].

Fig. 7: Treatment Summary

Summary of literature findings can be seen in Table I.

TABLE I. Literature Review Table

Lare	Participants	Intervention	Results	Limitation	Jaded score
[47].	Multiple patients on multiple apps N=n	The self-help model of multiple apps has been reviewed that how Google Play Store's apps help to cure agoraphobia and panic disorder.	The patients are comfortable with apps, and these help the same as CBT treatment and easy to get help anywhere.	No Customized solutions, disorder usability deployment has research lack.	1
[48].	Patients (N=18)	A study was conducted on 18 agoraphobic patients who were divided into two groups and subjected to different virtual reality exposure therapies. One group received VRET alone, while the other received VRET with cognitive behavioral therapy.	The agoraphobic patients treated with VRET got less effect than the patients treated with VRET combined CBT	Patients were not comfortable with devices and VR exposure made them uncomfortable at the initial stage.	3
[49].	Not mentioned but agoraphobic	Highlights the impact of psychosomatic factors, visual influences on balance, and treatment approaches. These approaches include vestibular rehabilitation and behavioral therapy through interfaces.	Patients with both balance and anxiety disorders rely more on visual cues for balance and become less stable when faced with conflicting visual information on interfaces.	The text lacks specific participant data, remote clinical outcomes, and a thorough analysis of treatment effectiveness.	3
[50].	N 60 undergraduate students with agoraphobia	Virtual Environment Desensitization (VED) for the experimental group.	The experimental group experienced significant reductions in fear and anxiety scores (ATAQ and SUDS) after VED treatment and steadily decreased across sessions, while the control group showed no significant changes.	A small sample size and no direct comparison to conventional systematic desensitization.	3
[51].	Patients = 2 (30 aged women)	The study presents how agoraphobia assessment can be done and what is the effect of exposure therapy on agoraphobic patients.	The results are better to have controlled examined exposure therapies with patients.	The sample size is small and lacks generalized ability.	1
[52].	Multiple groups and sessions	Clinical behavioral therapy with adults having agoraphobia disorder.	The study implemented multiple behavioral therapies on adults and made some questionnaires to ask adults or assess behaviors.	Lack of open access for the patient to reveal their experiences and a lack of generalizability.	1
[53].	Patients (N=111)	The experiment includes treating 67 patients with GPs and 44 with psychiatrists. To differentiate the role of GPs and therapy.	The most advantageous result of GPs' treatment is that they need fewer medicines rather than other psychiatrist's patients. The GP treatment is more conservative than others.	Small sample size, self-reported results.	3

[54].	Australian group of patients	They discussed the Factor structure of mobility for the mobile inventory and for validation of mobile inventory for those having agoraphobia.	The use of the Mobility Inventory was found to be particularly useful in conjunction with the Agoraphobia Questionnaire and Social Avoidance and Distress Scale, suggesting that it is a valuable tool for measuring agoraphobia. The study highlights the potential benefits of incorporating mobile inventories into the assessment and treatment of agoraphobia.	Lack of a non-deployed control and potential dropout bias	3
[55].	Multiple patients	A book on cognitive therapy designed to treat individuals diagnosed with agoraphobia.	The multiple ways of cognitive behavioral therapy showed different results in different situations and effects.	Self-reported records. Lack of experimental control and bias.	1
[56].	Patients (N=22)	The current paper presents novel findings on heart rate and synchrony/desynchrony about the trimodal assessment of 22 chronic agoraphobic patients before and after exposure therapy.	The study found that approximately one-third of the chronic agoraphobic patients had an increase in heart rate from pre- to post-treatment, which was the only reason for the observed desynchrony change. However, unlike phobic anxiety, heart rate was unable to differentiate between subgroups that differed in their initial levels of avoidance behavior. These results cast doubt on the sensitivity and validity of heart rate as a measure of change in agoraphobia.	Small sample size. No comparison, no follow-up.	1
[57].	Not defined	70 therapy experts visited a clinic to observe virtual reality effectiveness on agoraphobic patients with multiple behavioral therapies and without.	In a list of 45 computer-supported methods, virtual reality (VR) was ranked fourth, with four out of the top five positions occupied by other computer-supported methods. Despite the increased attention and promotion of VR through news, social media, conferences, and start-ups, it is important to note that VR is not a new technology.	need for customized treatment, the thought of individual setting	1
[58].	Not defined	Psychophysiological reactivity, interception, and emotion regulation in patients with agoraphobia during virtual reality and anxiety induction.	Using an innovative virtual reality stressor that forced participants to respond to an anxiety-inducing scenario, thus increasing ecological validity.	Possible bias in trials	1
[59].	N=29 participants	Vivo exposure therapy for their panic disorder and agoraphobia, with their self-statements, heart rate, and subjective anxiety levels monitored.	MI patients improved between 63% and 86%, while LI patients improved between 15% and 34% on the composite measure.	The focus on self-statements as a therapeutic factor may not capture the full complexity of cognitive changes during exposure therapy.	3
[60].	Participants aged ≥ 18 years	The study presents a comprehensive overview of the various treatment approaches available for managing “resistant panic” disorder.	The study suggests that there is limited evidence to support the effectiveness of switching to “pharmacotherapy” for individuals who do not respond to “cognitive-behavioral therapy” (CBT).	Not all ages were included, and partial bias was included. Need cross-sectoral designed experiments.	0

[61].	Patients (N=13)	Individuals who do not respond to an initial trial of 'Cognitive-behavioral therapy" (CBT) and medication ("benzodiazepines" or "antidepressants").	The study demonstrated a significant improvement in various scores such as "PA" (a 65% decrease in frequency), "HAM-A", "BAI", "PGI" (70% reported being much or very much improved), and "CGI-I" (90% reported being much or very much improved).	Small sample size and lack of deployment tools.	1
[62].	N=36 participants with a mean age of 39	Underwent virtual reality exposure therapy (VRE) for their fear of flying.	There was no significant link between presence and treatment outcome. it highlights the importance of presence in anxiety experiences during VRE but questions its role in treatment success	Small sample, Self-report measures, modified presence measure, possible mediators and heterogeneous sample.	1
[63].	N=1057 participants	Meta-analysis compared dropout rates between virtual reality exposure therapy (VRET) and in vivo exposure therapy for anxiety disorders.	No significant difference in dropout rates between the two approaches. The overall attrition rate for VRET across 46 studies was 16%, slightly lower than estimates for in vivo therapy and cognitive-behavioral therapy	Study quality was often rated as "unclear."	3
[64].	Patients not mentioned	AR/VR in healthcare is shown to assist patients in recovering from various issues, influencing brain function, behavior, mood, and perception	Reviewed important methods for the treatment of agoraphobia in augmented reality and virtual reality.	The small sample size and validation of effectiveness are unclear.	1
[65].	Patients not mentioned	Play-Mancer platform: The implementation is based on the Olympus/Ravenclaw framework, which was extended to meet the specific needs of serious games, speech recognition, and emotion recognition.	The speech interface is part of a platform designed for serious games used in therapy for cognitive behavioral and addictive disorders. The platform incorporates speech recognition and emotion recognition from speech components. Patients using the serious games started to develop new coping strategies for negative emotions in real-life situations.	Assessment of the effectiveness of these games is not validated through evidence so output is not measured.	1
[66].	N=57 participants	VR for diagnostic purposes and as a tool for assessing treatment effectiveness	VRET offers advantages of overexposure in vivo, including cost-effectiveness, the ability to create gradual exposure assignments, and the opportunity for repeated exposure. Participants may not experience a high level of presence in the virtual environment, which can affect the effectiveness of VRET.	VRET issues related to sample sizes, dropouts in studies, and safety concerns. Need direct comparisons with exposure in vivo	3
[67].	Three groups	The study includes three types of behavioral physical and biological therapies for the assessment of agoraphobia.	The present study aimed to explore the efficacy of combining behavioral and pharmacological treatments for individuals with agoraphobia and compare them with each treatment approach used alone. Results show that behavioral and physical	Less controlled experimental therapies.	1

