

Research Article

Mental Health Service Users' Experiences of Receiving Ear Acupuncture as a Complement in Psychiatric Care in ICELAND – A Qualitative and Quantitative Pilot Study

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Abstract

Depression, insomnia, cravings, and anxiety are significant and often long-lasting health problems. As medication has limited effect and often side effects, complementary methods such as ear acupuncture are used in mental health care. To describe mental health care users' experiences of ear acupuncture, including ratings of sleep, anxiety, depression, stress, pain, and cravings. This mixed methods study included in- and outpatients at a mental health rehabilitation service in Iceland. Standardized ear acupuncture (NADA-style) was offered as a complement to usual care. Eight participants rated sleep (the primary outcome), cravings, pain, anxiety, stress, and depression in questionnaires pre- and post-ten acupuncture sessions.



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Six participants were interviewed. Interviews were analysed with reflexive thematic analysis. Cravings, pain, anxiety, stress, and depression reportedly decreased after ten treatments, and sleep improved. In the interviews, participants described the burden of mental illness eased by NADA. The most prominent theme was the experience of palpable, obvious, instant relaxation brought by the needles inserted in their ears. Participants described a state in between sleep and wakefulness. The relaxation was predictable and longed for. Anxiety, distress and stress would diminish, often instantly, and the stress of daily life became less of a weight. Muscles, tense from anxiety and vigilance, would relax. Being able to taper down medication and thereby avoid side effects was also greatly appreciated. Participants wanted to continue with NADA, and they absolutely recommended acupuncture to others. The knowledge that NADA provided helped give them hope. Increased well-being led to greater activity and self-confidence, resulting in more social interactions and further progress through the long recovery journey. No severe side effects were reported. Participants' prior attitude towards acupuncture did not affect their self-rated effect. This study supports earlier findings that ear acupuncture is feasible, safe, and appreciated as a complement to mental health nursing.

Keywords

National Acupuncture Detoxification Association; NADA; ear acupuncture; auricular acupuncture; mental health; insomnia; anxiety; withdrawal

1. Introduction

Depression, insomnia, and anxiety are major and often long-lasting mental health problems, leading to personal, occupational, and social difficulties affecting quality of life. Anti-depressants, anxiolytics, and sleep medication are usually prescribed but have limited effects and often undesired side effects like increased tolerance and addiction. Medication may be contra-indicated for large groups such as pregnant women, the elderly, and persons with addictive disorders [1, 2].

Acupuncture is one of the most used complementary methods. There are various acupuncture styles. Compared to the common but more complicated body acupuncture, ear acupuncture presents an interesting treatment modality used in mental health services as a complement to counseling, group activities, and medication. NADA (National Acupuncture Detoxification Association) is a standardized ear acupuncture protocol used in more than 70 countries. Starting as addiction treatment, NADA has since been implemented in mental health and private clinics as an adjunct in the treatment of stress, sleeping difficulties, anxiety, withdrawal, and depression in outpatient care and inpatient care, in hospitals and treatment centers, in refugee camps, schools, and prisons, and at disaster sites [3]. The same five specific points are used bilaterally in every treatment [3, 4]. NADA is frequently provided in groups where the recipients sit with needles in their ears for approximately 40 minutes. In 2017, nine Icelandic nurses were NADA trained, and NADA was implemented in the rehabilitation of mental health services for persons with mental illness at the Landspítali National University Hospital in Reykjavik, Iceland. At this rehabilitation center, a nurse has provided NADA acupuncture to about 60 in- and outpatients per year.

Ear acupuncture can be interpreted in neuro-physiological terms. Stimulation of the ear modulates the autonomic nervous system in beneficial ways [5]. The parasympathetic system is activated, explaining the relaxation, calmness and reduced feelings of distress commonly reported by patients receiving ear acupuncture. Neurotransmitters and hormones such as endorphins, cortisol, adrenalin, nor-adrenalin, and oxytocin are released on different levels of the nervous system and may explain long-term beneficial effects on stress, pain, and anxiety.

Insomnia, substance abuse, anxiety and pain are among the issues commonly encountered by mental health nurses, who aim to reduce these symptoms among their patients. Therefore, mental health nurses seek alternative evidence-based approaches to deal with these symptoms with as few side effects as possible. The evidence for ear acupuncture in sleep disturbances and mental illness is growing and promising. Two overviews of systematic reviews concluded that ear acupuncture has a positive effect on disturbed sleep [6, 7]. A rigorously conducted systematic review [8] found that ear acupuncture and ear acupressure had a beneficial effect on anxiety. Systematic reviews also show that ear acupuncture has a proven effect on pain [6, 9]. Qualitative studies on mental health service users' experience of receiving ear acupuncture are sparse but mediate positive experiences of calm, well-being, increased energy, improved sleep and better concentration. Service users also described reduced craving and irritability, as well as reduced need for medication on demand [10-14]. Thus, auricular acupuncture may be an interesting complement to mental health nursing.

