

# To Assess the Effect of Mindfulness-Based Intervention on Early Schizophrenia in Men: A Systematic Review

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## Abstract

Schizophrenia is understood to be a chronic disorder of the brain which affects under 1% of the population of the United States of America. During its active phase, symptoms include hallucinations, reduced motivation, delusions, speech that is disorganized and problems with thinking. The condition influences perception, judgment and emotions which are known as the basic human processes. Studies of the brain affected by schizophrenia have shown that certain genes such as dysbindin, DISC1, DAOA, COMT and neuregulin 1 can be considered as its risk factors. A chromosome 22 microdeletion known as Velocardio Facial Syndrome (VCFS) can be associated with the pathogenesis of schizophrenia. Cognition, motor function, social interaction and physical morphology abnormalities are most commonly noticed in people who later exhibit schizophrenia which is indicative of developmental vulnerability. The literature search consisted of articles from known and recognized databases like Cochrane, PubMed, Medline and Google scholar. The evidence-based medicine practitioners frequently use a special framework known as the PICO framework. Males suffering with schizophrenia in its early stage which was less than 5 years were considered. Worldwide countries like Australia, United Kingdom or Canada have focused on including intervention at early stages as an important approach in the management of the disorder. In the Explicit Health Care Guarantees, the first episode of schizophrenia is considered as a first mental health condition. One of the meta-analysis contains 39 studies with a total of 1,140 participants. This analysis focused on patients suffering from depression, generalized anxiety disorder and a number of other psychiatric disorders. The greatest number of participants 1,140 was the biggest sample among all the articles included in this review. Remaining studies contained samples from 342 to 60 participants.

As this review was supposed to highlight the effect of mindfulness-based intervention therefore, a majority of the articles included in this review contained mindfulness therapy as a treatment for the disorders. The results indicated significant differences in mental health scores on the scales before and post the intervention. Participants further showed good improvements in their mental health after the treatment. PANSS score also improved and all the

above-mentioned points highlight the positive outcomes of mindfulness intervention.

**Keywords:** Mental illnesses; Schizophrenia; Velocardio facial syndrome

## Introduction

The aim of this project is to assess the mindfulness-based intervention effectiveness in male schizophrenia patients. It is hypothesized that this review will depict that mindfulness treatment has positive outcomes in management of early stage schizophrenia in men. Basically, there is little evidence available among research sources regarding mindfulness intervention and its uses in case of mental illnesses such as schizophrenia. Along with this, its effects on the outcomes such as illness relapse, awareness levels, depression levels, re-hospitalization rates, functioning levels, voice related distress and mental quality of life also had to be assessed. These outcomes which were measured by valid and reliable scales determined that the intervention benefits the mental health condition post treatment. Initially, electronic databases were used for the literature search consisting of Cochrane, Pubmed, Medline and Google scholar. For this reason, the fore mentioned electronic databases were searched for specific keywords such as schizophrenia, mindfulness and early schizophrenia etc. Consequently, the finalized searched literature based on its inclusion criteria was selected or rejected. Previous researches have focused on psychosis, bipolar disorders and other such mental disorders. In addition to that, a shorter follow up period was evaluated among the articles included in this review. Thus, in this review, the long-term effects of mindfulness intervention on early schizophrenia will be evaluated to highlight its benefits. Therefore, there is a research gap in case of follow ups when it comes to the mindfulness intervention effects in schizophrenia specifically males. Besides, the research question for this study is whether mindfulness-based intervention does give positive outcomes for early schizophrenia in men. Thus, the results obtained from this review have suggested that according to the scales used for outcomes evaluation, positive significant effects after the treatment in comparison to conventional treatment

were noticed. These positive outcomes depict the usefulness and benefit of mindfulness in early schizophrenia in men. Additionally, it can also be said without any doubt that mindfulness can be used either as an adjunctive or stand-alone treatment for schizophrenia patients. One of the important findings in this review remains the significantly reduced re-hospitalization rates among various researches which is a great breakthrough in this regard. The distress associated with auditory hallucinations in the early schizophrenia patients was also significantly reduced leading to a better adherence to the treatment. A better adherence led to longer positive outcomes in assessments done after longer follow ups. In addition to that, patients exhibited better functioning and improved mental health. Due to no adverse effects of this intervention in patients, mindfulness treatment can be considered to have general applicability. Similarly, these results show that mindfulness can be a more feasible, favorable and innovative alternative for the early stage schizophrenia sufferers and thus, further research in the future should be held on different severity and chronicity of this disorder for a clearer understanding of intervention on these factors. Furthermore, the mindfulness treatment was also well tolerated by the patients who are further considered its strength. Finally, this review has highlighted the significant positive outcomes of the mindfulness intervention for early stage schizophrenia patients in general population.

## Literature Review

### Definition and symptoms

Schizophrenia is classified as a severe mental disorder with a lifetime risk of about 1%. Hallucinations, cognitive deficits and delusions are known to be its characteristics with heritability of up to 80% approximately [1]. Apart from the hallucinations, delusions and thought disorders, schizophrenia influences an individual's perception, judgment and emotions which are known as the basic human processes. In addition to that, it can be said that schizophrenia is a harmful disorder of brain development and plasticity. At the end of this review, the reader will have a better understanding of how the mindfulness interventions affect the brain processes thus leading to a positive outcome especially in early schizophrenia in men.

### Etiology and prevalence

Considering the neurobiological studies of the brain affected by schizophrenia, they have shown that certain genes such as dysbindin, DISC1, DAOA, COMT and neuregulin 1 can be considered as its risk factors [2]. About 0.5 to 1.0% of the population globally suffers from schizophrenia with destructive consequences for individuals and their loved ones. It is also known as the seventh most costly mental health illness around the world [3]. A chromosome 22 microdeletion known as Velocardio Facial Syndrome (VCFS) can be associated with the pathogenesis of schizophrenia. This may provide us with clues about the pathogenesis of schizophrenia. Furthermore, negative symptoms like lost emotional reaction and expressions along with diminished interest in participation in interpersonal