			therapies are more effective than biological (medications) treatments of agoraphobia.		
[68].	Patients (N = 12)	The study aimed to evaluate the effectiveness and efficacy of "internet-based" "cognitive behavioral therapy (CBT)" in reducing symptom severity in patients with "panic disorder" and agoraphobia.	The results of the study indicate that internet-delivered "cognitive-behavioral therapy" ("iCBT") is effective in reducing "panic disorder" and agoraphobia symptom severity, with effects being sustained at follow-up after 3-6 months.	Possible bias in trials	1
[69].	Two groups	The review aims to provide a summary of the effectiveness of "videoconferencing" as a mode of delivering "psychological therapy" for treating anxiety disorders.	The results of all the controlled studies included in the review indicate that there were no significant differences between the "videoconferencing" and "face-to-face" groups in the treatment of "anxiety disorders".	Limitations include Low objective engagement metrics, small sample size, Self-reported measures, and active control group	3
[70].	Not defined	Research on the role of panic self-efficacy in the therapeutic outcomes of cognitive-behavioral therapy (CBT) for panic disorder (PD). The analysis was carried out using both descriptive and quantitative (meta-analytic) methods.	The study attended different sessions and different durations to check the ability of self-help procedures. And yielded that somehow it affects but in some situations.	Self-reported record and not mention the patient count.	1
[71].	Not defined	The authors evaluated the Cyber therapy effect on agoraphobic patients.	The study revealed that the use of cyber theory on agoraphobia is more efficient than traditional ways of medications.	Self-reported record and not mention the patient count.	1
[72].	Patients (N=22)	The research identifies the uses of Virtual reality in combination with other medicated treatments.	The patients are comfortable with the virtual environment and this helping is the same as CBT treatment and easy to take help and implement anywhere.	Small sample size.	1
[73].	978 Dutch ISAF veterans	Longitudinal review with Prospective cohort study following mental health side effects in veterans from pre-deployment to 10 years after returning home.	Side effects expanded more than opportunity to 6.5%, 2.7%, 3.5%, and 6.2% individually at 10 years after deployment. Seen social help post-deployment is at risk.	Lack of a non-deployed control, potential dropout bias	3
[74].	12 Individuals	10-multi-week Augmented Reality Mental Social Treatment (VR-CBT) program utilizing 360-degree recorded virtual conditions.	75-80% of Participants are highly satisfied and have no dropouts.	Small sample size, lack of control group, limited generalizability.	1
[75].	7,352 Participants	Correlation of psychotherapies (CBT, present moment psychodynamic treatment) against treatment to no one's surprise (TAU) for alarm turmoil and agoraphobia.	CBT and short-term psychodynamic therapy showed efficacy compared to "TAU"	Possible bias in trials	3
[76].	Older adults aged 55 or over	Assessment of mental conduct treatment (CBT) and third-wave CBT approaches (e.g., ACT, DBT, MCT) for nervousness side effects in more established grown-ups.	Evaluate impacts of CBT intercessions on nervousness side effect seriousness	Need for customized treatment, the thought of individual setting, mentalities towards maturing,	3

[77].	Patient = 61	Enlightening review inspecting agoraphobic circumstances and their connection to overreact risk.	Many agoraphobic conditions are just caused by the loneliness of a person or unattended kids.	The sample size is small.	0
[78].	Patient = 1,604 (mean age: 31.9–43.9; 71% female)	Meta-examination assessing Remote Cognitive Behavioral Therapy (RCBT) for PD.	Remote Cognitive Behavioral Therapy (RCBT) has demonstrated effectiveness in reducing symptoms of panic disorder (PD). Notable improvements were observed post-treatment (Hedges' g = 1.18) and at follow-up (Hedges' g = 1.51). RCBT was found to be more effective than passive control (Hedges' g = 1.17) and comparable to face-to-face CBT (Hedges' g = 0.02).	The sample size is biased and published.	3
[79].	Patients=56 female	Diffusion tensor imaging was employed to evaluate alterations in the micro-structural integrity of brain white matter.	(PD+AG) exhibited reduced fractional anisotropy (FA) values in the right uncinated fasciculus, along with elevated mean diffusivity and radial diffusivity values	The study is limited by its small sample size and cross-sectional design.	3
[80].	Patients=N=5 therapists and 11 student participants	User interface redesign based on interviews with therapists was introduced and compared to the original design and in the second trial used a flight scenario instead of manual simulation in 14 sessions.	The new design resulted in significant usability improvements, and therapists were observed using the system more effectively. it led to the identification of five design guidelines, favoring a treatment-focused user interface	The sample size was relatively small, which limits generalizability and did not assess the effectiveness of interface design for treatment.	1
[81].	Patients=668	4 different case studies were conducted which performed anxiety assessment, neurological evaluation, CBT, and functional cognitive disorder evaluation on patients.	Panic-induced agoraphobia & depersonalization (CD). Stuttering post-panic (CD), treated: Paroxetine & CBT. 32.5% of healthcare workers are anxious; linked to the female gender, leisure absence, sleep issues, and depression. Both interventions improved illness perceptions.	Case 1: self-reported data, Cross-sectional design. Case 2 and 3: single patient. Case4: no patient data	3
[82].	Patients=137	Two studies were performed including app-based VR exposure and with a chatbot named Vickybot for evaluation of agoraphobia.	With VR they observed a good reduction in symptoms and chatbot study they observed high subjective engagement but low objective engagement metrics.	Limitations include Low objective engagement metrics, small sample size, Self-reported measures, and active control group	1
[83].	Patients=50	They used B4DT delivered through a combination of face-to-face and videoconferencing sessions.	PD symptoms reduced post-treatment (d=2.18) and at 3-month follow-up (d=2.01). Remission 62%, significant response 70%. Decrease in depression and anxiety, high satisfaction.	Limited by no comparison, low participants, no inter-rater, and treatment assessment gaps. Need controlled studies with active controls.	0
[84].	Patients=156 German speaking patients aged 18-65	They conducted a 12-week online self-help program.	The intervention reduced panic symptoms (PAS; d=-0.37), and limited effects on other measures. Reduced anxiety and depression.	Limited power, floor/ceiling effects, COVID-19 impact, higher illness burden, no comparison, and no follow-up.	3

[85].	Patients=194	Designed an eight-item self-report questionnaire for observation	The results demonstrated The Oxford Agoraphobic Avoidance Scale demonstrated excellent psychometric properties.	Non-representative sample, cut-off from self-report measure, limited test-retest data, no assessment of sensitivity to change.	1
[86].	Patients=114	The researchers performed 2 studies by studying childhood trauma's impact on BD severity in Colombia. Added plant nurturing to the BD app with gamification.	BD patients showed higher childhood trauma rates. Abuse and neglect are linked to severe bipolar disorder. App usage and positive emotions increased	Cross-sectional, recall bias. Small sample, self-report bias.	1
[87].	Not defined	They designed prescription-based digital interventions in psychiatry.	They successfully designed DIGA for the cure of agoraphobia.	Satisfied improvement	0
[88]	Patients = 36	1. Patients received 8-12 hypnotherapy sessions over 3 months.2. A gamified app for bipolar disorder (BD) integrated plant nurturing therapy. 3. Virtual Reality Exposure Therapy (VRET) uses scenarios like elevators and subways. 4. Bipolar disorder (BD) app included plant nurturing therapy through gamification.	1. Reduction in agoraphobia symptoms post 3-month intervention 2. Improved app usage frequency and positive emotional changes reported.3. Reduction in anxiety across sessions, showing acceptance and real-life improvement.4. Positive user experiences, increased app usage frequency, and alleviation of depression and anxiety.	Small sample, short-term focus, limited follow-up data, lack of comparison group. Self-reporting bias, limited generalizability. Potential lack of long-term effectiveness data.	1
[89].	Patients = 6	They conducted 10 sessions of balance rehabilitation with peripheral visual stimulation (BR-PVS) over 5 weeks. The study aimed to assess the feasibility, acceptability, and potential clinical usefulness of BR-PVS.	The study suggested that BR-PVS might be a valuable adjunctive therapeutic option for patients with residual agoraphobia and dizziness.	Less control over the experiment, and a small sample size.	1

Literature Outputs

The data analysis method is employed to visually represent information, large numerical values, and frequently occurring words. The approach aims to emphasize the significance of these concepts in the comprehensive examination of the role of the digital world in the context of agoraphobia. In the present analysis, a comprehensive depiction of various interventions, technologies, and experimental equipment is presented in a singular figure (figure 8). Additionally, a separate image is provided to illustrate the limitations encountered during the review and experimentation processes, as well as the resulting outputs (figure 9). Also, Appendix A is attached at the end of the manuscript, and provides comprehensive details of the scoring system.

1.16. Gamification

Gamification has proven promise in agoraphobia therapy by integrating game aspects to augment therapeutic interventions. Gamification provides a systematic and engaging platform for individuals to gradually confront and overcome their anxieties by incorporating rewards, challenges, and virtual worlds [90]. The method provides for exposure therapy in a controlled environment, assisting individuals in navigating anxiety-provoking circumstances. Individuals can be motivated to actively participate in their therapy by using reward systems and virtual incentives, encouraging a sense of accomplishment and development. Furthermore, gamification may aid skill development by teaching coping mechanisms and anxiety management tactics [91].

1.17. Virtual Reality Exposure

VR therapy provides a controlled and immersive environment in which people can confront and handle situations that cause anxiety. One significant advantage of virtual reality is its capacity to imitate real-world experiences safely and gradually, allowing for exposure therapy. VR treatment strategy involves systematically exposing individuals to anxiety-provoking stimuli, allowing them to build resilience and diminish fear responses over time [92]. VR treatment allows people to confront their concerns in a therapeutic setting by recreating various locations and stimuli that cause agoraphobia. Additionally, VR can be combined with cognitive-behavioral approaches and relaxation exercises to improve overall therapeutic success. While research into the long-term effectiveness and general acceptance of VR in agoraphobia treatment is underway, preliminary findings and clinical trials indicate that VR therapy offers promise as a novel and potentially transformative tool in the treatment of anxiety illness [93].