Yet there is a knowledge gap about what ear acupuncture can contribute to within mental health care. Interviewing mental health service users about their physical and emotional experience of ear acupuncture, combined with quantitative measures of their symptoms, will fill a gap of knowledge and deepen the understanding of what acupuncture can add to mental health nursing. It will help us understand if ear acupuncture is a feasible and safe method to implement in a mental health services setting.

1.1 Aim

The aim was to describe service users' experiences of ear acupuncture in a mental health care context, and their ratings of sleep, cravings, anxiety, stress and depression before and after ten acupuncture treatments.

2. Method

2.1 Design

An open, non-randomized, inductive, mixed methods, effectiveness, real-world study. The qualitative part illuminates service users' experiences of acupuncture as a complement to usual treatment in a mental health rehabilitation service. The quantitative part of the study evaluates how service users rated their symptoms in questionnaires.

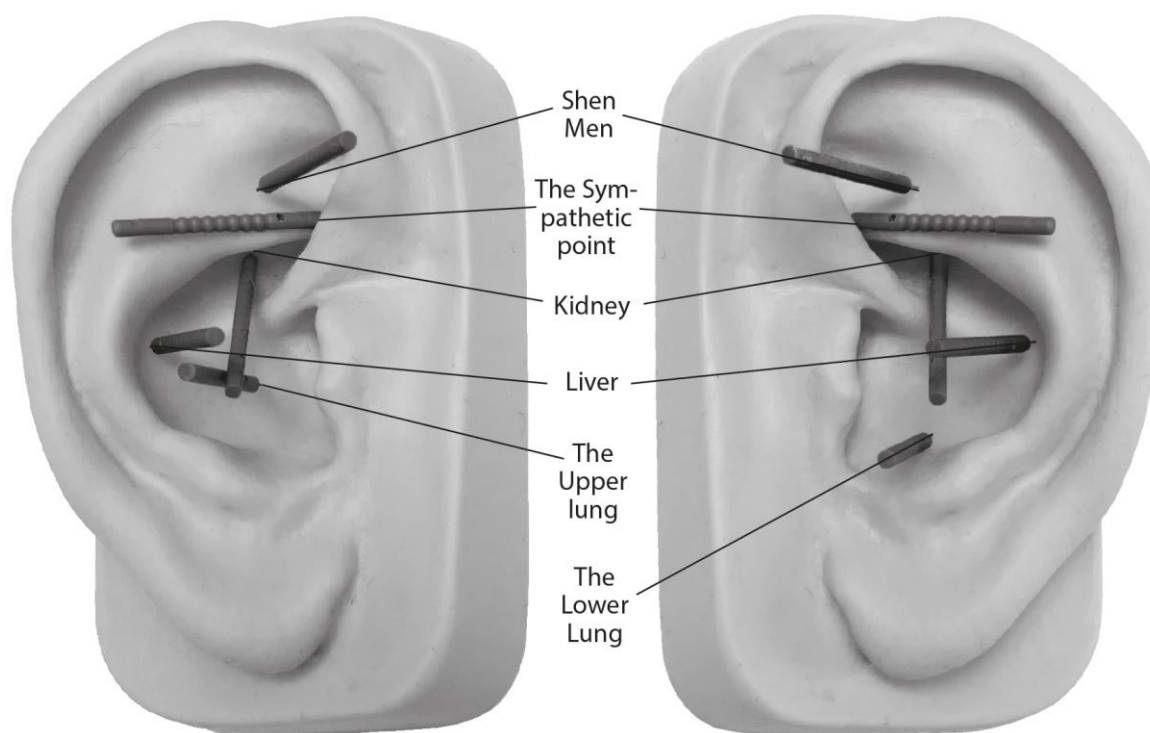
2.2 Participants and Setting

The study was conducted at the mental health rehabilitation service at Landspítali – University Hospital, Iceland. The service users have at least one of the diagnoses depression, anxiety, addiction, bipolar disorder, psychosis and/or ADHD. The center's recovery-oriented services arise from the movement of users, aiming to be a bridge to the community. The center offers a selection of

activities and exercises, and service users can influence their rehabilitation by choosing which activities they want to participate in. The usual treatment consists of counseling with psychologists, psychiatrists, and nurses, medication, psychotherapy, occupational therapy, and physiotherapy. As a complement to usual care patients are offered ear acupuncture for their experienced insomnia, cravings, anxiety and depression. Adults in and out-patients receiving treatment at this mental health rehabilitation service and choosing to receive NADA were eligible for participation. Service users willing to fill in the questionnaires and provide informed consent were included. There were no exclusion criteria.

