

Mindfulness of Voices and its Relation to Quality of Sleep among Patients with Schizophrenia Experiencing Auditory Hallucination

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Abstract

Background: Auditory hallucinations and sleep disturbances are common clinical issue for patients diagnosed with schizophrenia-spectrum disorders. Sleep disturbances has been identified as a putative causal factor in the onset and persistence of psychotic experiences. Mindfulness may have an effect on improving patient's sleep quality through acting with awareness and being non-judgmental towards oneself following the experience of an event. **Aim:** Assess mindfulness of voices and its relation to quality of sleep among patients with schizophrenia experiencing auditory hallucination. **Settings:** The inpatient psychiatric department of Tanta University, and The Neurology, Psychiatry, and Neuro-Surgery Center. **Subjects:** a convenient sample of 135 patients diagnosed with schizophrenia **Tools:** Tool I Socio-demographic and clinical characteristics, Tool II: Southampton Mindfulness of Voices Questionnaire (SMVQ), Tool III: The Hamilton Program for Schizophrenia Voices Questionnaire (HPSVQ) and Tool IV: Sleep quality scale (SQS). **Results** there was a statistically significant positive correlation between mindfulness of voices and sleep quality. On the contrary, a statistically significant negative correlation was detected between severity of voices and sleep quality. **Conclusion:** Based on the results of the present study it can be concluded that patients with schizophrenia in the present study had low mindfulness of voices which lead to exacerbation of hallucinations and subsequently affect negatively their quality of sleep. **Recommendations:** Incorporation of mindfulness of voices strategies into daily living activities of the patients to gain benefits from its application either on intensity of hallucination or quality of sleep and other aspects of their life. Implementing mindfulness training intervention to the patients who are suffering from auditory hallucinations to teach them how to apply it in their life.

Key words: auditory hallucination, mindfulness of voices, quality of sleep, schizophrenia.

Introduction

Auditory hallucinations are the most noticeable positive symptoms in schizophrenia-spectrum

disorders⁽¹⁾. It is estimated that more than 90% of the patients with schizophrenia experience hallucinations at certain period of their illness⁽²⁾. Seventy-five percent

of them usually have auditory hallucinations⁽³⁾. Persistent auditory hallucinations produce adverse effects, including heightened anxiety, depression, social withdrawal, homicide, suicide, and affect their quality of sleep⁽⁴⁾.

The term sleep quality is usually defined as how well a person is sleeping and is assessed by the frequency and severity of sleep onset issues, sleep duration, the use of sleeping medications, daytime drowsiness and sleep disturbances⁽⁵⁾. Sleep disturbance documented by polysomnography include difficulties falling asleep, awakening too early and being unable to go back to sleep, a preference for being awake during the evening, reduced deep or slow-wave sleep (the most restorative stage of sleep), and short rapid eye movement (REM) latencies⁽⁶⁾.

Difficulties initiating or maintaining sleep are frequently encountered in patients with schizophrenia. Disturbed sleep can be found in 30-80% of schizophrenic patients, depending on the degree of psychotic symptomatology⁽⁷⁾. Impaired sleep makes it difficult for patients with schizophrenia to cope with stressors and difficulty seeing the positive aspects of daily challenges. Moreover, sleep irregularities in schizophrenia can significantly reduce the patients' quality of life and lead to a deteriorating clinical condition^(8,9).

A previous study on patients with schizophrenia showed that auditory hallucinations predicted higher severity of next-day sleep disturbances. Various forms of sleep disturbance have also been linked to heightened levels of symptoms exacerbation and may portend relapse⁽¹⁰⁾. A study was conducted by Waite et al., (2015) reported that

many patients with schizophrenia do not want to sleep because they need to know what goes on during the night, or because they fear some violence to themselves while asleep due to auditory hallucinations. Patient explanations similarly show awareness of an interaction between their psychotic experiences and their sleep. Some patients stated that "They [the voices] keep me from going to sleep", "the more tired I am to sleep the worse they get"^(11,12).