1.18. Augmented Reality Exposure

By bridging the virtual and real worlds, augmented reality (AR) provides specific advantages in agoraphobia therapy. AR enables users to engage in exposure therapy inside the safety of familiar settings by superimposing digital material onto the actual world [94]. AR individualized method allows for incremental desensitization to anxiety-inducing events, resulting in a more regulated and targeted therapeutic experience. AR's interactive nature encourages active participation in the therapy process [95].

1.19. Micro-Learning

Micro-learning is successful in the treatment of agoraphobia because it cuts therapeutic information down into short, readily consumable modules, which aligns with the progressive exposure principles of exposure therapy. Individuals may study from the comfort of their own homes, decreasing the anxiety associated with conventional in-person sessions [96]. Smaller courses concentrate on specific coping methods, encouraging skill growth over time. Individual anxieties and problems are addressed through customized learning routes, which provide a tailored approach to treatment. Micro-learning's overall efficacy in agoraphobia management is enhanced by the lower cognitive load and sense of success associated with completing tiny modules[97].

1.20. Mobile Interfaces (MUXI) based Learning

By offering a flexible and accessible platform for therapeutic activities, mobile User Experience Interfaces (UXI) can improve learning efficacy in agoraphobia therapy. Mobile interfaces enable people to interact with treatment materials from the convenience of their own homes, removing the hurdles to physical attendance [98]. The user-friendly design of mobile UXI provides a user-friendly experience for people with varied degrees of technical ability. Using mobile interfaces to incorporate interactive aspects such as gamification or virtual reality can make learning more interesting and immersive. Furthermore, the mobility of mobile devices enables users to incorporate learning into their everyday life, supporting constant exposure, and skill-building in agoraphobia therapy [99].

1.21. Interventions Analytics

A variety of therapies are presented below for treating agoraphobia and associated problems. Virtual Reality Exposure Therapy (VRET), medication-based methods, Cognitive-Behavioral Therapy (CBT), and digital therapies such as smartphone applications and chat-bots were among the key interventions. Virtual reality and psychophysiological examinations were investigated as novel tools. Advanced techniques such as diffusion tensor imaging and gamification with plant nurturing were used. The study focused on improving patient engagement and symptom reduction. In essence, these multiple therapies attempted to enhance the lives of people suffering from agoraphobia by providing a variety of tactics for improved outcomes and treatment efficacy.

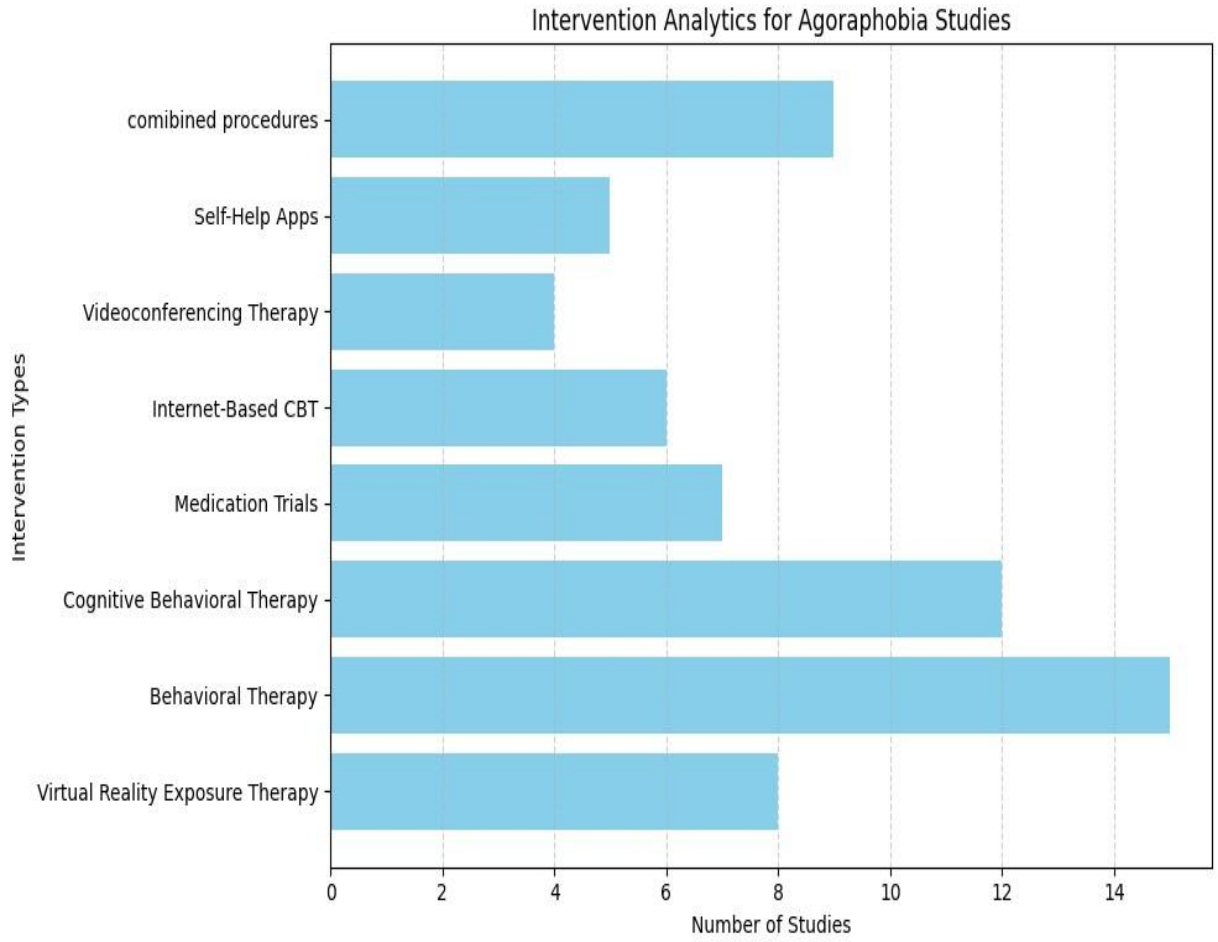


Fig. 8. Literature Output

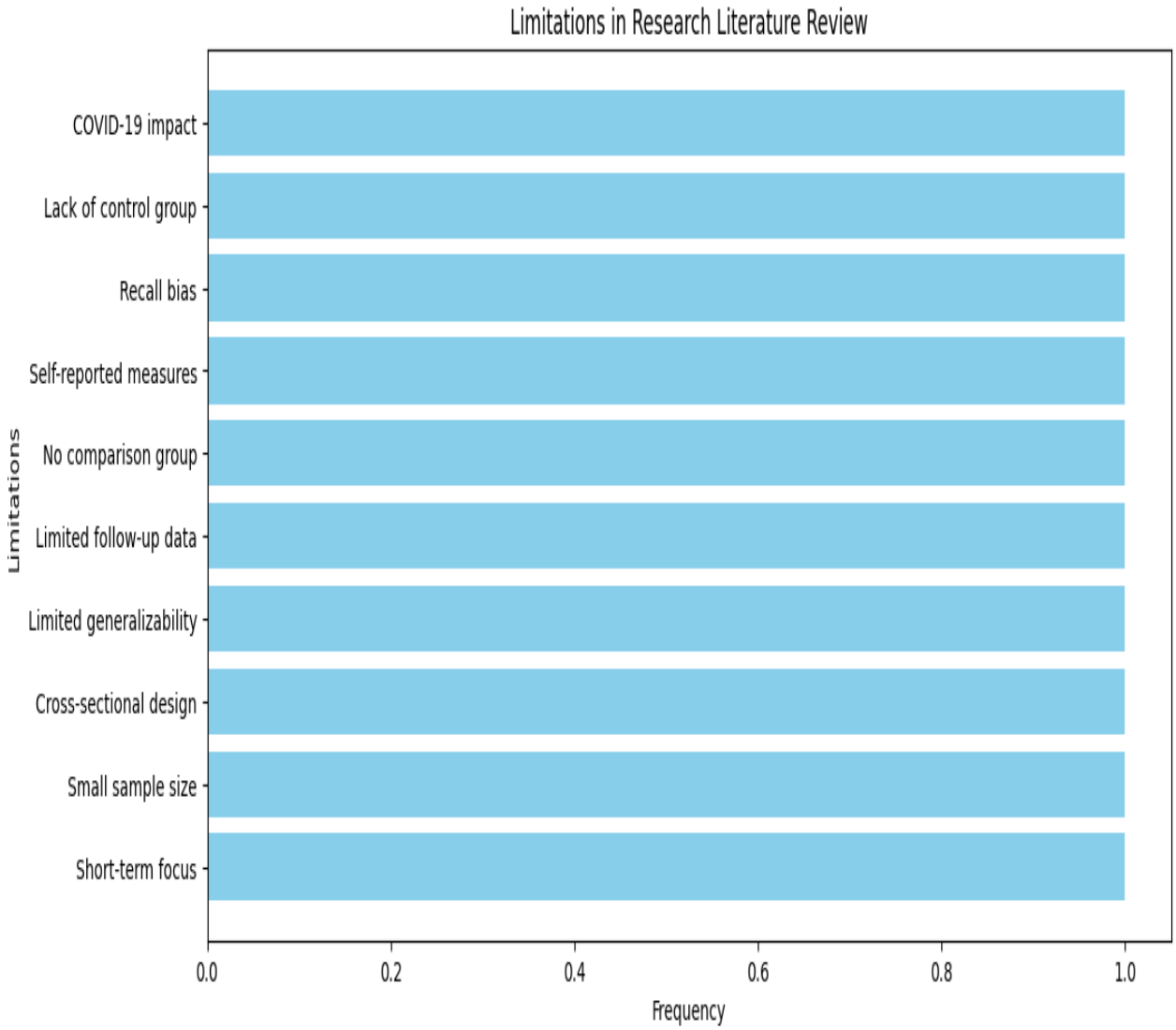


Fig. 9. Limitation Analytics of Literature Output

Gaps Found in Tools

People who suffer from agoraphobia may be able to conquer their fear of certain situations through education and practice. As a result of it, technology is developing a few tools and apps that are designed exclusively for affected people.