2.3 Intervention

Ear acupuncture was offered twice a week before lunch. The ear was cleaned with alcohol swabs before acupuncture. Thin disposable sterilized steel acupuncture needles (0.20 × 7 mm) were inserted 2-3 mm deep by a trained nurse (HMF) in the five NADA points (bilaterally in the Sympathetic, Shen Men, Kidney, and Liver, and Upper Lung in one ear and Lower Lung in the other ear, see Figure 1). Needles were retained for 30 to 50 minutes. Some participants also received acupuncture in the points Sishencong at the vertex (EX-HN1, the so-called sleep wreath) to increase the relaxation effect.



The NADA points including the Upper Lung.

The NADA points including the Lower Lung.

Figure 1 The NADA points (illustration from Landgren, K. NADA. Ear acupuncture for addiction and mental illness).

NADA was provided in groups. Service users were recommended to take at least ten acupuncture treatments. If they had perceived an effect, they could continue with acupuncture for the length of their stay at the clinic. The participants were sitting in a quiet room in a comfortable chair or lying

on the floor. They were offered blankets and pillows, and asked to be still and silent. Relaxing music was played. When everyone had received their needles, the participants were recommended to pay attention to their breathing, whether it was shallow or deep. They were asked to exhale well, empty their lungs, then inhale deeply, and repeat this three times.

2.4 Outcome Measures and Data Collection

Quantitative data was collected via questionnaires that service users were asked to fill in at intake, and again after ten acupuncture sessions (see Table 1). At intake they also self-reported age, gender, diagnosis, and duration of illness.

Table 1 An overview of outcome measures, and how and when data was collected.

	Outcome	Measured by	When?
Primary outcome	sleep	The Insomnia Severity Index (ISI) is composed of seven items with answer options from 0-4. A total score of 0-7 is considered normal, 8-14 is subthreshold insomnia, 15-21 is moderate insomnia, and 22-28 is severe insomnia [15].	At inclusion and after ten acupuncture sessions
Secondary outcomes	Depression, Anxiety, Stress	DASS-42 questionnaire (Depression Anxiety Stress Scale), a Likert scale rating symptoms from 0-3 with 42 items [16].	At inclusion and after ten acupuncture sessions
	Cravings from alcohol or drugs, stress, pain, anxiety	A linear, visual analogue scale (VAS) rating symptoms from 0-10, widely used for self-assessment of different symptoms [17].	At inclusion and after ten acupuncture sessions
	participants' experience of ear acupuncture and side effects related to the acupuncture	qualitative interviews analysed by reflexive thematic analysis [18, 19].	After ten acupuncture sessions
	How confident participants were about the effect of ear acupuncture and how logical acupuncture seemed to be	Credibility/Expectancy Questionnaire (CEQ), a Likert scale rating attitudes from 1-5 [20].	At inclusion and after ten acupuncture sessions
	Self-reported use of sleeping pills, anxiolytics and anti-depressive medications	A questionnaire was produced at the clinic.	At inclusion and after ten acupuncture sessions

The secondary outcome was service users' experiences of receiving acupuncture, illuminated in the qualitative interviews and their descriptions of side effects. A nurse (HMB) at the clinic asked eight service users who had finished the second questionnaire if they were interested in participating in an interview. All accepted and were contacted by JB who was not working at the clinic. She offered time for the interview in a calm place, chosen by the informant. For six service users an interview could be arranged. Semi-structured interviews were conducted individually. Before the interview started information about the study was repeated. Interviews began with a broad open question "Please tell me about your experience of NADA" followed by questions like "Have you experienced any change in your symptoms that you relate to acupuncture?", "Have you experienced any side effects?", "Has anything surprised you?", "Would you recommend it to others?" and "What do you think of the NADA procedure in terms of timing, duration and surroundings?" to get a deeper understanding of the informants' experiences. The interviews were recorded. They lasted 11-21 minutes (mean 18 minutes).

Data were collected between 2020 and January 2023. During 2020 and 2021 group treatments were discontinued for several months on and off, due to the COVID 19-pandemic, interrupting the data collection. Eighty-three service users answered the first questionnaires. Nineteen service users filled in the follow-up questionnaires after finishing ten NADA treatments. Eleven were excluded due to missing informed consent ($n = 6$) or missing questionnaires ($n = 5$). Eight participants were included in the statistical analysis. Six were interviewed.