Mindfulness may have an effect on decreasing sleep disturbances and improving a person's sleep quality through acting with awareness and being non-judgmental towards oneself following the experience of an event⁽¹³⁾. Mindfulness is defined as intentionally paying attention to the present-moment experiences (e.g., physical sensations, thoughts, sounds, voices) with non-judgmental awareness of it. Rather than attempting to alter current experiences or to eliminate them from awareness, a mindful response is one that accepts what is currently present without striving to change it and without becoming absorbed in ruminating on or worrying about these experiences. It works to target many different outcomes including sleep quality and stress related symptoms^(14,15).

Moreover, relating and responding mindfully to voices is a way to reduce anxiety and distress from voices. It involves accepting and decentering from the experience, that is experiencing thoughts and emotions as transient mental events rather than as necessarily accurate reflections of self or reality, maintaining a non-judgmental stance and allowing it to pass⁽¹⁶⁾.

Briefly, mindful voices approach increases meta-awareness of individual rather than preventing the voices. This is in contrast with reacting to unpleasant voices with confrontation, judgment, rumination, or avoidance, which appears to increase distress and affect sleep quality⁽¹⁷⁾.

According to Chadwick et al. (2005), therapies treating psychosis should aim at alleviating the distress resulting from resisting unpleasant psychotic sensations such as negative thoughts and images rather than trying to eliminate the psychotic experiences. The study reported that distressing reactions, not psychotic experiences cause distress. Instead of avoiding and judging unpleasant experiences that lead to rumination, mindfulness provides an alternative way for patients with psychosis to react with an attitude of acceptance and with clear awareness of the transient nature of thoughts⁽¹⁸⁾. A mindful response could reduce distress and rumination through changing the way a person relates to negative cognition⁽¹⁶⁾.

Therefore, the current study is designed to assess the relationship between mindfulness of voices and sleep quality in order to provide a new finding with potential therapeutic interventions for patients experiencing auditory hallucination which in turn can improve their sleep quality and enhance quality of their life.

Aim of the study:

To assess mindfulness of voices and its relation to quality of sleep among patients with schizophrenia experiencing auditory hallucination

Research questions:

-What is the relation between mindfulness and quality of sleep among patients with schizophrenia experiencing auditory hallucination?

- What is the relation between mindfulness and severity of auditory hallucination among patients with schizophrenia experiencing auditory hallucination?

- What is the relation between severity of auditory hallucination and quality of sleep among patients with schizophrenia experiencing auditory hallucination?

Subjects and method:

Subject

Research design:

The present study followed descriptive correlational research design.

Setting:

The inpatient psychiatric department of Tanta University. It has a capacity of 31 beds divided into two wards for male (17 beds) and two wards for female (14 beds) as well as Neurology, Psychiatry, and Neuro-Surgery Center. It has a capacity of 28 beds divided into one ward for male (18 beds) and one ward for female (10 beds). Both previously settings are under the supervision and direction of the ministry of higher education and scientific research. They work 24 hours \day, 7 days \week

Subjects:

A convenient sample of 135 patients diagnosed with schizophrenia was calculated according to the (Epi- Info software). **The selected patients**

were chosen based on the following inclusion criteria:

- Diagnosed with schizophrenia according to DSM-5 criteria.
- Experiencing auditory hallucination.

The exclusion criteria include:

- Current or past substance-use disorders, neurological illness, acute medical illness and mental retardation.

Tools of the study:

The data of this study was collected using the following tools:

Tool I: Socio-demographic and clinical characteristics

It was developed by researchers. Socio-demographic data includes patient's age, sex, marital status, level of education, residence, income, occupation, and cohabitation as well as patient's clinical characteristics as mode of admission, duration of illness and number of previous admission.

Tool II: - Southampton Mindfulness of Voices Questionnaire (SMVQ).

It was developed by **Chadwick et al. 2007⁽¹⁶⁾**. The SMVQ is a 16-item questionnaire are scored on a 7-point Likert scale rated from "strongly disagree" (0) to "strongly agree" (6), yielding a total range of 0–96. The SMVQ measures how mindfully person respond to their voices through four components; (1) clarity of awareness of the present moment versus unawareness and lost in the voice; (2) attention with unpleasant sensations versus experiential avoidance; (3) accepting difficult situations of oneself versus situation and self-judgment; and (4) letting go versus struggle and rumination.