Patients who suffer from agoraphobia are being encouraged to seek treatment with the use of technological tools, which provide them with guidance in the form of interesting and interactive user interfaces designed by a variety of programming tools.

1.22. Lacks Socio-Emotional Development

A person's behavior can be understood by looking at the person's emotions; people who suffer from agoraphobia do not have control over their emotions or are unable to manage their emotions. Because of this, they lose all rational thought; they are unable to comprehend how to behave and react, and how to organize their daily activities, and they develop depression because of a lack of emotional experience. Therefore, we must continually provide children with educational opportunities as well as opportunities to practice social and daily responsibilities [38].

1.23. Lack of Innovation Development

By offering some assistance to agoraphobic patients which reflects inexperience and learning. The patient with agoraphobia needs to offer some assistance which is associated with present and past learning [38]. Physical development: It is compulsory to define some security rules for them and

understand their sense of danger from what things the patients are afraid of. We might have to analyze the physical condition of the agoraphobic patient have strong or not. They feel the danger in the environment outstrips them [38].

1.24. Lack of Personalization

By utilizing various forms of visualization, the programmed tools can be of assistance to the individual who suffers from agoraphobia. They presented that individual with a variety of visuals, graphs, and words to hear and speak, as well as training the individual on how to react to or correspond with their surroundings. It gives them more self-assurance, which is necessary for surviving in their environment. Individuals who suffer from agoraphobia are allowed to encounter real-life situations with the use of certain technical tools [100].

1.25. Lacks in Exercise Tools

The exercises include breathing exercises and physical ones that purely aid agoraphobic individuals in overcoming panic and hypertension. They also assist in getting rid of avoidance and technology gadgets. Because VR offers a variety of practice and teaching opportunities, it is a useful educational tool for agoraphobia. As a result, technology now includes VR-based systems [38].

1.26. Lacks in Virtual Reality Therapy

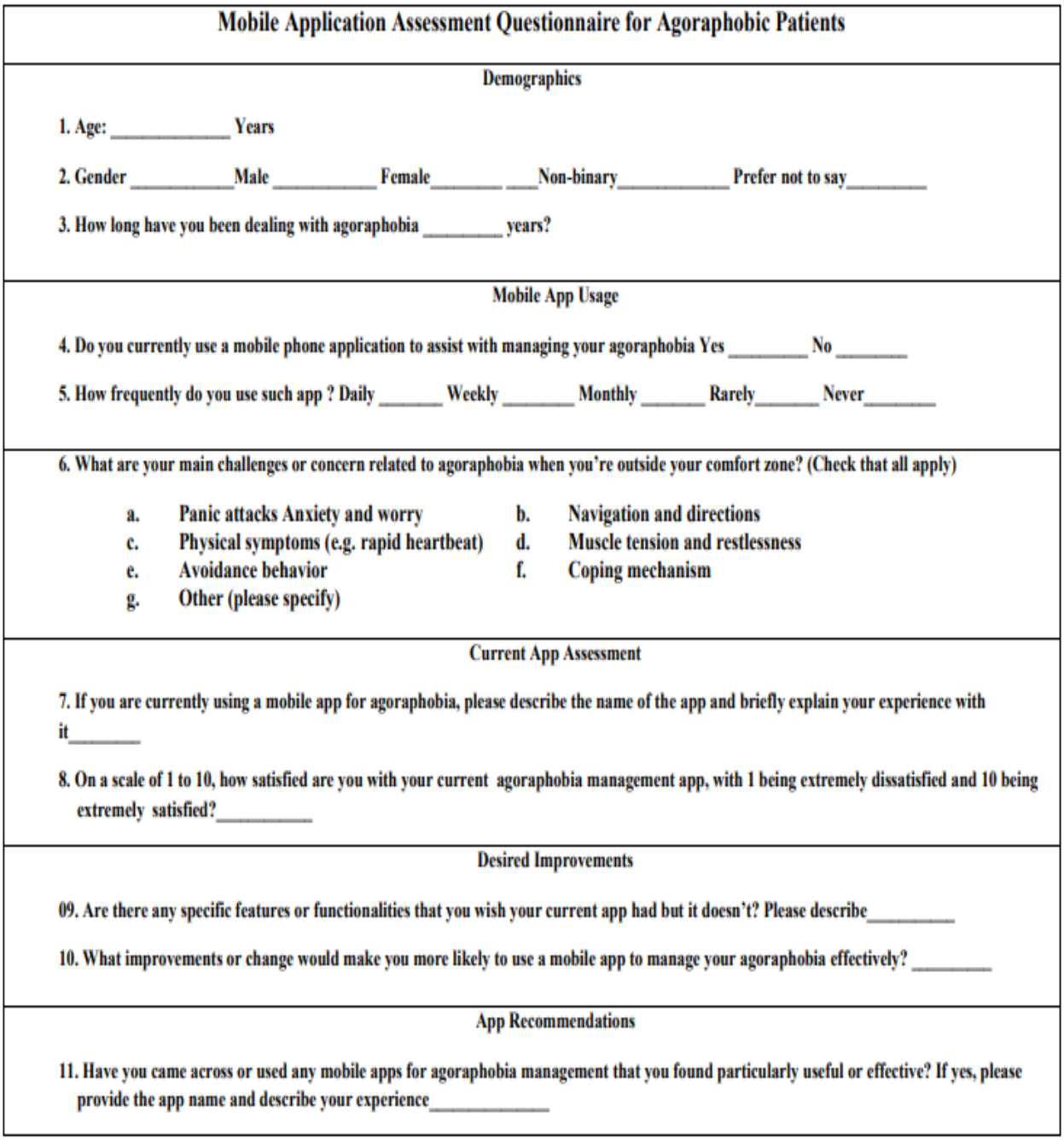
Since the face plays a complex role in communication skills and VR helps patients by offering different practice methods to make patients normal and to lessen their fear of patients, the system can recognize the facial expressions of the patients to recognize their mood by their face [101, 101]. A robotic environment is preferable to genuine interactions for agoraphobic individuals because they avoid real items, and most humans feel better at peace watching animations. It makes a robotic environment preferable for agoraphobic individuals.

Individuals who suffer from agoraphobia are free to roam wherever they like with their preferred smartphone or tablet because of the portability and user-friendliness of today's devices. The usability of the interface makes it easy to work, even in a situation of panic, by permitting a pleasant touch screen and favoring more tapping and sliding than writing. It makes the interface simple to operate. The following information, along with a table that lists a variety of apps, may be found below [101, 102].

MOBILE APPLICATIONS

Figure 11 and Figure 12 show applications selected with the help of a questionnaire (figure 10), online ratings, walk-in interviews, and live availability of mobile applications to compare and evaluate the most useful application or domain-oriented application for agoraphobia we used three rankings discussed above in methodology [13, 103].

The questionnaire is shown in Figure 10 which explains how we evaluated the mobile phone application based on agoraphobic patients in our city Lahore from the University of Lahore in Pakistan. Patients are very comfortable while reading and understanding the questions in the survey. Most patients agreed to give answers to surveys and shockingly some patients did not know about application use in the treatment of mobile phone applications.



Mobile Application Assessment Questionnaire for Agoraphobic Patients

Demographics

1. Age: _____ Years

2. Gender _____Male _____ Female_____ ___Non-binary_____ Prefer not to say_____

3. How long have you been dealing with agoraphobia _____ years?

Mobile App Usage

4. Do you currently use a mobile phone application to assist with managing your agoraphobia Yes _____ No _____

5. How frequently do you use such app ? Daily _____ Weekly _____ Monthly _____ Rarely_____ Never_____

6. What are your main challenges or concern related to agoraphobia when you're outside your comfort zone? (Check that all apply)

a. Panic attacks Anxiety and worry
b. Navigation and directions
c. Physical symptoms (e.g. rapid heartbeat)
d. Muscle tension and restlessness
e. Avoidance behavior
f. Coping mechanism
g. Other (please specify)

Current App Assessment

7. If you are currently using a mobile app for agoraphobia, please describe the name of the app and briefly explain your experience with it_____

8. On a scale of 1 to 10, how satisfied are you with your current agoraphobia management app, with 1 being extremely dissatisfied and 10 being extremely satisfied?_____

Desired Improvements

09. Are there any specific features or functionalities that you wish your current app had but it doesn't? Please describe_____

10. What improvements or change would make you more likely to use a mobile app to manage your agoraphobia effectively? _____

App Recommendations

11. Have you came across or used any mobile apps for agoraphobia management that you found particularly useful or effective? If yes, please provide the app name and describe your experience_____

Fig 10: Questionnaire for Mobile Application

Fig. 11: Applications useful for Agoraphobia

Fig. 12: Applications Developing Companies Working in the Field of Agoraphobia

Summary of android applications along with specifications are given below in Table II.