relationships with speech loss, fatigue, apathy and loss of drive for life are noticed. Such negative symptoms might be less responsive to the treatment given for schizophrenia. Bipolar disorders symptoms sometimes might overlap with schizophrenia and these symptoms include dramatic mood alterations along with psychotic phenomena [2]. It has been concluded from researches that schizophrenia onset most frequently occurs in second or third decade of an individual's lifetime; however it can vary depending on individual themselves. Cognition, motor function, social interaction and physical morphology abnormalities are most commonly noticed in people who later exhibit schizophrenia which is indicative of a developmental vulnerability [4]. Poor recovery outcomes are seen in people with schizophrenia along with decreased life expectancy [5]. A report provided by a congregation of 50 outcome studies in the form of a systematic review revealed that the median proportion of individuals suffering from schizophrenia patients who fulfilled clinical and social recovery criteria were merely 13.5% [6]. In 2016, despite schizophrenia being a less frequent disorder however it has been ranked as the twelfth most disabling condition amongst 310 disorders worldwide [7]. A study conducted in 2016 estimated 21 million of the population worldwide is living with schizophrenia and this figure will rise with growth and ageing. A big portion of these people belong to low- and middle-income nations constituting a treatment gap of about 90% in low- and middle-income nations altogether [8]. In another survey, increased burden along with higher prevalence of schizophrenia has been noted in China according to the iterations of GBD, whereas in the European region, the Netherlands showed higher prevalence [9].

### Diagnosis and clinical course in men and women

When talking about the diagnosis of disease, schizophrenia can be diagnosed with exhibition of certain psychotic phenomena such as delusions, hallucinations and thought disorder where other psychosis disorders have been excluded such as delirium or affective disorder. A research study conducted in China on schizophrenia patients has shown a lower prevalence rate among males in comparison to females. However, the suicide rate was found to be higher in males suffering from schizophrenia which may bestow towards a reverse sex effect noticed in China in relation to other areas worldwide [10]. Furthermore, previous researches suggest that men usually develop schizophrenia earlier than women [11]. Individuals belonging to 25-54-year age group manifest a larger burden from schizophrenia which is the most economically productive stage in an individual's life span. It has resulted in economic shortage and challenges due to productivity lack among individuals and their households leading to treatments being paid out of their pockets thus creating a burden on health and welfare system in return [12]. While considering the course of this disorder, the course of schizophrenia after a diagnosis is made can vary among genders but there remains much less literature in regards to this aspect [13]. Previous studies have shown that more of the depressive symptoms exist in women whereas the negative symptoms have been found to be more prevalent in men. Therefore, it can be said there is a gender dimorphism among schizophrenia symptoms. However, in

response to the treatment, it has been noted that women respond better as compared to men, yet this advantage disappears with advancing age [14]. Current studies bring forth insufficient data on the schizophrenia disease course in women and men in totality. In this case, a longitudinal study must be conducted among larger populations of individuals to assess age, early trajectory, mortality and morbidity in such patients. A recent research study put forth a finding that in both the sexes, the relative age of onset of the disease is above 30 years of age. This finding indicates that in the significant part of the population, schizophrenia worsens with age up till the age of 40 years. It was also seen that in men, the onset reached its peak at around 22 years, yet the onset in women showed more of a plateau-like phase which started at around 20 years and later decreased over the years with 1 to 2% yearly incidences up till about 65 years of age. Ultimately, it can be said that women diagnosed with schizophrenia might have a different course of the disease, yet it can be a tough one to call altogether. Furthermore, women experience more episodes of depression, more incidences of self-harm, frequent episodes of mania and suicide attempts leading to a rather excessive usage of antidepressants and sedatives, which indicates that the schizophrenia in women is more likely slanted towards the bipolar spectrum in comparison to men [15]. Another aspect assessed in various previous studies indicates that male schizophrenia patients show decreased testosterone levels as compared to healthy individuals in the group but this necessarily did not define a significant difference in symptoms severity. Similarly, it has also been observed that female schizophrenia patients showed high amounts of testosterone as compared to healthy controls [16]. A research study conducted in 2016 provided evidence that abnormal levels of sex hormones might be associated with the pathophysiological process of the disease itself. Ultimately, higher amounts of cortisol, DHEA-S and prolactin were found among male individuals experiencing schizophrenia [17]. In addition to these hormones, some studies have provided evidence that decreased amounts of testosterone are associated with additional severe negative symptoms among men [18]. Cognitive impairments are seen in schizophrenic patients such as delayed memory and language capabilities. Studies in this regard have revealed that male schizophrenia patients displayed more of severe cognitive deficits when compared to female patients in delayed memory, but not in the case of language, attention and visuospatial indices [19].

### Stigma associated with the mental illnesses

Previous researches have put forth the fact that in comparison to the developed countries, stigma regarding mental illness has been observed much more significantly in the developing countries. In addition to that, greater shame and fear is directed towards mental health illnesses and those who suffer from them. This in turn leads to acts of social distancing and contributes towards self-isolation along with a lack of employment opportunities and deflated self-confidence among those experiencing it. Similarly, it has been noted that, people with mental illnesses often exhibit poor adherence to treatment plans therefore, leading to poor health outcomes [20]. Such a condition in the society leads to mental distress, which then

causes further growth and worsening of stigma which is thus considered a ruthless negative force. An untidy appearance, mood swings and social skill deficits are most commonly assigned to those who suffer from mental health illnesses. Thus, the previously mentioned issues make it mandatory to place more emphasis on the mental health stigma that resides in the developing as well as the developed countries [21].

### Mindfulness intervention and its origin

Within the eastern traditions, mindfulness is commonly associated with a similar form of insight meditation known as Vipassana. Apart from this, recent definitions of mindfulness involve affective and cognitive ones, which are extracted from a variety of sources. These include attention, self-regulation, thoughts, acceptance, and openness and sensation awareness. Furthermore, non-judgment along with non-reactivity upon all kinds of situations and other aspects involve describing and observing [22]. Numerous interventions focus on different aspects of mindfulness, such as attention, awareness (e.g., meditation-associated practices) while other aspects such as detachment and endurance (e.g., acceptance-associated practices) and compassion with kindness (e.g., loving-kindness meditation) are also stressed upon. This is often mentioned as a 'third wave' of interventions affecting cognitive behavior in comparison to the first wave which is rather focused upon classical conditioning along with operant learning and the second wave which dealt with cognition and information processes [23]. If mindfulness qualities such as detachment, acceptance, living in the moment, compassion and non-reactivity are developed in a personality it can eventually assist in stress alleviation caused by any kind of psychosis instead of only controlling paranoid intrusions, images or voices experienced in it [24]. Yet, there are a few research studies which have reported the positive outcomes of mindfulness mediation which is a trained voluntary attention, in patients suffering with schizophrenia or psychosis. It is intended to treat patients by increasing their awareness of the situations, avoiding unwanted thoughts, changing their relationship with their own-self, sensations and reducing the associated negative feelings. In an outpatient study consisting of 16 individuals with psychosis through a grounded theory analysis revealed that every single patient relates distinctly to their own individual psychotic experiences. Certainly, by accepting oneself and experiencing the voices and thoughts coming and going without over reacting and reclaiming their power through this process [25].