The measure has four interrelated components of mindfulness namely; Mindful observation (MO), letting go (LG), absence of aversion (AV), and non-judgment (J). MO has three positive items and one negative, aversion has three negative items. J and LG both have two positive and two negative items. The negative items are reversed for scoring. The four subscales have the following items, with positive or negative wording:

Subscales	Number of Positive items	Number of Negative items
Mindfulness Observation (MO)	1, 7, 9	16
Letting Go (LG)	4, 10	2, 13
Absence a version (AV)	5	6, 12, 14
Non-Judgmental (J)	11, 15	3, 8

Scoring system: The total measurement has a range of scores from zero to 96 and each of the four subscales has a range from 0 to 24.

Tool III:-The Hamilton Program for Schizophrenia Voices Questionnaire (HPSVQ)

It was developed by **Van Lieshout & Goldberg 2007⁽¹⁹⁾**, The HPSVQ is a 9-item self-report questionnaire with a five-point Likert scale rated from 0 to 4, to measure the severity of voices from least to most severe.

The items are frequency, negative content, loudness, and distress, impact on self-appraisal, clarity and compliance with voices commands. This scale measures the severity of hallucinating voices in schizophrenia based on observations and interviews

with patients. The HPSVQ measures physical and emotional criteria of voices and had been used to provide information about the patient's experiences of voice hearing.

Scoring system:

- 0-7: Absence of to minimal auditory verbal hallucinations
- 8-13: Mild severity of auditory verbal hallucinations
- 14-25: Moderate severity of auditory verbal hallucinations
- <25: Severe auditory verbal hallucinations

Tool IV:- Sleep quality scale(SQS)

SQS was developed by **Yi et al 2006** ⁽²⁰⁾. It Consists of 28 items on a four-point Likert-type scale, the SQS evaluates six domains of sleep quality, daytime symptoms, restoration after sleep, problems initiating and maintaining sleep, difficulty waking, and sleep satisfaction. Respondents indicate how frequently they exhibit certain sleep behaviors (0 = “few,” 1 = “sometimes,” 2 = “often,” and 3 = “almost always”). Scores on items belong to factors 2 and 5 (restoration after sleep and satisfaction with sleep) and are reversed before being tallied. Total scores can range from 0 to 84, with higher scores demoting more acute sleep problems.

Method

The study was implemented according to the following steps:

Obtaining approval:

An official letter was addressed from the Dean of the Faculty of Nursing to the Director of the Psychiatric Department of Tanta University Hospital and Neurology, psychiatry and Neurosurgery center to request their permission and cooperation for data collection

Ethical consideration:

-The approval was obtained from Faculty of Nursing, Scientific Research Ethical Committee (code 301-9-2023).

-Written informed consent was obtained from subjects of the study to participate in the study after explaining the purpose of the study.

-Confidentiality was taken into consideration regarding data collection.

-Nature of the study didn't cause any harm or pain to the entire subjects

-Each patient had the right to refuse participation or withdrawn from the study at any time.

Preparation of the study tools:

-The researchers translated Tools II, III and IV into Arabic language then translating them back into English language. Results indicated that the back translation and the original were comparable.

-A panel of five specialists in the disciplines of psychiatric medicine and nursing conducted a content validity assessment, and the necessary adjustments were made as a result

-The reliability of the validated tools was then evaluated using Cronbach's alpha, and found to be (0.89, 0.94, 0.81, respectively).

Pilot study:

A pilot study was carried out on 10% of patients to ensure the clarity and applicability of the study tools. These patients were excluded later from the actual study.

Actual study:

-The researchers reviewed the patients' charts to determine those who were eligible to participate in the study.

-Then, the researchers interviewed each patient on an individual basis through interviewing technique to introduce themselves, establish rapport, gain patients' trust, explain the aims of the study, and complete the study tools.

- The duration of each interview ranged from 30 to 45 minutes according to patient's attention and understanding.

-The researchers met the patients three days per week during the morning shift.

Statistical analysis:

Data were analyzed using Statistical Program for Social Science (SPSS) version 24.0 Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage. A one-way analysis of variance (ANOVA) when comparing between more than two means. Chi-square (X^2) test of significance was used in order to compare proportions between qualitative parameters. Pearson's correlation coefficient (r) test was used for correlating data.