2.5 Data Analysis

2.5.1 Quantitative Data

The statistical program SPSS, version 29.0.2.0 [20] was used for data processing. Data was analysed with descriptive statistics, mean and standard deviation. Since the sample was small the non-parametric Wilcoxon rank-sum test was used to examine pre- and post-treatment differences between measurements. Spearman's rank correlation coefficient was used to analyse whether the attitudes of the participants influenced the outcomes.

2.5.2 Qualitative Data

The interviews were transcribed verbatim, translated from Icelandic to English and analysed with Reflexive Thematic Analysis [19]. The analysis was guided by the six steps and the 15-point checklist described by Braun and Clarke [18]. Two authors (JB and KL) conducted the initial analysis. To familiarize themselves with the data, they read the interviews several times, immersing themselves in the data. Codes were generated independently by the authors who then met to discuss and refine codes for three entire days. They then reflected on the aim of the study and reorganized and renamed codes. At the next step of the analysis, the authors interpreted codes and discussed, named, renamed, and defined themes around meaning-based concepts like perceived effects, the clinical environment, and side effects. This creative and active process resulted in consensus.

The authors' prior preconceptions of the effectiveness of NADA were a risk of bias. Reflections on how preunderstandings shape analysis and active endeavors to challenge the beliefs of the authors' were made.

2.6 Ethical Considerations

The Institutional Review Board of Landspítali – the National University Hospital of Iceland, approved the study (27/2019). Before inclusion the participants were informed orally and in writing about the study, that participation was voluntary and that they could withdraw at any time. Participants signed informed consent. As the acupuncture intervention was provided as part of the usual care the study was considered to fall into the remit of clinical service evaluation. Thereby, registration of the study in Clinical Trials Registration was not deemed necessary.

3. Results

Eighty-three patients filled in the first questionnaires. The average time of being mentally ill was 20 months. 42.2% of participants reported being diagnosed with depression and 37.3% with anxiety. The participants were 18 to 71 years old (mean 40 years). Of the eight service users who filled in the second questionnaire and were included, seven self-reported as female and one as male.

Self-reported changes in medication, symptoms, and attitudes toward acupuncture before and after ten sessions of acupuncture for the eight service users are reported in Table 2. Wilcoxon's Rank Sum test shows a significant reduction in stress ($p = 0.027$), pain ($p = 0.018$), and depression ($p = 0.028$). Even cravings and anxiety were reduced, and sleep was rated as improved, although not reaching significance. There was a tendency to self-reported increase in medication (sleeping pills, anxiolytics, and antidepressants). The confidence in acupuncture increased. There was no correlation between attitude towards acupuncture and change in symptoms.

Table 2 Means and standard deviations before and after the NADA acupuncture intervention.

	n	M – before	SD – before	M – after	SD – after
<i>Medication</i>					
Sleeping pills	7	1.29	0.49	1.43	0.54
Anti-anxiety	7	1.57	0.54	1.71	0.49
Anti-depressants	8	1.88	0.35	2.00	0.00
<i>Symptoms, VAS</i>					
Cravings	8	3.13	3.68	2.88	3.48
Stress	8	9.13	1.55	5.63	3.07
Pain	8	7.38	3.70	5.13	3.36
Anxiety	8	8.00	3.08	4.88	3.60
<i>Sleep, ISI</i>					
Sleep disturbance	7	16.29	4.07	12.29	11.51
<i>Symptoms, DASS-42</i>					
- total score	8	1.86	0.33	1.18	0.92
- depression	8	2.32	0.46	1.52	1.11
- anxiety	8	1.26	0.58	0.71	1.01
- stress	8	2.01	0.31	1.31	1.01
<i>Confidence in acupuncture</i>	8	11.38	4.78	13.3	4.13

3.1 Results from the Interviews

Six participants were interviewed; five self-reported as women and one as men. They described their burden of mental illnesses as “depression and anxiety, and a significant social phobia” (P5). They had had mental breakdowns, and some described being in a desperate situation when they had been offered NADA. Some dealt with alcohol addiction and overwhelming cravings. They had tried everything and were desperate to find help.

When you’re admitted to treatment, you’re desperate. You’ll do anything to feel better... It’s hell to carry that burden /addiction/ while also having a mental illness... it’s not a good combination. ... Drinking while taking psychiatric medication is like pouring gasoline on a fire. (P3)

Participants had been informed about NADA by a nurse or by someone else in the treatment environment they trusted. Some had never tried acupuncture, starting without expectations. Some were even skeptical but decided to try. Others had positive experiences from earlier acupuncture treatments.

I’ve had acupuncture for my back before, and it helped me with pain, so I was open to this. I’m willing to try anything that could help me. (P4)

It was just offered. I was here anyhow and decided to give it a try, when I saw how popular it was. ... I always came back. There was often a queue outside. (P5)

The analysis resulted in five themes: “A wonderful relaxation”, “NADA helped coping with many symptoms”, “An attractive treatment I recommend to others”, “Increased hope and recovery” and “A complex/multi-modal intervention with no side-effects”.