### Effects of mindfulness on brain

Not only does mindfulness relate to measures of self-report for psychological wellbeing but it has also been noted to induce a difference in the brain activity which was observed using functional neuroimaging methods. In 2007, a research study conducted by concluded that mindfulness was responsible for a reduction in bilateral amygdala activation along with a greater widespread prefrontal activation of the cortex in the brain during the entire course of affect labeling tasks. In this study, it was also observed that among those who scored high on mindfulness did in fact exhibit a strong and relatively significant

inverse association among right amygdala and prefrontal cortex of the brain. On the other hand, this pattern was not seen among those who scored low on the mindfulness intervention. This finding conveys that those who are more mindful do exhibit improved emotional responses as a result of the prefrontal cortical inhibition of the amygdala. In addition to that, another factor known as the trait mindfulness was also noted to correlate negatively with resting activity in medial prefrontal region as well as the amygdala portion of the brain. These parts are related to self-referential processing however, the depression symptoms levels positively correlated with resting activity within this part of the brain. Finally, such studies prove the association of heightened self-reported ability of an individual to give up negative thoughts that they possess about their own self with mindfulness [26]. Apart from this, researchers have also actively examined the relationships among mindfulness practices and psychological well-being. A similar research study conducted in 2009 reported comparisons among non-mediators and mediators in various measures of mental well-being. Results concluded significantly increased degrees of Mindfulness, Self-Compassion, Definitive wellbeing sense and at the same time, lowering the levels of rumination, psychological symptoms, fear of emotion, thought suppression and emotional regulation problems in comparison to the non-mediators. Another thing worth mentioning here is that the change observed in these variables was in fact linearly associated with mindfulness (meditation) extent [27]. In two other research studies, trait mindfulness facets mediated the association between meditation practice and psychological wellbeing in merged mediator and non-mediator samples [28].

### **Mindfulness intervention in other disorders**

In case of psychosis, mindfulness interventions have proved to be effective and research in this field is actually fast growing. Mindfulness can be further divided into three groups based on the strategies carried out in the treatment. The first group involves mindfulness meditation-based protocols which use meditation practices that are direct, the next group involves acceptance-based protocols then finally the third category contains compassion-based protocols. In response to these protocols, mindfulness meditation focuses in governing emotions by an affect enhancement of a positive type, a negative affect reduction and emotional reactions that are maladaptive by attention retraining [29]. Furthermore, considering psychosis, the acceptance and commitment therapy approach is in fact acknowledged as an intervention that is supported empirically by the APA (American Psychological Association). Apart from that, no meta-analysis has been observed to evaluate its effectiveness, alongside the popular studies of mindfulness intervention in the research world. Two systematic reviews have studied the effect of mindfulness intervention and meditation that they are indeed useful as an adjunct treatment for psychosis by distress and hospitalization rates reduction and in turn an increase in the individual's self-efficacy feelings [30]. In addition to that, another meta-analysis research has found that meditation associated with mindfulness influenced the mindfulness treatments in a relatively positive way for psychiatric conditions and disorders a research study

was conducted on patients experiencing schizophrenia using the mindfulness-based psych education in 2014, which gave a reassuring result about the effectiveness of this particular intervention [31]. The results of this research indicated that the severity of psychiatric symptoms along with psychosocial functioning improved, in a 6-month interventional programme in comparison to conventional usual care. Patients demonstrated positive outcomes such as those related to awareness of the illness along with treatment required and hospital readmissions. Lastly, these observations imply that people diagnosed with schizophrenia and other psychotic disorders do show positive results of mindfulness psych education [32]. When it comes to empowering patients with a variety of mental health illness and disorders, mindfulness training has significantly shown remarkable effects, in the way that it manages the negative thoughts and distressing behavior and also on the physical level, such as raised prophylactic effect on illness relapse and the return of anxiety and depressive episodes [33]. Nonetheless, such type of a research study which consisted of 15 participants with schizophrenia was conducted for testing the mindfulness meditation usefulness in increasing patients' awareness, reducing unwanted thoughts and sensations along with cognition changes like higher motivation in illness management. The results of this study indicated that individuals suffering from schizophrenia might not be distressed due to symptom occurrence but because of the understanding they perceive and construct from them. Early intervention focuses on the individual's premorbid states alongside the first psychotic episode, which is characterized by less detectable symptoms (subclinical signs) consisting of disorganized speech, delusional beliefs and decreased hallucinations. These attenuated symptoms are considered as a high-risk mental state and all patients experiencing schizophrenia show a mental state that is high risk [34].

### **Global approach on mindfulness intervention as a treatment**

Worldwide countries like Australia, United Kingdom or Canada have focused on including early intervention as a vital approach in the management of schizophrenia. In the Explicit Health Care Guarantees, the first episode of schizophrenia is considered as a first mental health condition. In this case, the clinical guidelines put forward an adjunct approach which consists of pharmacological and psychosocial dimensions. Such a treatment approach for schizophrenia is mindfulness-based cognitive behavioral therapy which does promote acceptance and mindfulness [35]. Another study done in the United Kingdom with individuals suffering from hallucinations that were stress-induced revealed outcomes which consisted of increased mindfulness skills in stress management and associated thoughts. In addition to that, this study also depicted that the psychological condition of these patients did in fact improve following the intervention [36]. Furthermore, another research study which was the first controlled study meant to assess mindfulness skills and overall outcome of the function of the patients. The results depicted an improvement in the predicted direction along with that significant positive outcomes were noticed in the intragroup comparisons, however, it didn't do any