Results:

Table (1) presents the distribution of the studied patients according to their sociodemographic and clinical characteristics. It was observed that the mean age was 34.8 ± 9.67 years with the highest percentage being in the age group less than 30 years.

Concerning sex, more than one half of the studied subjects 56.3% were male. In relation to marital status, those who were single and married had the same percentage 38.5% compared to 5.9% only who were widows. Regarding educational

level, the highest percent of subjects 41.5 % had secondary level of education and 59.3 % of them lived in rural area. Those who did not have enough income represented 68.1 %. More than two thirds 68.9% were unemployed and 75.6 % living with their families. As for mode of admission to psychiatric hospital, 83.7 % enter the hospital involuntary and 41.5 % had duration of illness ranged from 5 to less than 10 years with a mean of 7.85 ± 5.85 . Finally, regarding number of previous hospitalization, around one half of the studied subjects were admitted to the hospital from 5 to less than 10 times as shown by 51.1% with a mean of 5.18 ± 3.16 .

Table (2): reveals the distribution of the studied participants according to their level of mindfulness of voices. It can be noticed that 40.7% of participants had a low level of mindfulness compared to 22.2% only who had high level of mindfulness with a total mean score of 22.43 ± 16.61 .

Table (3): illustrates the distribution of the studied participants according to their mean scores of total mindfulness of voices and its subscales. From this table it can be detected that the mean score of total mindfulness was 22.43 ± 16.61 . Regarding mean scores of subscales, it was noted that, absence of aversion subscale takes the highest mean 6.24 ± 5.19 followed by mindful observation 6.07 ± 4.83 , then letting go subscale 5.88 ± 4.61 and finally, non-judgment subscale received the lowest mean 4.48 ± 3.94 .

Table (4): illuminate the distribution of the studied participants according to severity of voices according to The Hamilton Program for Schizophrenia Voices Questionnaire

(HPSVO). The table shows that nearly one half of the participants (46.7%) had severe degree of voices while only 29.6% of them had mild severity with a mean score of 22.04 ± 8.91 .

Table (5): shows the distribution of the studied participants according to their degree of sleep quality. The table illustrates that 60.7% of participants had low sleep quality, in comparison to 9.6% of them who had high sleep quality with a mean score of 40.50 ± 15.84 .

Table (6): displays the correlation between severity of voices, mindfulness of voices (total and subscales) and sleep quality. A statistically significant positive correlation was discovered between mindfulness of voices (total and subscales) and sleep quality ($P=0.005^*$, 0.001^* , 0.009^*). On the contrary, a statistically significant negative correlation was detected between severity of voices, mindfulness of voices (total and subscales) and sleep quality. ($P=0.001^*$)

Table (1) Distribution of the studied patients regarding their sociodemographic and clinical data

Sociodemographic and clinical data		N	%
Age	< 30	52	38.5
	30 – 40	45	33.3
	> 40	38	28.1
	Range	22–58	
	Mean \pm SD	34.8 \pm 9.67	
Sex	Male	76	56.3
	Female	59	43.7
Marital Status	Single	52	38.5
	Married	52	38.5
	Divorced-Separated	23	17.0
	Widowed	8	5.9
Education	Illiterate	29	21.5
	Basic education	28	20.7
	Secondary	56	41.5
	University education or higher	22	16.3
Residence	Rural	80	59.3
	Urban	55	40.7
Income	Enough	43	31.9
	Less than Enough	92	68.1
Occupation	Employed	42	31.1
	Unemployed	93	68.9
Cohabitation	Family	105	75.6
	Alone	33	24.4
Mode of admission	Voluntary	22	16.3
	Involuntary	113	83.7
Duration of illness (years)	< 5	47	34.8
	5 – 10	56	41.5
	> 10	32	23.7
	Range	1–25	
	Mean \pm SD	7.85 \pm 5.85	
No of previous hospitalization	< 5	58	43.0
	5 – 10	69	51.1
	> 10	8	5.9
	Range	1–12	
	Mean \pm SD	5.18 \pm 3.16	

Table (2): Distribution of the studied participants according to their level of mindfulness of voices.