3.2 A Wonderful Relaxation

The most prominent theme was the experience of palpable, apparent, instant relaxation brought by the needles inserted in their ears. They perceived “a state in-between sleep and wakefulness” (P4). Anxiety, stress, distress and muscular tension, were described to diminish, often instantly, and their minds became calmer. They reached “mental peace” (P5) and compared the sensation with “a bit of mindfulness practice” (P5). Participants were surprised that they could be relaxed to the point that the nurse had to wake them up because they “had fallen asleep and /were/ snoring so loudly it disturbed the others” (P4). The relaxing effect was described as “amazing” (P4), “incredible” (P1, P4), and “complete” (P4). Their feeling of well-being increased. In spite of stress in their daily lives they experienced an ability to handle stress better now and to fulfil their duties in studies and recovery. The relaxation was predictable and longed for. The calming effect was described to last for at least the remainder of the day. They also reported becoming less stressed and tense over time, motivating them to continue coming for acupuncture.

I really experienced relaxation in a way I hadn’t before. /NADA/ is better than any other relaxation technique. I reached a state between sleep and wakefulness, where you’re almost asleep but completely relaxed, like yoga nidra, but with NADA I don’t have to lie down to relax. It is like floating on a cloud. This happens almost every time. (P2)

After years of isolation, it was good for me to find that I could achieve relaxation in a room full of people. ... I found it a great exercise in relaxation. Sitting in a room full of people, just being present. Focusing on breathing, not worrying about the clock or anything like that. /The nurse/ said when guiding us into relaxation, it's normal for thoughts to come and go. It's a good exercise in that. ... It always gets better and better. I've been able to utilize this in my daily life, definitely, like being able to fall asleep. ... And now, with this studying, I'm swamped. But yes, it's been going well. I got a 10 on an assignment. A year ago, I would be biting my nails from stress, but that hasn't happened yet. (P5)

After the relaxation during the acupuncture session, participants felt more energy.

I was very relaxed there, but I didn't feel tired or dazed afterward... I always felt refreshed. (P5)

3.3 NADA Helped Coping with Symptoms

Besides relaxation, participants described how NADA relieved anxiety and depression. Convinced that the relief was due to the acupuncture, they managed the stress of daily life better and sleep quality increased. Being able to taper down medication, and thereby avoid side effects like weight gain and feeling tired and sluggish was appreciated.

I was on anxiety medication. I was on a very high dose of strong medications, three times a day... My anxiety has gone away, and I noticed this around my fifth session. I gradually stopped taking anxiety medication... I've also stopped taking sleeping pills... I owe all this to acupuncture. (P4)

Social phobia was perceived to be alleviated after acupuncture.

When you achieve that calmness, it might be easier to handle being around people and such. (P6)

Even physical sensations, "a physical calmness" (P6), were described. Shoulders were relaxed.

I felt something happening in my body. I could feel increased blood flow. (P2)

One participant struggling with alcoholism felt NADA helped with addiction and pointed out how helpful acupuncture was for cravings.

That's what stands out. /NADA/ curbs craving for alcohol. It's as if that overwhelming urge has been removed. It's just faded away. The physical craving is completely gone. This time, it feels different. This is the first time in five years of treatment I feel like that craving has been taken away. (P3)

3.4 Increased Hope and Recovery

Participants perceived increased wellness and energy. They described how their recovery trajectory was positively influenced by acupuncture. Learning that they could relax was helpful in daily life. This new skill made it easier to fall asleep when they went to bed at night, and they described being able to focus on the well-being they had felt during the acupuncture sessions when their anxiety increased, and how that could alleviate their anxiety even without needles. They felt that NADA definitely was part of their overall recovery from mental health illness and trusted that

acupuncture could help them every time. Knowing that they had found something that helped them move forward through the long journey of recovery gave them hope.

I've been through this for years, and I know this time it's helping. (P3)

3.5 An Attractive Treatment I Recommend to Others

Participants described wanting to continue with NADA after the first ten acupuncture sessions, as acupuncture was experienced as very attractive. As one participant said: “/NADA/ really saved me.” (P2). They took every offered treatment and wanted to continue as long as they were allowed to. They worried about whether they could continue to get NADA when they were discharged from the clinic.

I would never miss an acupuncture session. It was one of the main things I looked forward to. (P3)

I always came back. Usually, there was a queue down there... Everyone is happy about it. I always returned because I felt good after each session. I think everyone said this. It was very popular. (P5)

All but one participant would absolutely recommend acupuncture to others. Without hesitation they told others how helpful it was. One participant was cautious in recommending NADA as they didn't know the mechanisms and felt uncomfortable recommending something they didn't fully understand.