better than the control group [37]. Similarly, a second control trial done in Spain consisted of a rather little sample of patients with psychosis. The results depicted that with the betterment in the acceptance rates, the overall condition and functioning of the patients improved yet, only the first result was observed to be statistically significant in comparison with the control group [38]. Apart from that, a rather more solid study consisting of a greater sample size (N=98) was conducted with an 18 month follow up period. The results of this particular study defined that the outcomes contained improved illness and insight levels along with overall functioning. In addition to that, there was a significant symptom reduction observed in the patients. One of the outcomes of this study also depicted that the length of stay at the hospitals was reduced and therefore these positive indicators suggest the clinical benefits of mindfulness intervention [39]. Due to a lack of research in the mindfulness intervention effects in males suffering from schizophrenia, this review will highlight studies focusing on these particular aspects. Although there is still a need to conduct more randomized control trials in this manner, all the fore mentioned points suggest there is a research gap when it comes to the effects of mindfulness intervention in the schizophrenia patients specifically males. It is important to therefore involve individuals with mental problem of high risk in mindfulness treatments for evaluation of its clinical effects. This project intends to explore

the efficacy of mindfulness-based interventions on schizophrenia male patients to bridge the research gap and bring forth existing literature and studies in this topic to the forefront. Eventually, such reviews will assist in using other adjunct treatments such as mindfulness interventions in managing the disorder along with the conventional treatment for a better prognosis in schizophrenia.

## Methodology

The evidence-based medicine practitioners and researchers frequently use a special framework which is known as the PICO framework. It is used in order to formulate a question and also assist in searching the literature. 'P' in the PICO means population in the study or patient problem, 'I' means the intervention used in the trial whereas 'C' means comparison and 'O' means outcomes related to it [40]. Such a model allows the clinician to effectively formulate essential parts of a clinical question which is mostly applicable to the population involved. Additionally, it also assists in the process of literature searching by bringing forth vital fundamental concepts concerned for a complete search scheme required [41]. The PICO framework for this study is given below in the form of a Table 1.

**Table 1:** PICO framework.

Population	Schizophrenia male patients
Intervention	Mindfulness based intervention
Comparator	Being on mindfulness-based intervention against not being on mindfulness-based intervention
Outcome	Awareness, cognition, depression, level of functioning, voice related distress, illness relapse and mental quality of life

### Inclusion criteria

In this review, the research studies which are considered in the inclusion criteria were those with particular relevance to the topic of the review itself. In addition to that, those studies which contained the specific keywords were also included. Apart from this, all the studies in the English language were included and those having mindfulness intervention as their treatment for the disorders were included in this review. A special effort was put into selecting only those studies which contain schizophrenia in its early stage which is a period of less than 5 years are included.

### Exclusion criteria

Research studies whose main topic is not evolving around schizophrenia or related conditions are excluded from this review. In addition to that, severe psychiatric disorders like affective disorders, organic brain disorders, moderate or severe learning disability and personality disorders are also excluded. Studies in languages other than English are also excluded from this review.

### Types of studies

The type of research studies included in this review are randomized control trials, case control trials and cohort studies.

Contrary to that, the trials which were either cluster-randomized or cross-over were not included in this review. As the study design is an important part for the assessment of studies, therefore, according to the hierarchy of the study designs, randomized control trials are considered as the most representative of the population study design. 9 of the included studies are randomized control trials and therefore the risk of bias is minimized here, other than that, the rest of the 4 studies were either meta-analysis or systematic reviews.

### Language used for the studies

The research for this review included all the literature published in the English language. Predominantly, there are libraries and other methods from which the data can be handpicked however, due to the time restriction and associated reasons, search engines were used by the researcher for the literature search. It is however, recommended to use other sources for literature search as well for the future researchers. It must be noted that an extensive search has been carried out to select the most relevant available information for this paper.

## Types of participants

Males suffering with schizophrenia in its early stage which was less than 5 years were considered here. In the first article [42]. Recruitment of individuals was from psychiatric outpatient departments with schizophrenia diagnosed as according to the current Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). A well written informed consent was obtained from the patients in the study and it was mentioned in this particular article. The second article [43]. Which consisted of 18-60 year old Chinese patients diagnosed with schizophrenia or its subtypes were included. In addition to that, an informed consent was also acquired from the participants concerned. A rather large study consisting of 1,082 patients who were randomly selected with schizophrenia disorder less than 5 years and similarly an informed consent was obtained from them [39]. Likewise, other research studies like [44-47]. Included in this review involved schizophrenia patients diagnosed according to DSM-IV whereas involved early stage psychosis patients as sample for treatment [48-50]. A review involving studies which includes patients suffering from anxiety as well as. Similarly, another meta-analysis included contained participants who were suffering from schizophrenia spectrum disorder and a review consisting of studies involving individuals diagnosed with depression [51,52]. The greatest number of participants 1,140 was the biggest sample among all the articles included in this particular review. The remaining studies contained samples from a number of 342 to 60 participants.

## Types of interventions

As this review was meant to highlight the effects of mindfulness-based intervention therefore, a majority of the articles included in this review contained mindfulness therapy as a treatment for the disorder(s) concerned.

## Types of outcome measures

In this review there are primarily two outcomes, one of them is the primary outcome which is the most important measure of

**Table 2:** Keywords and boolean operators.

Population	Intervention	Outcome
Search term 1	Search term 2	Search term 3
- Schizophrenia in men OR male schizophrenia	-Mindfulness OR	-Awareness OR mental awareness
-Early schizophrenia OR schizophrenia in early stage	Mindfulness therapy	-Functioning
-Schizophrenia spectrum disorders OR schizophrenia	-Mindfulness based- intervention	-Illness relapse
	-Mindfulness based stress reduction OR mindfulness based cognitive intervention programs	-Mental health quality
		-Depression
		-Voices distress OR auditory hallucination

Furthermore, with the help of PRISMA strategy, the articles were then selected and rejected as in accordance to the title, schizophrenia disorder, by abstract and ultimately by reading the article thoroughly.

effectiveness post the application of the intervention which is mindfulness intervention in this review. In addition to that, the secondary outcomes depict the effectiveness of intervention but not to the extent as primary outcome. However, it is important to mention them also as they help in evaluating the effectiveness to a certain extent. The primary outcome of this review is awareness. Other outcomes such as levels of depression, levels of functioning, illness relapse, voice related distress and mental quality of life will be considered as the secondary outcomes in this review.

## Search methods for identification of studies

The trials with regards to inclusion for this review were identified by a search of electronic databases and other resources.