Table II. Android Application Review

Application Name	Purpose & used technologies	OS	Price	User and user scores	Quantities of downloads	App size	Classification
1. Anxiety Free	People can learn techniques to relax and Conquer Anxiety Play Store. The app uses remote therapy and an autonomous task manager to relax.	Play Store	Free	People who are victims of Agoraphobia (anxiety disorders etc.) agoraphobia has no rating	1k+	0 MB	Assessment Treatment Information Useful for Agoraphobia
2. Acupres sure	Heal Yourself Use the pressure points of your fingers to relax your body and reduce tension. The app uses acupuncture technology.	Play Store	Free	People are victims of pressure points to reduce their anxiety. The app has no rating till.	1k+ downloads	15 MB	Assessment Treatment
3. Nature Sounds	It uses different sounds to calm a patient. The app uses a sound directory and auto-play music technology.	Play Store	Free	Especially for those people who can't sleep at night easily due to anxiety. People rated it 4.6 out of 5 stars.	1M+	63 MB	Assessment Treatment
4. Worry Box	It tells you about things if it is important or unimportant to you. The app gets the user's data and give a solution on how to get over worries. The app uses different datasets to recommend optimal solutions.	Play Store-2	Free	People who don't know what is important and what is not important to them in their life. They rated it 4.7 out of 5 stars.	Not Found	14.7 MB	Assessment, Treatment+ Useful for Agoraphobia
5. Stop Panic and Anxiety Self Help	It controls panic attacks and overcome those by getting data from your side. The app manages data and remotely draws plans for patients.	Play Store	Free	People who are victims of panic attacks under different circumstances. They rated it 4.2 out of 5 stars.	500K+ Downloads	12 MB	Useful for Agoraphobia
6. Sleep Time	Analyzing tool which analyzes your sleep time and suggests accordingly. The app tracks patient sleeping hours and manages alerts.	Play Store	Free	People who find it difficult to especially sleep at night. They rated it 4.5 out of 5 stars.	1m+	7.5 MB	Information
7. Relax and Rest Guided Meditations	It features three guided meditations so you can re-center yourself as needed. The app uses recommendation and scheduling technology to memorize medication.	Play Store	Free	For People who find it difficult to settle yourself for different relaxed positions etc. they rated it 4.8 on the platform.	70m+	91.7 MB	Assessment
8. Relaxing Nature Sounds and Spa Music	It Features nature sounds to relax yourself and your anxiety in actual It uses a soundboard with 35 Sounds to relax patients.	Play Store	Free	For People who are victims of stress and anxiety. They rated it 4.4 out of 5 stars.	Not Found	256.4 MB	Assessment
9. Self-help for Anxiety Management	It enables users to have a personal toolkit to understand their anxiety first and then manage it. The app uses cloud technology to remotely manage tasks.	Play Store	Free	For those people who can't handle their anxiety and overcoming that over the years. They rated it 3.3 out of 5 stars.	4k+	25 MB	Assessment Treatment+ Useful for Agoraphobia
10. Head Space	For 10 minutes a day and 10 days a week you would exercise and learn about meditation. The app uses remote therapy technology.	Play Store	Free	Who can't manage? Meditation. They rate it 4.8 out of 5 stars.	10m+	270.1 MB	Information
11. Pacifica	1. Rate and track mood 2. Guide Deep breathing muscle relaxation	Google Play Store	Free	For those people who can't handle their anxiety. Has no rating.	83	25 MB	Useful for Agoraphobia

	exercises3. Daily antianxiety experiments 4. Record their thoughts. App uses cloud technologies.	and Apple Store					
12.Mind Shift	1. Making "Sleep Count" 2. "Riding Out Intense 3. "Emotions", 4. "Test Anxiety" 5. "Perfectionism", 6. "Social Anxiety 7. "Performance Anxiety", 8. The "Worry", and "Panic Conflict" app uses autonomous cloud features.	App Store and Google Play Store	Free	Ways to cope with anxiety and prevent it from taking over your life. They rated it 4.3 (App Store); and 4.1 (Google Play)	500k+	42 MB	Useful for Agoraphobia
13. Moods	The Moods app provides a quick and simple way to track and record your current mood, which can be an important tool for promoting and maintaining good mental health.	IOS	Free	Mental Equilibrium they rate it 3.5 out of 5 stars.	Not Found	32.7 MB	Assessment
14. What's Up?	Plenty of grounding techniques and other mindfulness tips. Uses autonomous inventory technology.	IOS and Android	Free	Anxiety Free they rate it 4.4 out of 5 stars.	Not Found	43.7 MB	Information
15. Happily	Overcome stress and negative thoughts. Build resilience. The app uses cloud and remote therapy technology.	IOS and Android	Free	To Overcome the stress of agoraphobic patients and they rated as 4.5 (App Store); 3.5 (Google Play)	Not Found	129.2 MB	Useful for Agoraphobia
16. Brain.fm	Focus, Meditation, Relaxation, Naps, or Nighttime Sleep. The app uses cloud features and music technology.	IOS and Android	Free	To fresh the mind provides music, they rated it 4.5 out of 5 stars.	Not Found	104.6 MB	Information
17. Healthy Minds	Mood Tracker Write a journal entry to express your feelings. And Breathe activity. The app uses cloud and chatbot technology.	IOS and Android	Free	Stress, anxiety, memory loss, lack of focus, and the rate it 3.8 out of 5 stars.	100k+	41 MB	Assessment + Information
18. Mood Doc	Test mood, assessment of results, personalized exercises. The app uses cloud features.	IOS and Android	Free	Worried and mental health patient, they rate it 4.8 out of 5 stars.	Not Found	20 MB	Assessment + Information
19. Talk Life	Avoid loneliness. The app uses AI chatbot technology.	IOS and Android	Free	People who are not social they rate it 4.5 out of 5 stars.	Not Found	148.4 MB	Useful for Agoraphobia
20. Super Better	Help if feel Unable to think clearly, or work, or even get out of bed, she became anxious and depressed, even suicidal. The app uses activity tracking, remote therapy, and emergency manager modules.	IOS and Play Store	Free	Depressions they rate it 4.7 out of 5 stars.	100k+	72.6 MB	Treatment
21. Talk Space	Improve your mental health and what's the deal with emotional affairs and offer the best therapists. The app uses remote therapy technology.	IOS and Play Store	Free	Mental health they rate it 1.8 out of 5 stars.	55k+	111.3 MB	Information + Treatment
22. Calm	Calm Body and helping to overcome stress and best processes for medications. App uses task manager cloud technologies.	IOS and Play Store	Free	Mental health through medication and physics. Patients rated it 4.8 (App Store); and 4.4 (Google Play)	50M+	118.3 MB	Information + Treatment

23. Worry time	Control everyday stress and adjust and update your schedule and app send an alert for stressful activity. The app uses track and alert cloud technology.	IOS and Play Store	Free	Manage schedule to overcome anxiety and stress they rate it 3.9 out of 5 stars.	10K+	20.8 MB	Assessment+ Treatment + Useful for Agoraphobia
24. Breathe2relax	1 tool to reduce stress, 2. "Belly Breathing" 3. Record "Stress levels" 4. Provides informative Videos 5. Graphics about the consequence of stress 6. Tool to manage Stress	IOS and Play Store	1.99$	Anxiety, anger, mood instability they rate it 4.4 out of 5 stars.	10K+	40.1 MB	Assessment+ Treatment
25. 7 Cups	The service offers individuals the opportunity to receive anonymous emotional support and counseling from trained active listeners. The app uses remote technology.	IOS and Play Store	Free	People experiencing emotional distress they rate it 4.1 out of 5 stars.	1M+	Not Found	Information
26. Digi pill	Increase motivation Reduce stress and uses psychoacoustics to allow you to unlock your subconscious and change your perception.	IOS and Play Store	Free	Change your perception. They rate it 3+ out of 5 stars.	50K+	Not Found	Useful for Agoraphobia
27. THIS WAY UP	Reduce anxiety and the app uses cloud and remote therapy features.	Website	Free	To Manage mental disorders and has no rating.	No	no	Useful for Agoraphobia
28. PTSD Coach	1. for veterans 2. Educates users about PTSD 3. Offers a self-assessment tool 4. Avoidance of Stressful situations 5. Provides stress management tools, remote therapy, and activity tracker cloud technology.	IOS and Play Store	Free	Manage mental disorders, they rate it 4.6 out of 5 stars.	100k+	214.6 MB	Assessment + Treatment + information + Useful for Agoraphobia
29. Positive Activity Jackpot	1. Utilize "Pleasant Event Scheduling (PES)" 2. Recommend activities 3. Enable users to Save preferred locations and activities for the future 4. Search function to find new locations.	IOS and Play Store	Free	Depression, education and practice they rate it 3.5 out of 5 stars.	Not Found	Not Found	Information
30. Mind-able	Uses cognitive behavioral therapy by using remote cloud features and video conferencing.	Play Store	Free	For Agoraphobic they rate it 4.0 out of 5 stars.	Not Found	63.4 MB	Useful for Agoraphobia
31. ICBT App	Uses cognitive behavioral therapy by using remote cloud features and video conferencing.	App Store	5.99$	Agoraphobia and depression they rate it 3 out of 5 stars.	No	no	Assessment + Treatment + Useful for Agoraphobia
32. LIVE OCD FREE	Uses exposure and CBT by using remote cloud features and video conferencing.	App Store	Free	For OCD they rate it 4.6 out of 5 stars.	Not Found	55.9 MB	Assessment + Treatment
33. Mood kit	Depression Anxiety disorder CBT Anger management and Self-monitoring. The app uses cloud and remote conferencing with activity-tracking cloud features.	App Store	$4.99	People to work on by themselves. They rated it 4.0 out of 5 stars.	Not Found	29.4 MB	Assessment + Treatment