I have told my friends and family how amazing it is. I took over from the girl who first told me about it and started telling others to try it as well. I even offered to go with them. (P2)

The setting was described as good, or even “excellent” (P3), and therapeutic. The participants made sure to arrive early to grab their favorite chair as sitting comfortably made it easier to relax. Blankets and pillows were appreciated, as was the possibility to choose between a room with relaxation music, and a more private room with silence and dimmed light. The schedule, twice a week, was perceived as acceptable, although they would have preferred to have NADA more often.

When you walked down there, there was a good, calm energy in the air. (P5)

3.6 A Complex/Multi-Modal Intervention with No Side-Effects

Participants were asked about negative side effects. The only reported side effect was a bruise, a little spot in the ear that one patient detected afterward. (P3)

No/side effects/, I was just steadily improving. (P5)

Participants who had tried NADA combined with acupuncture on the head described as a “sleeping wreath” (EX-HN1), appreciated the extra needles. The reminder to focus on their breathing was experienced as powerful. Symptoms were perceived as alleviated after acupuncture, although participants pointed out the difficulty of discerning what effect which intervention had, as they also participated in other treatments.

It's like with medication. I can't say for sure that it was 100% just acupuncture that helped. (P3)

Participants described synergetic effects: increased well-being was perceived to lead to more activity, leading to more social interaction. After acupuncture they experienced themselves as more positive and open-minded, making life and recovery easier. When they stopped drinking everything else improved. The practice of letting go of negative thoughts during acupuncture could be turned into a skill when getting stuck with destructive thoughts again. When they could deal better with anxiety their self-confidence increased.

Possibly this calmness helps with other treatments I'm undergoing. As I said, I'm dealing with a lot of social anxiety. When you achieve that calmness, it might be easier to handle being around people and such. (P6)

It provided me with space to sit and be calm. That was especially something I always saw as beneficial; it generally got better each time. (P5)

I dropped out of school as a teenager because of this anxiety, especially social anxiety and depression. I always regret that. So, it's great to find that I can study and learn now. (P5)

Some requested more information about the mechanisms of acupuncture as they didn't understand the function of the needles. Despite having read the information, they still did not understand how acupuncture could help. The names of the acupuncture points, like "Kidney" and "Lung" were confusing. Participants supposed the points had an effect on those organs but wondered how it actually worked.

I thought it could always have a placebo effect, but I don't know anything about the science behind it. (P5)

4. Discussion

This pragmatic effectiveness study aimed to assess whether auricular acupuncture as a complement to usual care works under real-life conditions, and how the service users experienced the complement. We found that offering acupuncture as a part of the program at this mental health rehabilitation center in Iceland was feasible and highly appreciated. In this small pilot study, stress, pain and depression decreased after ten treatments. Service users highly appreciated the acupuncture sessions, describing a pronounced relaxation and perceiving a growing feeling of well-being. These experiences can be understood with the backdrop of basic research that has mapped the mechanisms of ear acupuncture. It is known that this multifaceted method works neurophysiologically by modulating the autonomic nervous system [5, 21]. Stimulation of the parts of the ear innervated by the vagus nerve and the trigeminal nerve modulates the parasympathetic nervous system. The release of several neurotransmitters and hormones may explain the effects on stress, anxiety, sleep, cravings, and pain the participants in the present study experienced.

4.1 Complex Illnesses Need Complex Interventions

Persons with mental health illness and addiction have a complex burden of symptoms. The diagnoses are complex themselves; symptoms and medications are interacting. Sometimes, the illness is self-healing, while other service users are in a life-long fight to handle their daily lives. The treatment is complex, combining medication, counselling, and psychosocial interventions. The nurse's specialty is to provide symptom management, coping strategies, supportive psychotherapy,

a positive atmosphere, and a caring attitude. They should understand the service user's life-world and strive to increase their subjectively perceived health. Service users demand the personalization of treatments and autonomy in their therapeutic process. Auricular acupuncture provides nurses with a tool to assist them in the development of a therapeutic alliance in the clinical encounter with the patient [22, 23]. Stimulation of the vagus nerve innervated part of the ear can be done by needles, beads, electrical stimulation or laser. Among these options, ear acupuncture and ear acupressure are easy to learn and administer, cost-effective, safe, and require no appliances. Standardized ear acupuncture protocols like NADA have advantages as they are even more easy to learn and administer. A recent article [24] suggests that auriculotherapy should be included as a nursing intervention in the Nursing Interventions Classification (NIC) [25]. Patients' participation and autonomy can be increased with a say in factors such as how often they want acupuncture, and how they want to sit during the session. NADA is described as relieving patients' symptoms, augmenting other treatments, instilling stillness and hope [26], and also providing an opportunity for small talk, showing empathy, listening, and validating. For the patient, NADA delivers a framework for stillness and reflection, which is so important in recovery [11, 27]. In a focus group study with health care professionals providing NADA in mental health care, NADA was seen as a valuable tool. Ear acupuncture was appreciated as a person-centered, non-verbal, and non-pharmacological treatment in a setting usually relying on verbal therapy and pharmaceuticals [23].