## Electronic databases

The literature search consisted of articles from known and recognized databases such as COCHRANE, PUBMED, MEDLINE and GOOGLE SCHOLAR. Several articles were searched from the reference list of included studies. Monthly searches of a number of the previously mentioned sources led to selection of the most relevant articles. In the beginning of May 2020, a total of 30 articles were selected after the search, whereas after further examining and perusal, only 13 articles were noted to be strictly relevant to the topic concerned and for this particular reason they were included in this review. The articles in this review are published between the years 2004 to 2019. For the literature search, specific relevant keywords were used containing terms relating to the topic concerned and the intervention used. These keywords and Boolean operators are listed in the Table 2.

## Searching other resources

In addition to the previously mentioned electronic databases, the literature was searched from reference lists of the selected articles which were found to be most relevant to the topic and

contained the keywords. Where possible, the corresponding authors of randomized control trials specific to the topic were contacted for further information with regards to those particular. There were no identified language barriers in this case.

## Results

### Description of studies

**Results of the search:** The searches yielded a total of 30 potentially related citations from the electronic databases. After thorough screening, 17 of the searched articles were excluded due to irrelevance or incomplete information regarding the topic concerned. Whereas, 13 articles were finally included in this review which specifically focused on the topic under study.

### The PRISMA diagram below describes the screening process

**Included studies:** One of the meta-analysis contains 39 studies with a total of 1,140 participants. This analysis focused on patients suffering from depression, generalized anxiety disorder and other psychiatric conditions. All the studies took place between the years 1992 to 2009. Furthermore, the number of included participants ranged from 9 to 104 among various studies. Besides, another study included meta-analysis that discusses the prevalence, mortality and incidence associated with schizophrenia using 3 systematic reviews which share a common methodology. It concludes that schizophrenia is characterized by several tantalizing gradients and about its epidemiology; the research provides sufficient relevant information for future trends. An included study involved the comparison of mindfulness therapy with conventional psych education and another group consisting of treatment as usual in people with schizophrenia spectrum disorder over a period of 24 months. Another study consisted of mindfulness-oriented psycho-education group intervention on both early and long-term patients suffering from schizophrenia. This study intended to see its effects on functioning of patients and their mental conditions. Similarly, a study testing the mindfulness intervention effectiveness in an 18-month follow-up program among patients suffering from schizophrenia was also included. A rather different study consisted of mindfulness intervention effectiveness in young psychosis patients experiencing their first episode. Furthermore, in metacognition was also assessed to be improved by mindfulness intervention in a study in people with schizophrenia. Additionally, there are studies which contained similar protocols involving mindfulness intervention on schizophrenia patients. The effects of mindfulness on persistent mental illness, auditory hallucinations are also evaluated in 2 of the studies. Finally, the last paper contains a proper operational definition for mindfulness intervention [53].

### Study population

Males suffering with schizophrenia in its early stage which was less than 5 years were considered in this review. In the first article the patients were recruited from psychiatric outpatient

departments with schizophrenia spectrum disorder diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). A well written informed consent was obtained from the patients and it was mentioned in this article. The second article which consisted of 18-60-year-old Chinese patients diagnosed with schizophrenia or its sub-types were included. In addition to that, an informed consent was also acquired from the participants. A rather large study conducted by consisting of 1,082 patients who were randomly selected with schizophrenia disorder less than 5 years and similarly an informed consent was obtained from them. Likewise, other research studies like included in this review involved schizophrenia patients diagnosed according to DSM-IV whereas involved early stage psychosis patients as sample for treatment. A review involving studies which includes patients suffering from anxiety and depression. Similarly, another meta-analysis included contained participants suffering from schizophrenia spectrum disorder. Furthermore, there was a review consisting of studies involving patients suffering from depression. The greatest number of participants 1,140 was the biggest sample among all the articles included in this review. Remaining studies contained sample numbers ranging from 342 to 60 participants.

### Interventions

Among the included research articles, mindfulness-based intervention has been used as a treatment for various disorders mainly schizophrenia and others such as psychosis and depression or anxiety. As it is mentioned previously in this review, the inclusion criteria have defined mindfulness intervention as the main point.

### Comparisons

Articles in this review have been categorized into 2 or 3 groups. Those categorized into 2 groups contain Mindfulness-Based Intervention Group (MBIG) compared to Treatment As Usual Group (TAUG). Other than that, the rest of the articles have been categorized into 3 groups which consist of Mindfulness-Based Intervention Group (MBIG), Conventional Psychoeducation Group (CPG) and Treatment As Usual Group (TAUG). A comparison among these groups will highlight the effects of mindfulness intervention in male patients suffering from early schizophrenia.

### Outcomes

The primary outcome measure in the study was the average number and length of re-hospitalizations using the Positive and Negative Syndrome Scale (PANSS) over the course of 6 months. The secondary outcomes in this study included functioning level which was measured by Specific Level of Functioning scale (SLOF). This scale has proven to show very good validity in addition to internal consistency and reliability (intraclass correlation=0.84-0.88) [54]. Other than that, Insight and Treatment Attitudes Questionnaire (ITAQ) measured the insight into illness and treatment. The groups in the study all indicated a significant reduction in PANSS score, improvement in levels of functioning, reduction in average length/duration of re-hospitalizations and improvement of insight into illness/

treatment. Moreover, Mindfulness based treatment depicted improvements in the hospital stay duration and length, levels of functioning improvement and also insight into illness or treatment. In addition to that, participants receiving mindfulness-based intervention in comparison to the Conventional Psycho Education Group (CPEG) reported significant improvements in length of re-hospitalizations ( $p=0.05$ ), insight into illness treatment ( $p=0.005$ ), symptom severity ( $p=0.01$ ) and levels of functioning ( $p=0.01$ ).

Reported psychosocial functioning as its primary outcome whereas the psychotic symptoms measurement, illness/treatment consisting of Specific Level Of Functioning scale (SLOF) and Insight and Treatment Attitude Questionnaire (ITAQ) for measuring insight and treatment. In addition to that, Positive and Negative Syndrome Scale (PANSS) and five facet mindfulness questionnaires was used. The results indicated that in comparison to the conventional and treatment as usual groups, the mindfulness intervention group exhibited improvements in psychosocial functioning and in other secondary outcomes as well namely the re-hospitalization, psychotic symptoms and insight into illness/treatment. Moreover, mindfulness-based intervention participants showed significant improvements in Positive and Negative Syndrome Scale (PANSS) when compared with the other 2 groups over the course of 18 months. It also depicted fewer patient re-hospitalizations over 9 months and 18 months follow ups.