Levels of Mindfulness of voices	N	%
low	55	40.7
Average	50	37.0
High	30	22.2
Range	8 – 82	
Mean ± SD	22.43 ± 16.61	

Table (3): Distribution of the studied participants according to their mean scores of total mindfulness of voices and its subscales.

Mindfulness of voices and its subscales			F test	P value
Mindful observation	Range	1–21	1.713	0.309
	Mean ± SD	6.07±4.83		
Letting go	Range	1–22		
	Mean ± SD	5.88±4.61		
Absence of aversion	Range	0–21		
	Mean ± SD	6.24±5.19		
Non-judgment	Range	1–20		
	Mean ± SD	4.48±3.94		
Total Mindfulness	Range	8 – 82		
	Mean ± SD	22.43 ± 16.61		

F: ANOVA test

*Significant at level $p \leq 0.05$ **Table (4): Distribution of the studied participants according to severity of voices according to The Hamilton Program for Schizophrenia Voices Questionnaire (HPSVO).**

Severity of voices according to The Hamilton Program for Schizophrenia Voices Questionnaire (HPSVO).	N	%
Mild	40	29.6
Moderate	32	23.7
Severe	63	46.7
Range	8 – 33	
Mean ± SD	22.04 ± 8.91	

Table (5): Distribution of the studied participants according to their degree of sleep quality.

Sleep quality	N	%
Low	82	60.7
Average	40	29.6
High	13	9.6
Range	9 – 72	
Mean ± SD	40.50 ± 15.84	

Table (6): Correlation between severity of voices, mindfulness of voices (total and subscales) and sleep quality.

Correlation	Sleep quality		HPSVO	
	r	P value	r	P value
HPSVO	-0.821	0.001*		
Total Mindfulness of voices	0.652	0.005*	- 0.761	0.001*
Mindful observation	0.741	0.001*	- 0.702	0.001*
Letting go	0.598	0.009*	- 0.672	0.003*
Absence of aversion	0.792	0.001*	- 0.834	0.001*
Non-judgment	0.807	0.001*	- 0.867	0.001*

r=spearman's rho coefficient *Significant at level $p \leq 0.05$

Discussion

Relating mindfully to voices is the recognition of them as temporary mental experiences rather than a reality and allowing it to pass in a non-judgmental way. Without being reacted to with anxiety, fear, discomfort, or ruminations which may affect patients' quality of sleep negatively. Thus, the mindful voices approach act by increasing patients' awareness to voices rather than stopping the voices⁽²¹⁾. Through this way it can be change the relationship between patients and their voices and promote positive coping strategies. Therefore, the current study assessed the mindfulness of voices and its relation with severity of auditory hallucination and quality of sleep.

The findings of the present study revealed that the studied subjects had high degree of hallucination and low degree of mindfulness of voices. Moreover, a statistically significant negative correlation was detected between severity of voices and mindfulness of voices. This result could be explained by many factors present in the current subjects.

The first one is being hospitalized many times throughout their life (around one half of the studied subjects entered the hospital from five to less than ten times). This means that their life period in the hospital is longer than in the community. Really the admission to psychiatric hospitals is associated with a lot of negative consequences on the patients such as being away from their families and community, deteriorate level of social skills, increase feeling of boredom inside the hospital, lack of leisure activities, and being a part of unfamiliar people and environment. This locked environment in the hospital is free from any opportunity to acquire any new skills and away from the concept of mindfulness of voices.

Additionally, the patients who live inside the hospital just follow its rules without initiation to any innovation which increases free time without any benefits⁽²²⁾. All these factors create many challenges and increase stress level on the patients which in turn leads to exacerbation of psychotic symptoms such as hallucination. In this respect, Hosseini et al., (2021) discovered that low

mindfulness trait leads to high-level of stress and then leads to hallucinations⁽²³⁾.

The study also found a negative correlation between acting with awareness and hallucinatory experiences. Deficits in attending to the current actions may affect self-monitoring (i.e., the ability to recognize that a sensory signal has an internal origin and monitor one's own behavior). Furthermore, some studies have suggested that deficits in self-monitoring explain auditory hallucinations^(24,25). Regarding the effect of recurrent admission to the hospital, Abdelrahman & Berma (2017) noted that the patients who live in the community and using behavioral coping strategies, such as performing home tasks or hobbies have reduced level of auditory hallucination⁽²⁶⁾.