4.2 Sleep

Lack of sleep may cause or contribute to many different mental health disorders and restoring sleep is crucial in recovery. One of the aims of the present study was to explore if auricular acupuncture as a complementary therapy could help the rehabilitation center's service users with varying diagnoses to improve sleep quality. The participants rated their sleep as improved after ten acupuncture sessions, in line with an earlier meta-analysis that found that auricular acupuncture had a positive effect on primary insomnia [28], a systematic review concluding that both body and ear acupuncture was significantly more effective compared to treatment with diazepam [29] and two overviews of systematic reviews [6, 7] that agree on a positive effect by ear acupuncture in sleep problems.

4.3 Anxiety

Anxiety is one of the most common mental health symptoms, also felt by the participants in the present study. The reduction of anxiety they reported in the questionnaires, and the pronounced and deep relaxation they experienced during ear acupuncture sessions, time after time, is supported by earlier reviews. An overview of ten systematic reviews [30] indicated that acupuncture was more effective than both medication and sham acupuncture in the treatment of anxiety, and a systematic review about the effectiveness of ear acupuncture and ear acupressure in anxiety concluded that ear acupuncture is effective as a complementary treatment for preoperative anxiety and anxiety before exams [8]. Vieira et al. [8] also pointed out that ear acupuncture may spare patients side effects from drugs. Several qualitative studies support the calming effect of NADA. Patients who had received NADA during protracted withdrawal experienced reduced drug and alcohol cravings, as well as physical and emotional relaxation, a sense of well-being, better sleep, more energy and an increased ability to concentrate [14]. In another study, patients at mental

health centers, besides relaxation, described how their communication and concentration skills increased after NADA [12]. Veterans with PTSD who received auricular acupuncture experienced that the quality of sleep improved, they experienced increased relaxation, found less pain, and finally, they found the intervention acceptable, and they favored it [13]. In-patients treated for severe anorexia with high co-morbidity in a highly specialized care unit felt that NADA provided a long-awaited opportunity to relax and rest in a restrictive therapeutic environment, allowing them to process emotions [10, 11]. Acupuncture was described as a handle to hold on to during a stressful time, helping them to regain control. The NADA sessions were compared to a pause button, giving a palpable rest and relaxation helping them to think clearly. Anxiety became more manageable to endure. Patients appreciated acupuncture as an optional treatment that they could influence.

4.4 Cravings

NADA was launched in the 1970s to reduce withdrawal and cravings, even though it nowadays is also used to reduce other mental health symptoms. Larger trials [31, 32] could not reproduce the first, very positive, studies about ear acupuncture and addiction [33-35]. More recent systematic reviews [36-38], support beneficial effects from NADA. The participant in the present study having experienced a clear reduction in cravings from alcohol is of interest here. Their experience is mirrored in a systematic review including 16 RCTs concluding that acupuncture reduces both alcohol craving and alcohol withdrawal symptoms [36]. Ear acupuncture and ear acupressure as a tool in addiction recovery are further supported by a more recent systematic review on auricular therapy and addiction [38]. In this review 64% of the 36 RCTs reported that auricular treatment was effective for treating addiction.

4.5 Pain

Mental health care users more often than not have somatic symptoms too, such as pain. Participants in the present study reported significantly less pain after ten acupuncture sessions. This experience is in line with earlier studies. Systematic reviews [6, 39] found ear acupuncture to have a better effect compared to analgesics for immediate pain relief. The authors suggest that ear acupuncture may be used as an adjunct in pain management, to reduce the use of medications, and thereby minimize pharmacological adverse effects.

4.6 Safety

Safety is of utmost importance when deciding which treatments to use. All interviewed participants in the present study were asked about perceived effects and any adverse events. No severe side effects were reported, in line with two systematic reviews [39, 40]. These reviews of adverse events considered ear acupuncture as safe with only very minor and quickly transient side effects such as tenderness or pain at insertion, dizziness, local discomfort, and nausea.

4.7 Pre-Conceptions

In complex interventions mental health service users' attitudes and pre-conceptions to the treatment may influence the result. In the present study, participants' confidence at inclusion in whether acupuncture could alleviate their symptoms did not affect their self-rated effect on their

symptoms. The fact that there was no significant correlation between attitude towards acupuncture and change in symptoms, promotes the opinion that acupuncture has a specific and not only a placebo effect.