34. Better help	Offer multiple sessions of treatment depression, anxiety, and anger by using remote cloud features and video conferencing.	App Store and Google Play Store	Free	For the session of treatment of depression, anxiety and anger they rate it 3.8 N play another hand 4.8 on app store.	1M+	106.8 MB	Information
35. Mood tools	Provide a questionnaire to educate the patients. The app uses a cloud directory and news feed from the cloud and tracks interested content.	Google Play Store	Free	Depression, anxiety they rate it 4.8 out of 5 stars.	100K+	41.9 MB	Information
36. PE coach	To educate the patients App uses a cloud directory and news feed from the cloud and tracks interested content.	App Store and Google Play Store	Free	For depression and has no ratings	10K+	Not Found	Information
37. Sanvello	Teaches deep breathing, Behavioral exercises, and CBT voice recording. The app uses cloud and remote therapy features.	App Store and Google Play Store	$5.99	Anxiety disorder, depression and stress and disorder people. They rated it 4.8 (App Store); and 4.6 (Google Play).	Not Found	156.4 MB	Information +Assessment + Treatment + Useful for Agoraphobia
38. Behavioral Experiments	Uses cognitive behavioral therapy by using remote cloud features and video conferencing.	Website	Free	Agoraphobic (Anxiety disorders). Has no rating	No	no	Useful for Agoraphobia
39. DBT Diary Card and Skill Coach	Dialectical Behavior Therapy by using remote cloud features and video conferencing.	IOS and Android	$4.99	Provide support and reference materials for users who would like to implement. They rate it 4.4 out of 5 stars.	100K+	42.9 MB	Useful for Agoraphobia
40. Depression Test	Uses cognitive behavioral therapy by using remote cloud features and video conferencing.	Android and App Store	Free	Anxiety disorder Depression and stress Disorder they rate it 3+ out of 5 stars.	100K+	28.6 MB	Information +Assessment + Treatment
41. Habit Tracker	Keep track of habits and suggest Things to control. The app uses cloud technology.	Android and IOS	Free	People have agoraphobia. They rate it 4.8 out of 5 stars.	Not Found	201.3 MB	Information +Assessment + Treatment
42. Healthy Mind	Deal with things like stress and worry that can make you feel down. The app uses customized cloud-based modules.	Android	Free	Anxiety disorder, depression and stress and disorder they rate it 3.8.	100K+	Not Found	Information +Assessment + Treatment
43. Brains in hand	Help to self-manage mental health and well-being. The app uses activity tracking and cloud features.	Android and IOS	Free	People have agoraphobia. Does not available a rating.	10K+	27.2 MB	Information + Treatment
44. SAM	Self-help methods for learning to manage their anxiety. The app uses cloud features.	Android and IOS	Free	Serious people about learning to manage their anxiety. They rated it 3+ out of 5 stars.	10K+	Not Found	Information +Assessment + Treatment
45. Smile Mind	The field of "psychology" and education aims to promote balance and well-being in	Android and IOS	Free	People have agoraphobia. They rated it 4.7 out of 5 stars.	1M+	41.8 MB	Information +Assessment + Treatment

	individuals' lives. The app uses cloud and chat-bot technology.						
46. Stress Relief Yoga – Anxiety &	To Physically relax, the patient has anxiety. The app uses exercise simulation technology.	Android and IOS	Free	For Anxiety, they rated it 4.4 out of 5 stars.	10K+	Not Found	Treatment
47. Moodlytics	Mood Journal or a Mood Diary. The app uses an activity tracker and cloud features.	IOS	$1.99	People have agoraphobia and anxiety. They rate it 4+ out of 5 stars.	1k+	30 MB	Information +Assessment +Treatment
48. Imoodjournal	Help you discover the causes of your ups and downs. The app uses an activity tracker and cloud features.	IOS	$2.99	Anxiety disorder they rate it 4.4 out of 5 stars.	1m+	66.3 MB	Information +Assessment + Treatment
49. Dare	For Mental Health and app uses remote therapy through audio conferencing technology.	Android	Free	Mentally disturbed people. They rate it 4.6 out of 5 stars.	500K+	51.9 MB	Information +Assessment + Treatment
50. Icounslerf	To Physically relax patients having anxiety. The app uses exercise simulation technology.	Android and IOS	free	Anxiety disorder they rate it 2.0 out of 5 stars.	100+	0 MB	Treatment

Analysis of Gaps in Applications and Recommendations

The examination of deficiencies within a mobile application about agoraphobia holds significance due to its potential to enhance both the user experience and the efficacy of said applications. The following are frequently observed deficiencies in such applications. One of the key issues identified is the absence of personalization. Most of the applications adopt a standardized approach, potentially lacking efficacy for all users [104]. The availability of personalization options, such as the ability to set custom goals, access tailored content, and track individual progress, is frequently insufficient. By addressing its discrepancy, it is possible to enhance user engagement and achieve improved outcomes [105].

It is also observed that the availability of professional support is restricted. Although certain mobile applications focus on providing users with self-help tools and resources, they may not facilitate access to mental health professionals who possess the necessary qualifications. There is a notable deficiency in the provision of immediate, interactive communication channels between individuals seeking guidance and support and mental health professionals such as therapists or counselors. Other issues are observed as insufficient content and resources.

Most of the applications exhibit a deficiency in providing comprehensive resources or concentrate solely on a limited spectrum of behavior concerns [106]. It is imperative to broaden the scope of subjects covered and offer current, empirically supported information. Furthermore, it is worth noting that certain applications may fail to provide adequate resources and support for specific user segments, such as LGBTQ+ individuals or individuals from diverse cultural backgrounds [107]. These omissions can result in the exclusion of significant user groups, thereby limiting the inclusivity and effectiveness of these apps.

The lack of adequate privacy and security measures. The preservation of privacy and data security holds utmost importance in such applications; however, it is worth noting that certain applications may not adhere to rigorous criteria in safeguarding user data and upholding confidentiality. The existence of these gaps has the potential to erode trust and discourage users from actively seeking assistance [108]. The provision of restricted feedback and monitoring. There may be deficiencies in the capacity of applications to deliver prompt feedback and effectively monitor the progress of users. For instance, certain applications exhibit a deficiency in incorporating functionalities such as mood tracking, journaling, or reminders for medication and therapy sessions. The presence of behavioral issues frequently coincides with the occurrence of other medical conditions, such as chronic illnesses or substance abuse disorders [109]. Applications may potentially fail to sufficiently address these concurrent medical conditions, thereby resulting in users receiving inadequate healthcare. Moreover, mobile applications disregard the Importance of Prevention and Early Intervention. Moreover, most of the applications primarily emphasize the management of symptoms and the provision of assistance for individuals who have already received a diagnosis. Nevertheless, there is a notable deficiency in the progress of applications that prioritize prevention and early intervention to identify and address concerns before they reach a critical stage. The issue of limited accessibility is also observed in such applications [110]. Certain applications may lack accessibility features, thereby limiting their usability for individuals with disabilities. It is imperative to ensure the usability of the application for individuals with visual, auditory, or motor impairments [111].

The User Experience is Suboptimal among such applications. The presence of a gap in the user experience has the potential to discourage users from maintaining consistent usage of these applications. This phenomenon can be attributed to a user interface that is not user-friendly, has suboptimal performance, or a dearth of captivating features that sustain user engagement. The scientific validation is inadequate among such applications [112]. Some of the applications exhibit a dearth of rigorous scientific validation, thereby posing challenges in ascertaining their efficacy. The credibility of such applications can be enhanced through the conduct of research and clinical trials aimed at bridging these gaps. To bridge these existing gaps, it is imperative for developers of such applications to consistently evaluate the requirements of their users, engage in collaborative efforts with mental health experts, and remain abreast of current research and technological advancements [113]. The approach will enable them to offer more comprehensive and efficacious solutions to individuals seeking support. In addition, it is crucial to prioritize transparency, comply with privacy regulations, and uphold ethical standards when it comes to the development and enhancement of applications focused on agoraphobia. Some of the critical issues are listed below[114].