The second reason for explaining this result is the absence of insight in the studied patients which act as a barrier to successful understanding of the true cause of hallucination and misinterpret its origin. Dudley et al., (2017) declared that the mindfulness approach emphasizes acceptance of experiences without being judgmental about them. However, the presence of insight is necessary for the individual to have a mindful approach towards their psychotic experiences⁽²⁷⁾. Hence, the patients' ability to deal constructively with their symptoms is disturbed due to absence of awareness about psychotic illness. Moreover, the study recommends that it is essential to assist the client to have an awareness about their illness through metacognitive approach and then to keep a mindful approach towards those experiences. In other words, Kumar & Venkatasubramanian (2018) reported that being insighted into the

mechanisms of psychotic experience facilitates a mindful approach towards that experience⁽²⁸⁾.

The third possible justification for the current results is that the presence of hallucination itself may fulfill some unmet needs within the patients and may satisfy certain dreams in the self. From our understanding of hallucination, it may have a positive effect on the patients as increases self-esteem, decreases feeling of loneliness and alienation and help them to cope with the strange environment within the hospital. On the same line, Luhrmann, (2014) said that the person's social and cultural environment influence hallucinatory experiences and each one has his own experience that may differ from the experience of others⁽²⁹⁾.

The author also added that the patients may gain many benefits from hallucination as provides a channel for expression of anxiety, alleviate feeling of boredom, pleased the patients and relieve unpleasant feelings. Furthermore, hallucination may act as a guide for patients to help them in decision making process and served a protective or companionship function. The perceived benefits from hallucinatory experiences among patients lead them to accept their presence and lessen their trials to resist. This explanation goes in the same line with Abdelrahman & Berma (2017), they reported in their study that the most commonly used cognitive coping strategy was acceptance of the voices followed by suppression of the voices and decreasing attention⁽²⁶⁾.

The fourth probable reason for the explanation of the current results is the socioeconomic profile of the existing subjects. They were unemployed and less educated, which hindered their ability to correctly

understand the mindfulness of voices and their use in dealing with hallucinations. It is well known that high levels of education make the person open-minded and able to get the information they need from a suitable person and use this information in the right place. Moreover, the presence of occupation and being busy all the time make the patients more independent, elevate self-esteem, and decrease time of hallucination⁽¹⁴⁾.

In this respect, Abdelrahman & Berma (2017) reported that the highest percentage of their subjects who went to the doctor to seek help were educated and employed and used the strategy of talking to someone else⁽²⁶⁾. Needless to say, that the educated patients are able to decide appropriately the source of psychological, social as well as physical support. Additionally, highly educated patients may have more awareness about their problems and how to cope with them. The same authors also found that the existence of employment give an opportunity for the patients to function independently in all aspects of daily life activities, get support from others, increase feeling of self-confidence, and make them busy all the time^(6,12).

The present study results contradicted another study by Lam et al., (2022) which indicated that increased mindfulness does not reduce psychotic symptoms both directly and indirectly through the mediation of rumination and negative emotions⁽³⁰⁾. Along the same line, Fazekas, (2021) found that the vividness of experiences may increase because of observing and noticing hallucinatory experience. Consequently, the increased vividness of experiences could affect proper judgements regarding whether these experiences are

externally or internally generated and then leads to more hallucinations⁽³¹⁾.

The second main finding of the existing study is that the highest percentage of the current studied subjects have low sleep quality and there is a statistically significant negative correlation between sleep quality and severity of voices. On the other hand, a statistically significant positive correlation was discovered between sleep quality and mindfulness of voices.

This finding is consistent with the previous one and goes in line with the effect of hallucination on patients' quality of sleep. Factually, the presence of hallucination is an important factor that disturbs patients' sleep cycle and may affect quality of life as a whole. Because of severity of hallucination the patient may stay all the night just listening to voices and follow its commands which may lead to several consequences as decrease social interaction with others, social isolation, increase probability of dangerous behaviors, difficulty falling asleep and increase sleep interruption.