A study indicated primary outcome of symptom severity and its secondary outcomes consisted of functioning, insight into illness or treatment and social support. These were measured with Brief Psychiatric Rating Scale (BPRS), Specific Level of Functioning scale (SLOF), Social Support Questionnaire (SSQ) and finally Insight and Treatment Attitudes Questionnaire (ITAQ) for insight into illness measurement. These scales were mentioned to be satisfactorily reliable and valid. The statistical analysis depicted those mindfulness group participants' illness insight and length of re-hospitalizations and symptom severity had gotten better post treatment over the course of 18 months in comparison to the control group.

The primary outcome in the next article was metacognition assessment using the Metacognition Assessment Scale (MAS-A). Its secondary outcomes consisted of assessing dispositional mindfulness using Five Facet Mindfulness Questionnaire (FFMQ), self-reflection and overconfidence measurement using Beck Cognitive Insight Scale (BCIS), Positive and Negative Syndrome Scale (PANSS) and lastly the Marlowe-Crowne Social Desirability Scale (MCSD) for assessing individual's tendency. Thus, according to the results, higher levels of mindfulness were associated with higher levels of self-compassion and metacognition.

The study conducted by depicted caregiver's burden as the primary outcome measured by a 22-item caregivers' perceived stress level. The secondary outcome variables included caregiving experiences measured by the Experience of Caregiving Inventory (ECI), caregivers' physical health using the 14-item Body Mind Spirit Well-being Inventory (BMSWBI). In addition to that, anxiety and depression was also assessed using Hospital Anxiety and Depression Scale (HADS). Significant

improvement was noted among all the scales after mindfulness intervention application.

Consists of assessment of the primary and secondary outcomes. The primary outcomes for this study include participants' functioning and re-hospitalization rate. However, the secondary outcomes consist of patients' psychotic symptoms, their disease prognosis and insight into their illness. The scale used to measure the participants' functioning was the Specific Level of Functioning scale (SLOF), patients' symptoms severity in psychosis was measured by Positive and Negative Syndrome Scale (PANSS). Furthermore, levels of recovery were assessed by Questionnaire about the Process of Recovery scale (QPR) and insight into illness was assessed by Insight and Treatment Attitudes Questionnaire (ITAQ). Finally, for the assessment of mindfulness the Five-Facet Mindfulness Questionnaire (FFMQ) was used. The results concluded that the Mindfulness Based Intervention Group (MBIG) showed significant improvements in the four outcomes which were patients' functioning, psychotic symptoms severity, positive negative symptoms scale and symptom severity than the Conventional Psychoeducation Group (CPG) and Treatment As Usual Group (TAUG). Specifically, the Mindfulness Based Intervention Group (MBIG) depicted improved outcomes in functioning of patients in comparison with the Treatment As Usual Group (TAUG) and Conventional Psychoeducation Group (CPG). Psychotic symptoms were also observed to be significantly reduced whereas treatment as usual showed consistent symptom severity increase with time. Furthermore, the recovery from illness score also significantly improved in the Mindfulness Based Intervention Group (MBIG) than that of Treatment As Usual Group (TAUG). Similarly, the insight into illness or treatment also improved than the Conventional Psychoeducation Group (CPG) and Treatment As Usual Group (TAUG). It was also noted that, re-hospitalizations were less frequent in the patients undergoing mindfulness based therapy than those of the other two groups over a course of 6 months.

A similar trend was noticed in which reported a decrease in the hospital readmission rate along with increased functioning by using the Specific Level Of Functioning scale (SLOF) and a significant reduction in Brief Psychiatric Rating Scale (BPRS). All of these outcomes were seen to be improved among the Mindfulness-Based Intervention Group (MBIG) in comparison with the Treatment As Usual Group (TAUG) and Conventional Psychoeducation Group (CPG) overall.

This systematic review includes 1,140 patients in total who were given mindfulness-based therapy. The articles over-viewed in the review consisted of disorders like depression, panic disorder, generalized anxiety disorder, fibromyalgia, attention-deficit hyperactivity disorder, bipolar disorder and stroke. The results indicated that mindfulness-based therapy reduced the symptoms of anxiety in individuals experiencing anxiety. Similarly, it was found to be effective in reduction of depressive symptoms in people with depression symptoms in comparison to other disorders.

For the measurement of mindfulness, in the Mindfulness Attention Awareness Scale (MAAS) was used and Beck Depression Inventory (BDI-II) was used for severity of depression



symptoms measurement. Another Scale for the Assessment of Negative Symptoms (SANS) shows the severity of negative symptoms. Similarly, (PANSS) was used for positive and negative symptoms in people with schizophrenia. This study showed no significant difference among the outcomes between Mindfulness Based Intervention Group (MBIG) and Treatment As Usual Group (TAUG) in PANSS scale ( $p=0.699$ ), SANS ( $p=0.347$ ), depressive symptoms ( $p=0.545$ ) and mindfulness levels ( $p=0.078$ ).

Another article focused on the auditory hallucinations experienced during schizophrenia and the Psychotic Symptom Rating Scales (PSYRATS) was used to assess it. Another tool used to measure peoples' beliefs about auditory hallucinations and their relationship with these voices was the Beliefs about Voices Questionnaire (BAVQ-R). Apart from these, other scales were also used such as Beck Depression Inventory (BDI-II), Beck Anxiety Inventory (BAI) and Southampton Mindfulness of Voices Questionnaire (SMVQ) for the assessment of depression symptoms, extent of anxiety and mindful response to hearing voices respectively. These scales showed the existence of negative relations among mindfulness of voices and voice related stress in addition to resistance to voices. Furthermore, the analysis of other factors revealed that positive relation exists between loudness of voice and voice related stress, duration and its frequency.

Similarly, in another article included in this review used specific scales to assess the outcomes. The primary outcomes in this study are depression levels and anxiety levels. Secondary outcomes are stress levels, quality of life and mindfulness levels. These are measured by respective scales such as PANSS, CASS, SF-12, DASS-21 and FFMQ. The results indicated significant differences in mental health scores on the scales before and post the intervention. Participants further showed good improvements in their mental health after the treatment. PANSS score also improved and all the above-mentioned points highlight the positive outcomes of mindfulness intervention.