1.27. App Usability

The consideration of app usability is a crucial aspect to consider. There is a scarcity of research studies investigating the practicability of integrating and the user-friendliness of the application in individuals with agoraphobia. Our analysis indicates that there is a necessity to prioritize the adoption of applications that cater to the specific requirements of the intended users while also considering factors such as implementation, utility, and user friendliness [115].

1.28. Failure of Application

The primary cause of the failure of an application or technology designed for agoraphobia is the inadequate gathering of requirements, resulting in a product that does not effectively cater to the diverse needs of individuals with agoraphobia. Technology helps agoraphobic people to restore their abnormal

behavior by teaching them but on another hand, agoraphobic patients are discriminated against in society because of their lower communication and social skills these affect badly to their education as these things create a barrier for them to learn education [116]. The study includes the description of problems of an agoraphobic person and solutions for their problems and includes great details for tools and technologies to make their education and daily life tasks. The study has certainly covered all work and every role of technology which is easily accessible for them to experience which they have not unexperienced before [117-119].

1.29. Communication Gaps

Agoraphobia disease may occur due to genetics and pervasive development. Agoraphobia disease restricts patients or decreases their communication and social skills and makes them abnormal and they react abnormally and lose their control over behavior and brain. Technology has been great in curing agoraphobia by facilitating different apps and VR-
based technologies with very high nonfunctional requirements such as portability usability and robustness comfortableness and flexibility to teach agoraphobic patients to help them restore their abnormal behavior [120, 121].
These technologies help to explore and increase their accessibility and creative and math skills communication and social and as well as writing and functional skills and behavioral and reaction tricks. A person having agoraphobia is disturbed physically and mentally. The constant change in the app marketplace means that the application presented in the availability of review may be limited in the future, and it's possible that some apps were not included because they were not registered during the search period [122].

1.30. Lack of Personalization

Given the individualized nature of agoraphobia, mobile applications must be tailored to address the unique requirements of each patient. It may involve modifying their specific triggers and preferences and offering customized techniques and coping strategies [123, 124].

1.31. Limited Accessibility

Some patients with agoraphobia may also have physical disabilities that could impact their ability to use mobile phone applications. Ensuring that these applications are accessible to individuals with visual, auditory, or motor impairments could improve their overall usability [125, 126].

1.32. Insufficient Clinical Validation

While mobile phone applications for agoraphobia have the potential to be helpful, they may not always be grounded in evidence-based clinical practices. Without proper validation or clinical trials, patients may not receive the most effective treatment [124, 127].

1.33. Lack of Integration with other Treatments

Agoraphobia is often treated through a combination of therapy and medication. Mobile phone applications for agoraphobia may not always be integrated with other treatments, which could limit their effectiveness [128, 129].

1.34. Limited User Engagement

Mobile phone applications for agoraphobia may not always be engaging enough to keep patients motivated to use them consistently. It could be due to a lack of interactive features or interesting content, or the app may not be designed with a user-friendly interface. To improve patient engagement, developers could incorporate gamification or social features, or ensure that the application is designed with a simple, intuitive interface [130, 131].

1.35. Inadequate Data Privacy and Security

Patients may be hesitant to use mobile phone applications for agoraphobia if they do not trust that their personal information will be kept private and secure. Data breaches or unauthorized access to personal health information could undermine patients' confidence in the application and lead to them discontinuing use [132]. Developers need to address concerns by ensuring that the application complies with relevant data privacy laws and by implementing robust security features to protect patient information [133].

1.36. Limited Availability

Mobile phone applications for agoraphobia may not be available in all languages or countries, which could limit their accessibility to a global patient population. Additionally, the application may not be compatible with certain types of smartphones or operating systems, which could exclude some patients from using the app [134]. Developers could work to address these issues by making the application available in multiple languages and ensuring that it is compatible with a wide range of devices [124].

1.37. Lack of Ongoing Support

Some patients with agoraphobia may benefit from ongoing support or coaching to help them stay motivated and accountable in their treatment [124]. Mobile phone applications may not always provide support, which could limit their effectiveness in the long term. Developers could consider incorporating features like personalized reminders, coaching or mentorship, or access to online support groups or mental health professionals [135].

Conclusion

1.38. Recapitulation

The investigation of digital tools for treating agoraphobia uncovers a varied use of technologies like gamification, virtual reality (VR), augmented reality (AR), micro-learning, and mobile interfaces (MUXI). Every procedure brings its advantages: gamification adds a component of fun to therapy, VR makes profound, immersive environments for exposure therapy, AR combines digital components with the physical world for a more controlled therapeutic experience, micro-learning improves complex information into more modest chunks, and MUXI gives simple-to-use, interactive platforms for learning. Despite their true capacity, these technologies face obstacles like the requirement for customization, integration with professional healthcare, more grounded privacy protocols, and further developed user engagement for consistent use.

These digital strategies for handling agoraphobia are promising, however, experience obstacles like the absence of exhaustive clinical testing and restricted reach. They ought to supplement traditional therapy techniques and offer ceaseless help. For higher efficacy, these tools should adjust to everybody's way of life, cultural context, and preferences, potentially using adaptive algorithms. Incorporating well-rounded wellness approaches like mindfulness and stress reduction, along with powerful data analytics, could prompt more tailored and encompassing support for those with agoraphobia.

An evaluation of mobile apps, including 20 general and 30 specifically designed for agoraphobia, indicates potential in managing the condition. In any case, the recommendation for widespread use is tempered by the limited quality of existing studies as shown in figure 13. The importance of customized treatment is emphasized, recognizing that everyone with agoraphobia has distinct necessities. A computer-based approach to information technology stands out as the most flexible and accessible solution. Broadening the accessibility of digital mental health tools to accommodate various age gatherings, abilities, and backgrounds, and encouraging collaboration across disciplines, can lead to additional comprehensive solutions. Focusing on counteraction, early detection, and regular updates can maintain the relevance and effectiveness of these tools. Balancing the ease of digital tools with elements of human interaction, guaranteeing ethical utilization of AI and data, and building trust through transparency are also crucial aspects.

In conclusion, integrating digital innovation into mental health care, especially for agoraphobia, holds the commitment to more effective, personalized, and empowering treatment methods. Nonetheless, the

outcome will rely upon addressing current gaps in customization, support, privacy, engagement, and clinical evidence. Integrating these advances with conventional therapeutic practices and focusing on a patient-centered, ethical approach, which develops in sync with the field, is essential for the effective management of agoraphobia.

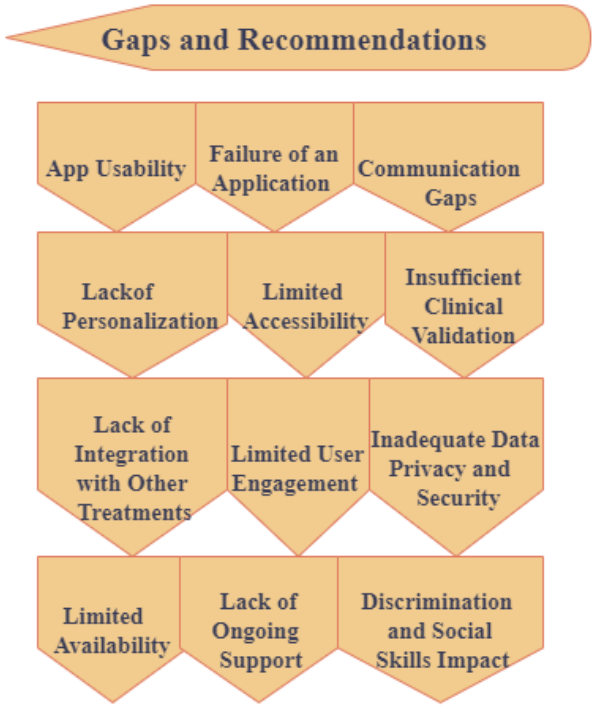


Fig. 13: Gaps and Recommendations

1.39. Recommendations

By considering these studies we developed app guidelines containing the best procedures for diagnosis as the processes still now are very slow about diagnosis and behavioral therapies to break their negative thoughts and stop their early wrong predictions and an excellent monitoring tool by using their facial expressions of an agoraphobic patient and allowing them to customize the system according to their interest and flexibleness And by giving them the facility to increase the size of shown content on the screen with the help of special magnifiers [136]. By considering their hyper panic condition offering them robust and comfortable systems using suitable interfaces as voice-based interfaces for agoraphobic people to make them more relaxed if they have a fault in their eyes or if they are blind persons [137]. And by offering them the conversion of audio and video and other voices into text form if they have any hearing impairment or can have a problem with noise or loud noise. The interactive test in usability comparative analysis of our app enhances the effectiveness and usability of our proposed application [138-140].

1.40. Future Work

The review highlights the requirement for deep user studies to develop technologies that are reliable and address the issues and requirements of each agoraphobic patient. The absence of development of technologies without these studies can prompt shortcomings and obstacles in the job of technology to support agoraphobic patients. Future research studies are expected to sort out the best methods and variables to assist agoraphobic patients with mobile phone applications. These studies ought to likewise zero in on approving the quality of the interface with heuristic principles of interface design in human-computer interaction by a gathering of patients. It will assist with developing the most useful, interactive, and disease-managing mobile application for agoraphobic patients [141, 142].