Faezeh Tatari & Habibolah Khazaie (2018) reported that there was a substantial difference in sleep quality between schizophrenic patients with predominant positive and negative psychotic symptoms in which patients with positive symptoms like hallucination reported poorer sleep quality⁽³¹⁾. The literature also showed that poor sleep quality is associated with lower quality of life, suicidal behaviors and sometimes disturbance even cause symptoms like paranoia^(32,33). Further, sleep problems may influence psychological outcomes, such as emotion regulation,

and cognitive functioning not only neural processes⁽³⁴⁻³⁶⁾.

An additional factor might have a role in the interpretation of this result which is the patients' feeling toward hallucination. Patients' feelings may act as an important reason in maintenance of hallucination and decrease sleep quality. Sometimes the patients may feel comfortable, happy, and secure with their voices which make them satisfied with their hallucinatory experience and stay all times preoccupied with it which affect sleep quality negatively. In another times the patients may be fearful, anxious, or even panic toward the voices which make them reluctant to go to sleep because they perceived dangerous action may occur from hallucination. This justification is in the same line with Dule et al., (2020) who observed that positive psychotic symptoms like hallucinations and delusions can made the patients feel fear and fall asleep more slowly which can contribute for bad sleep in these patients⁽³⁷⁾. Additionally, Dudley, Eames, Mulligan, & Fisher, (2017) added that patients who have highly intrusive and distressing voices may find it difficult to focus on the present moment and maintain a nonjudgmental approach towards their experiences⁽²⁶⁾.

Current finding was agreeing with the study done by Faezeh & Habibolah (2018) in Iran who reported that positive psychotic symptoms were significantly associated with disturbed sleep, higher impairments of daily functioning and poorer sleep quality⁽³¹⁾. Also, the study done in Oxford by Reeve et al., (2018) found that hallucination and paranoia are significantly associated with sleep disturbances and poor sleep quality⁽³⁸⁾.

Moreover, Dule et al., (2020) stated that more than half of the patients (57.4%) reported poor sleep quality⁽³⁷⁾. On the contrary, the study done in Reeve et al 2018 reported no significant difference in sleep quality was observed between both patients with dominant positive and negative psychotic symptoms⁽³⁸⁾. Afonso et al., (2011). and Dule et al., (2020) summarize that sleep problems are consistently associated with psychotic symptoms, but potential pathways are diverse and need further explanation^(37,39).

Speaking about the significant positive correlation between mindfulness of voices and sleep quality. It can be stated that when the patients apply mindfulness of voices on auditory hallucination this will improve their quality of sleep. Mindfulness of voices means paying attention in a precise way: on purpose, in the existing moment, and nonjudgmentally. It is assumed to target numerous intellectual and emotional processes that contribute to poor sleep quality, diminish emotional reactivity to voices, and promote objective re-evaluation of psychotic experiences, which together may facilitate sleep⁽⁴⁰⁻⁴³⁾. On the same respect, Chien et al., (2020), proposed that mindfulness of voices serves as an alternative way for patients to become clearly aware of their illness experience and respond to their experience nonjudgmentally⁽⁴⁴⁾.

Conclusion and recommendations:

Based on the results of the present study it can be concluded that patients with schizophrenia in the present study had low mindfulness of voices which lead to exacerbation of hallucinations and subsequently affect negatively their quality of sleep.

The following are the main recommendations suggested:

- Introduce the concept of mindfulness of voices to the patients and its association and influence on severity of hallucination and quality of sleep.

-Conduct different workshops about mindfulness of voices and how to apply it to the patients who are suffering from auditory hallucinations.

-Incorporate mindfulness of voices strategies into daily living activities of the patients to gain benefits from its application either on intensity of hallucination or quality of sleep and other aspects of their life.

-Mindfulness-based interventions need to be implemented for psychiatric nurses to teach them about its profits and how to apply with the patients.

- Future research should be planned for to clarify the concept of mindfulness and how it relates to other psychotic symptoms.

- Conduct a future study about the influence of mindfulness on some basic psychological processes such as insight, memory, and cognitive abilities.

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