## Discussion

### Summary of main results

This review consisting of 13 studies in total evaluated the effects of mindfulness therapy in comparison to treatment as usual and conventional psych education therapy in schizophrenia patients. The results have essentially reinforced the belief that mindfulness intervention can be utilized in management of schizophrenia disorder. It can be noted that the primary and secondary outcomes of almost all the studies have provided sufficient data on improvement among main variables. The scales used for assessment of the outcomes consisted mainly of the Positive And Negative Syndrome Scale (PANSS), Specific Level Of Functioning scale (SLOF), Insight and Treatment Attitudes Questionnaire (ITAQ), Brief Psychiatric Rating Scale (BPRS), Social Support Questionnaire (SSQ), Metacognition Assessment Scale (MAS-A), Five Facet Mindfulness Questionnaire (FFMQ), Marlowe-Crowne Social Desirability scale (MCSD), Experience of Caregiving Inventory (ECI), Body Mind Spirit Well Being Inventory (BMSWBI), Hospital Anxiety and

Depression Scale (HADS), Process of Recovery Questionnaire (QPR), Beck Depression Inventory (BDI-II), Scale for the Assessment of Negative Symptoms (SANS), Psychotic Symptoms Rating Scales (PSYRATS), Beliefs About Voices Questionnaire (BAVQ-R) and Southampton Mindfulness of Voices Questionnaire (SMVQ). Mindfulness intervention depicted a reduction in re-hospitalization and stay among the schizophrenia patients using the Specific Level of Functioning Scale (SLOF). The comparison with Treatment As Usual Group (TAUG) and Conventional Psychoeducation Group (CPG) reported that Mindfulness Based Intervention Group (MBIG) patients experienced less hospital stay and duration along with improvement in total functioning level. These results were noticed to be consistent among 5 studies. These studies contained a follow up of about 9 months to 12 months period for re-assessment of the long-term effects of mindfulness intervention in schizophrenia patients. Positive and Negative Syndrome Scale (PANSS) assessed in a total of 6 studies where it was compared among a Mindfulness Based Intervention Group (MBIG) and Treatment As Usual Group (TAUG) or Conventional Psychoeducation Group (CPG). 5 of the included articles depicted in the review showed significant improvements according to the statistical analysis whereas one of the articles did not show any significant reduction among the Treatment As Usual (TAUG) and Mindfulness Based Intervention Group (MBIG) ( $p=0.699$ ). Another scale which assessed the insight into illness measurement known as the ITAQ (Insight and Treatment Attitudes Questionnaire) was used in 4 of the studies. It showed significant reduction ( $p=0.005$ ) during the assessment post the intervention in all 4 of the trials. As it was previously mentioned, these assessments were done among the Treatment As Usual Group (TAUG), Conventional Psychoeducation Group (CPG) and Mindfulness Based Intervention Group (MBIG). Similarly, 4 of the studies also assessed Five Facet Mindfulness Questionnaire (FFMQ) depicting significant improvement in the mindfulness group in comparison to the other 2 groups. Lastly, 2 of the articles which used Beck Depression Inventory (BDI-II) also showed significant improvement post mindfulness intervention in comparison to the Treatment As Usual Group (TAUG) and Conventional Psychoeducation Groups (CPG). Other scales mentioned previously have collectively shown significant improvements after the mindfulness treatment. Such results further strengthen the belief that mindfulness has beneficial effects in the treatment of mental illnesses specially schizophrenia in this case. The strengths and limitations of this review are mentioned below.

### Strengths

The findings provided by this review give preliminary support for the mindfulness-based intervention efficacy in schizophrenia patients concerning their overall functioning and illness relapse. This program which focuses on enhancement of self-awareness, positive attitude and interdependence can lead to a better psychological health thereby reducing the length of hospitalizations and number of visits over an 18 month follows up period. This review has thus provided significant evidence considering the effects of mindfulness training in schizophrenia patients' psychological and social functioning. The included

studies contain application of mindfulness intervention with a follow up at the end which further indicates its long-term effects. Some of the researches included in this review have a follow up period of 9 months. While, most of the other researches have assessed the effects of mindfulness intervention over a period of 12 months and 18 months. In addition to that in this review, the longest follow up in a research is of 24 months. These factors indicate the strength of this review. The sample sizes of participants in researches further determine the strength of study. In this review, 1,140 participants were the highest number of sample size among the studies whereas 342 to 60 participants were included in rest of the articles. A greater sample size is better representative of the population under study therefore; the researches including more sample sizes can provide a better understanding of the effects of intervention on the disorder. All of the studies have reported significant improvements in case of assessment scales after statistical data analysis. Other groups such as the Treatment As Usual Group (TAUG) and Conventional Psychotherapy Groups (CPG) have shown positive effects but the Mindfulness Based Intervention Group (MBIG) has comparatively given more positive outcomes. Study designs are also considered an important factor in the strength of a review. Most of the included articles in this review are randomized control trials whereas few of them are meta-analysis and systematic reviews. RCT designs increase the credibility of the involved studies by reducing risks of bias. Furthermore, no adverse effects were found post mindfulness intervention which is strength of this review which denies the claims made by previously conducted studies that mindfulness training for people suffering with mental illnesses such as psychosis may exacerbate the psychotic symptoms. Findings from this study suggest that mindfulness provides more insight into and acceptance of their illness along with its symptoms after the treatment in people with schizophrenia. Thus, participants will be able to manage their psychotic symptoms associated with the disorder and will be less affected which in turn will lead to a better psychosocial functioning. Interestingly, the gender studies on this topic have revealed that sex indeed is a significant predictor when it comes to negative self-compassion. The females in the studies involved have shown less self-compassion in comparison to the males using the assessment scales which indicates that women are engaged in rumination and self-critical more than males. In consonance with these positive outcomes obtained by mindfulness intervention through FFMQ scores in various studies might fill the gap suggested by previous reviews that mental state improves and further relapse of illness is prevented in schizophrenia.