When service users in the present study were asked for suggestions on how the ear acupuncture sessions can be improved, two of them said they had not understood how ear acupuncture works. This reminds us to provide information on different levels about how it works to those who request it.

4.8 Limitations

In the present pragmatic study all symptoms decreased which is hoped for as participants underwent several parallel interventions in usual care. To fit the aim, the present mixed-methods study is based on self-reported data and interviews. The result from the interviews shows that service users related their enhanced well-being to acupuncture and highly appreciated and praised this part of the treatment program. However, in a study with several parallel interventions, it is impossible to separate the effect from each intervention. The effect of acupuncture and whether acupuncture increases the effect of other interventions can only be evaluated in randomized trials.

One of the inclusion criteria was responding to a second questionnaire after ten acupuncture sessions. The second questionnaire was collected from only eight participants, which is a weakness. Eighty-three service users filled in the first round of questionnaires and started with acupuncture. Collecting the second round of questionnaires failed, partly because recruiting was severely interrupted by the COVID-19 pandemic as pandemic rules discontinued group meetings. A gathering ban was imposed from March to November 2020, and on and off during 2021, making group treatment impossible. Most of the participants in the study were recruited from the hospital's wards and participants were sometimes discharged during the quarantine period. This explains the high rate of participants who were recruited to the study but did not fulfill the ten NADA sessions. We use the opportunity to point out the importance of following a project plan.

Anxiety and stress were self-reported in two scales (VAS and DASS-42). Both showed that symptoms decreased during the treatment period. We recommend avoiding extensive paperwork that could increase dropouts, yet it was comforting to see that the results from the two scales were consistent.

Wilcoxon's Rank-Sum test showed a significant reduction in pain, stress, and depression. However, due to the small number of participants, the p-values should be interpreted with caution. Participants self-reported a slightly increased use of medication during the study period. A limitation is that we did not confirm if prescribed medication was higher, and we did not ask participants if the reported increase was due to availability (as they were in contact with psychiatric care during the study period) or better compliance.

Acupuncture is a complex method with a wide variety of styles. Even in a standardized model like NADA, the acupuncturists often add points or combinations with other treatments. In the present study some participants also were treated with needles in a body acupuncture point, and they received instructions to focus on their breathing, both perceived to enhance the effect. As NADA, body acupuncture and breathing exercises have their own effects. The combination of these interventions makes it difficult to isolate the effect on each of these interventions. However, the

combination of these interventions was appreciated by the participants in the present real-world, whole-system study.

The qualitative part of the study adheres to the Standards for Reporting Qualitative Research (SRQR) [41]. The interviews were relatively short and followed the semi-structured guide. The themes are strongly linked to the specific research questions.

In this pragmatic real-life study, the effectiveness of NADA has been studied in a population of service users in rehabilitation services in Iceland. Transferability to other settings is unknown. However, the results point in the same direction as earlier and larger quantitative and qualitative trials. The results can guide decision-makers in different countries in how to use non-verbal and non-pharmacological tools like NADA to facilitate recovery.

5. Conclusion

In a complex world of clinical practice, this pragmatic real-world study adds to the current literature and demonstrates that NADA ear acupuncture was well accepted by service users in rehabilitation mental health services in a hospital setting in Iceland. NADA worked well with medication, therapy and other methods in usual care. Service users highly appreciated the NADA sessions, describing pronounced relaxation, better sleep, and a reduction of stress, pain, cravings, and depression. No severe side effects were reported. We suggest that NADA is seen as a mental health nursing intervention, meeting service users' needs, and used in concert with other parts of a treatment program to support recovery. We recommend the inclusion of NADA as a part of usual and often complex care. We encourage further research into the effectiveness and costs of auricular acupuncture as a complement to mental health care.

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Author Contributions

All authors were involved in conceptualization and design. Kajsa Landgren: Analysed data and wrote draft manuscripts. Hólmfríður Margrét Bjarnadóttir: Informed and scheduled the participants, administered acupuncture, collected questionnaires and wrote draft manuscripts. Helga Sif Friðjónsdóttir: Wrote draft manuscripts, Jóhanna Bernharðsdóttir: Interviewed participants, analysed data and wrote draft manuscripts. All authors significantly contributed to the manuscript, read and approved the final version.

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Competing Interests

The authors have declared that no competing interests exist.

Data Availability Statement

The raw quantitative data supporting the conclusions of this manuscript will be made available by the authors to any qualified researcher upon request. The interviews supporting the findings of this study are not publicly available due to privacy.

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