The research discoveries demonstrate the need to adopt an interdisciplinary methodology including specialists in psychology, psychiatry, computer science, and human-computer interaction to make viable mobile applications for agoraphobia management. The mechanism can likewise represent the individual necessities and preferences of agoraphobic patients. To guarantee that the mobile phone

application is user-friendly and meets their requirements. The proposed mobile phone application ought to incorporate features, for example, robust and comfortable systems utilizing suitable interfaces, voice-based interfaces for agoraphobic people to make them more relaxed, magnifiers to expand the size of shown content on the screen, and the transformation of audio and video into text structure for patients with hearing impairments. These features will make the mobile phone application more accessible and user-friendly for agoraphobic patients [102, 142].

The interactive test in usability comparative analysis of the proposed mobile phone application ought to be conducted to assess its effectiveness and usability. It will assist with identifying any shortcomings or areas for development and guarantee that the mobile phone application is meeting the necessities and requirements of agoraphobic patients. In conclusion, the review highlights the requirement for deep user studies and an interdisciplinary way to deal with developing mobile phone applications for agoraphobic patients. The proposed mobile phone application ought to be user-friendly, accessible, and meet the requirements of every patient. Further research is expected to develop the most useful, interactive, and disease-managing mobile phone application for agoraphobic patients [143-145].

Conflict of Interest

The authors declare no conflict of interest.

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Appendix A: Oxford Scoring Scale for Research Reviewed Quality Assessment

Reference	Medium	Year	Quality Assessment				
			(a)	(b)	(c)	(d)	Score
[6]	Journal	2020	1	0	1	0	2
[7]	Conference	2005	1	1	0	0	2
[8]	Journal	2006	1	0	1	0	2
[9]	Journal	2019	1	0	1	0	2
[10]	Journal	2010	1	0	1	0	2
[11]	Conference	2017	1	1	0	0	2
[12]	Journal	2013	1	1	0	0	2
[13]	Journal	2014	1	0	1	0	2
[14]	Journal	2011	1	1	0	0	2
[15]	Journal	2006	0	1	0	1	2
[16]	Journal	2010	1	1	0	0	2
[17]	Journal	2011	1	1	0	0	2
[18]	Journal	2010	1	0	1	0	2
[19]	Journal	2010	1	1	0	0	2
[20]	Journal	2010	0	1	0	1	2
[21]	Journal	2014	1	1	0	0	2
[22]	Conference	2010	1	1	0	0	2
[23]	Journal	2012	1	1	0	0	2
[24]	Journal	2004	1	1	0	0	2
[25]	Journal	2023	1	1	0	0	2
[26]	Journal	2005	1	1	0	0	2
[27]	Journal	1986	1	1	0	0	2
[28]	Journal	1986	1	1	0	0	2
[29]	Journal	2012	1	1	0	0	2
[30]	Journal	1998	1	1	0	0	2
[31]	Journal	1995	1	1	0	0	2
[32]	Journal	1984	1	1	0	0	2
[33]	Journal	2010	1	1	0	0	2
[34]	Journal	2010	1	1	0	0	2
[35]	Journal	1984	1	1	0	0	2
[36]	Journal	2023	1	1	0	0	2
[37]	Journal	2012	1	1	0	0	2
[38]	Journal	2023	1	1	0	0	2
[39]	Journal	1983	1	1	0	0	2
[40]	Journal	2017	1	1	0	0	2

Reference	Medium	Year	Quality Assessment				
			(a)	(b)	(c)	(d)	Score
[41]	Journal	2005	1	1	0	0	2
[42]	Journal	1986	1	1	0	0	2
[43]	Journal	1986	1	1	0	0	2
[44]	Journal	2023	1	1	0	0	2
[45]	Journal	2010	1	1	0	0	2
[46]	Journal	1987	1	1	0	0	2
[47]	Journal	2015	1	1	1	1	4
[48]	Journal	2013	1	1	1	1	4
[49]	Journal	2001	1	1	1	1	4
[50]	Journal	1996	1	1	0	1	3
[51]	Journal	1984	1	1	1	1	4
[52]	Book	1985	1	1	1	1	4
[53]	Book	1988	1	1	1	1	4
[54]	Journal	1990	1	1	1	1	4
[55]	Journal	2010	1	1	1	1	4
[56]	Journal	1987	1	1	1	1	4
[57]	Journal	2019	1	1	1	1	4
[58]	Journal	2017	1	1	1	1	4
[59]	Journal	1994	1	1	1	1	4
[60]	Journal	2016	1	1	1	1	4
[61]	Journal	1998	1	1	1	1	4
[62]	Journal	2007	1	1	1	1	4
[63]	Journal	2019	1	1	0	1	3
[64]	Conference	2022	1	1	1	1	4
[65]	Journal	2012	1	1	1	1	4
[66]	Journal	2004	1	1	1	1	4
[67]	Journal	2015	1	1	1	1	4
[68]	Journal	2020	1	1	1	0	3
[69]	Journal	2019	1	1	1	1	4
[70]	Journal	2014	1	1	1	1	4
[71]	Journal	2004	1	1	1	1	4
[72]	Journal	2008	1	1	0	1	3
[73]	Journal	2023	1	1	1	1	4
[74]	Journal	2022	1	1	1	1	4
[75]	Journal	2022	1	1	1	1	4
[76]	Journal	2021	1	1	1	0	3
[77]	Journal	2021	1	1	1	1	4
[78]	Journal	2021	1	1	1	1	4

Reference	Medium	Year	Quality Assessment				
			(a)	(b)	(c)	(d)	Score
[79]	Journal	2021	1	1	0	1	3
[80]	Journal	2010	1	1	1	1	4
[81]	Journal	2021	1	1	1	0	3
[82]	Journal	2023	1	1	0	1	3
[83]	Journal	2023	1	1	1	1	4
[84]	Journal	2023	1	1	0	1	3
[85]	Journal	2023	1	1	1	1	4
[86]	Journal	2023	1	1	0	1	3
[87]	journal	2023	1	1	1	1	4
[88]	Journal	2023	1	1	1	1	4
[89]	Journal	2023	1	1	1	1	4
[90]	Journal	2020	1	1	0	0	2
[91]	Journal	2020	1	1	0	0	2
[92]	Journal	2023	1	1	0	0	2
[93]	Journal	2022	1	1	0	0	2
[94]	Journal	2023	1	1	0	0	2
[95]	Journal	2023	1	0	1	0	2
[96]	Conference	2018	1	1	0	0	2
[97]	Journal	2023	1	1	0	0	2
[98]	Journal	2018	1	1	0	0	2
[99]	Journal	2020	1	1	0	0	2
[100]	Journal	2014	1	1	0	0	2
[101]	Journal	2002	1	1	0	0	2
[102]	Journal	2023	1	1	0	0	2
[103]	Journal	2023	1	1	0	0	2
[104]	Journal	2011	1	1	0	0	2
[105]	Journal	2021	1	1	0	0	2
[106]	Journal	2021	1	0	1	0	2
[107]	Journal	2023	1	1	0	0	2
[108]	Journal	2021	1	1	0	0	2
[109]	Journal	2017	1	1	0	0	2
[110]	Journal	2019	1	0	1	0	2
[111]	Journal	2021	1	1	0	0	2
[112]	Journal	2023	1	1	0	0	2
[113]	Journal	2015	1	1	0	0	2
[114]	Journal	2016	1	1	0	0	2
[115]	Journal	2019	1	1	0	0	2

Reference	Medium	Year	Quality Assessment				
			(a)	(b)	(c)	(d)	Score
[116]	Journal	2021	1	1	0	0	2
[117]	Book	2020	1	1	0	0	2
[118]	Journal	1990	1	1	0	0	2
[119]	Journal	1994	1	1	0	0	2
[120]	Journal	1985	1	1	0	0	2
[121]	Journal	2007	1	1	0	0	2
[122]	Journal	1985	1	1	0	0	2
[123]	Journal	2018	1	0	1	0	2
[124]	Journal	2020	1	1	0	0	2
[125]	Journal	2021	1	1	0	0	2
[126]	Journal	2016	1	1	0	0	2
[127]	Journal	2023	1	1	0	0	2
[128]	Journal	2020	1	1	0	0	2
[129]	Journal	2016	1	0	1	0	2
[130]	Journal	2020	1	1	0	0	2
[131]	Journal	2018	1	1	0	0	2
[132]	Journal	2019	1	1	0	0	2
[133]	Journal	2016	1	1	0	0	2
[134]	Journal	2015	1	1	0	0	2
[135]	Journal	2022	1	1	0	0	2
[136]	Journal	2022	1	1	0	0	2
[137]	Journal	2023	1	1	0	0	2
[138]	Journal	2023	1	1	0	0	2
[139]	Journal	2011	1	1	0	0	2
[140]	Journal	2022	1	1	0	0	2
[141]	Journal	2021	1	0	1	0	2
[142]	Journal	2023	1	1	0	0	2
[143]	Journal	2023	1	1	0	0	2
[144]	Journal	2023	1	1	0	0	2
[145]	Journal	2023	1	0	1	0	2