### Limitations

Over and above that, some limitations were found besides the strengths of this review. These limitations must not be overlooked by future researchers so that the quality of evidence is improved. First of all, in some of the included studies, the treatment allocation was not blinded which can produce a response bias. Moreover, the assessors were not blinded to the intervention and control groups. Such biases lead to inaccurate data findings and might inflate the treatment effects. In my

study, the people suffering schizophrenia for less than 5 years were specifically included, whereas some of the studies contained in this review count this as a drawback, the reason being that people experiencing schizophrenia for less than 5 years such as 2 to 2.5 years might not effectively represent the chronic disorder effects on the mental health. As this was the intended purpose of the review to evaluate the effects of mindfulness in early schizophrenia therefore, less than 5 years of schizophrenia population will not be seen as a limitation yet must be mentioned for clarity. Another limitation in this review is that most of the studies did not mention any comorbidity such as other severe mental disorders, substance abuse or affective disorders. Comorbidities in one way or another can affect the results of the data therefore, it is necessary to eliminate or mention them in the text. Advanced trained nurses who practiced through the researchers were given the role of applying the intervention to the people suffering with schizophrenia. Therefore, one such limitation is that this might reduce the applicability of this intervention in the psychiatric care which supports easy to run and brief therapies that are simple to use by anyone. Despite the fact that mindfulness practice levels were measured by the Five-Facet Measurement Questionnaire (FFMQ), yet the adherence of patients to the treatment and their regularity were troublesome to be standardized by interventions using psychoeducation programs. The researchers were told that the patients have completed their sessions whereas it was not made sure whether the sessions contained all the components of the intervention. Most of the researches included in this review have evaluated the effects of mindfulness in comparison to the conventional psychoeducation groups whereas none of them compared the combined benefits of psychoeducation and mindfulness alone. Another limitation is that the sample size was not very big, which is not representative of the population under study and these results also cannot be generalized to other countries populations. Furthermore, the different sub-types of schizophrenia were not assessed separately in this review whereas a generalized schizophrenia spectrum disorder diagnosed by DSM-IV was evaluated. Similarly, some of the studies which measured the distress associated with voices experienced by schizophrenia patients used scales like PSYRATS which as mentioned in the previous literature are criticized for being an insensitive index for voice-related distress measurement. The fore mentioned limitations need to be resolved in the upcoming researches for a better assessment of the intervention effects in schizophrenia patients [55].

### Impact including clinical and research

The results stated previously collectively suggest that mindfulness-based intervention has the potential to assist and facilitate in early recovery such as symptom reduction and overall functioning improvement in the patients suffering from early stage schizophrenia. Moreover, it improves various other domain of a patient's functioning such as their social functioning and self-maintenance which leads to a successful interaction with the community and independence in living. It must also be stated that the re-hospitalization rates and symptom recovery, assessed by specific valid and reliable tools, improved after the

mindfulness intervention in patients which can lift the economic burden from the patient's family in order to ensure better care. In comparison to other psychosocial interventional studies, mindfulness has provided far more desirable effects such as a low attrition rate and better intervention completion rates. These findings in turn strengthen the claim that mindfulness intervention might prove to be a better and new approach for treatment of mental illnesses. In this regard, previous researches have not specifically focused on patient insights into their illnesses and in addition to that interventions practiced in the past were not insight-oriented, however this review has highlighted this variable in the form of an outcome assessed by scales which are indeed valid. The reading of those scales suggests an improvement in the patient's insight into illness causing a proper adherence to the treatment and self-care which is indeed a vital component for mental well-being. In a nutshell, these findings support and encourage the use of mindfulness therapies as a full-fledged treatment for the general population in case of mental disorders. The prior mentioned results recommend that mindfulness intervention might not be diagnosis-specific yet; it may solve those processes occurring in many conditions by altering emotional and evaluative dimensions that cover general wellbeing aspects. This suggests that mindfulness has general applicability. Furthermore, these third-wave therapies have been considered as novel treatments and an optimistic approach for the patient population. Also, because these interventions have proved to be feasible and well-tolerated among the population by demonstrating no adverse effects which adds to the benefits. Hence, as mindfulness gave positive outcomes in the voice related stress management along with alleviating the negative impacts caused by auditory hallucinations in schizophrenia patients, it must not be only seen as an intervention for persistent voices but as a broader rehabilitation and recovery intervention which is beneficial to the individual's overall mental health. In the light of the above-mentioned reasons, it is tentatively suggested that mindfulness should be considered as an adjunctive treatment or stand-alone treatment for the treatment of mental disorders especially early stage schizophrenia.

## Conclusion and Recommendations

There is scanty evidence with regards to the effects of mindfulness intervention in chronic schizophrenia patients therefore; it is recommended that future researches be conducted on different chronicity and severity of schizophrenia along with those exhibiting comorbidities of other mental illnesses. Moreover, the cost effectiveness, patient preference and treatment acceptability of mindfulness should be compared with conventional treatment or psychoeducation treatment for a broader picture of the benefits of this intervention as compared to the other treatments as described. Robust studies which are using randomized control trials and contain sufficient sample size power must be conducted in the future researches for a high-quality level of evidence that is free of bias and portrays a clear representation of the population that is being studied. In terms of mindfulness intervention, its components should be assessed separately to evaluate specifically which of them cause changes and in what way they do so thus creating an interesting

discussion on the intervention effects. In the recent conditions where therapist and patient interaction is limited, an online system is very much needed to be developed and implemented in order to deliver the proper mindfulness intervention on the instructions of the therapist and the researches must be conducted on this topic for evaluating its effect in a virtual setting. Apart from that, it is vital to report baseline data on medication use by the patient and psychological treatment which will inspect the potential of any co-intervention bias. During the treatment phase, meditation must be kept brief with frequent guidance by the instructor while facilitation in psychotic experiences discussion for psychosis patients with regards to complete adherence to the treatment assigned. The validity and reliability of scales used for outcomes measurement in the study from the previously held researches must be included in each study which will show accurate results of the treatment on those targeted outcomes. The follow ups mentioned in the studies in this review were spanning a period up to a maximum of 24 months depicting the mindfulness intervention long-term effects. Finally, in this regard, future researches should conduct follow ups more rigorously than those mentioned in these studies to assess the long-term benefits of the mindfulness-based intervention. In the nutshell, review and assessment of overall research articles from all over provides a degree of insight into the sufferings of those associated with schizophrenia symptoms. These mentioned symptoms have been observed to have lessened with the use of mindfulness intervention leading to a great alternative for the treatment of schizophrenia as seen from the evidence as mentioned. Therefore, it can be concluded that mindfulness intervention does indeed have an effect on the alleviation of early schizophrenia symptoms in men along with the improvement of the individual's quality of mental health.

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