Psychiatria Danubina, 2025; Vol. 37, Suppl. 1, pp 193-200

Conference paper
Research article

THE USE OF ARTIFICIAL INTELLIGENCE IN VISUALISING RECOVERY OF PSYCHIATRIC REHABILITATION PATIENTS: CREATING GRAPHICS AS A THERAPEUTIC TOOL

Agata Łosiewicz[1], Maciej Loska[1], Barbara Kwaśnica[1], Anna Kożuch[1] & Krzysztof Krysta[2]
[1]*Students' Scientific Association, Department and Clinic of Rehabilitation Psychiatry, Faculty of Medical Sciences in Katowice, Medical University of Silesia, Katowice, Poland*
[2]*Department and Clinic of Rehabilitation Psychiatry, Faculty of Medical Sciences in Katowice, Medical University of Silesia in Katowice, Katowice, Poland*

SUMMARY

Background: *Many psychiatric patients struggle to visualise their recovery, decreasing treatment motivation. Globally, 280 million people live with depression, 24 million with schizophrenia, and 40 million with bipolar disorder. First-line treatments achieve remission in only 30–45% of depression cases and 20–60% of schizophrenia cases, with full recovery rates at 10–20%. Artificial intelligence (AI) is increasingly applied in psychiatry for psychoeducation, symptom monitoring, and therapy support. GPT-4o is a generative AI tool producing personalised text, speech, and images. No studies have explored its use for creating recovery-focused visuals to motivate psychiatric patients. This study investigated the potential of ChatGPT-generated visuals as potential therapeutic tools.*

Subjects and methods: *Twenty psychiatric outpatients in remission (schizophrenia, affective, developmental disorders) completed a structured questionnaire with demographic and open-ended questions on recovery expectations. Based on responses, AI-generated recovery visuals were created using GPT-4o and presented for evaluation. Attitudes towards AI were assessed before and after. Participants rated how strongly each image reflected their recovery vision and motivational impact (0–4 scale). Data were analysed using descriptive statistics, paired t-tests, Spearman's correlations, and cluster analysis (Excel, Jamovi, Python).*

Results: *Attitudes towards AI improved post-intervention (M=1.70, SD=0.80 vs. M=2.15, SD=0.67). Ratings indicated moderate to strong reflection of personal visions (Graphic 1: M=2.80, SD=1.15; Graphic 2: M=3.25, SD=0.91). No significant differences occurred across demographic groups (p>0.05). A strong positive correlation was found between attitudes towards AI and openness to using AI visuals clinically (ρ=0.65, p=0.002). Cluster analysis identified three profiles: positive adopters (60%), sceptics (25%), and emotionally engaged but technologically sceptical (15%).*

Conclusions: *AI-generated images were well-received, improved attitudes towards AI, and enhanced patient motivation. Integrating generative AI images into psychiatric rehabilitation may support engagement and personalised care.*

Key words: *artificial intelligence - AI-generated graphics - psychiatric rehabilitation - recovery visualisation*

* * * * *

INTRODUCTION

The World Health Organization (WHO) defines health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. According to this study, patients generally defined health as a state of social, physical and psychological well-being often associated with independence in basic everyday activities such as work, commuting and studying as well as freedom in social interactions and communication, which is consistent with the WHO definition.

Many psychiatric patients may have difficulties in visualising their recovery. Approximately 280 million people in the world may suffer from depression, 24 million globally from schizophrenia and 40 million from affective bipolar disorder (IHME 2021). However "first-line treatments typically lead to a remission rate of around 30–45% regardless of treatment type" (Devon LoParo et al. 2025) in case of depression. Symptomatic remission of schizophrenia may be" achieved in 20–60% of patients, depending on treatment adherence, early intervention, and psychosocial support" (Yeomans et al. 2010), and a full recovery can be achieved for approximately 10-20% of patients due to some studies. These data may explain why for many psychiatric patients seeing their future without limiting symptoms may appear difficult, which in turn can lead to a decrease in motivation for treatment and therapy.

"Artificial intelligence (AI) refers to computer systems that can perform complex tasks normally done by human-reasoning, decision making, creating, etc." (NASA 2024). AI is capable of learning from new information and experience and also of understanding human language and responding to it. (IBM 2024).

ChatGPT is a generative artificial intelligence chatbot developed by OpenAI. It is a conversational language model which uses deep learning to understand and generate human-like text, answer questions, write summaries, help in learning and hold natural conversations in various languages and disciplines. It is capable of responding using text, speech or images. Combining these three response modalities in an improved and faster way is characteristic of ChatGPT version 4o.

As shown in some previous studies AI already has its role in psychiatry. So far, AI and also chatbots have increasingly been used as tools to support psychiatric treatment and psychotherapy. They enable psychoeducation, symptom monitoring, medication reminders, self-help Cognitive Behavioral Therapy and mindfulness therapy (Vaidyam et al. 2019).

Jiang et al. (2025) emphasize that artificial intelligence could be a future solution to support the diagnosis and treatment of schizophrenia. However, to date, AI has mainly been discussed in the context of analysing clinical data, rather than creating positive visualisations that could increase patients' motivation for treatment.

No studies have specifically explored the impact of visuals, especially these of recovery generated by AI tools such as chatbots, on psychiatric patients. However, studies have shown that multi-sensory imagery techniques, such as mental imagery (Holmes & Mathews 2010) or guided imagery (Trakhtenberg 2008), can have a noticeable impact on patients with various illnesses, including psychiatric disorders, and can support therapy.

Holmes & Mathews (2010) marked that mental images can evoke stronger emotional reactions than verbal or text stimuli. This leads to the conclusion that advanced technologies, such as chatbots, could have significant therapeutic effects on patients with mental disorders through the use of images and visuals.

Therefore, the aim of this study was to investigate the potential of ChatGPT, as an example of generative AI tool, to generate visuals representing the vision of health of psychiatric patients and to assess its possible role in enhancing motivation for treatment.

SUBJECTS AND METHODS

The study was conducted among outpatients of the Department and Clinic of Rehabilitation Psychiatry at the Prof. Leszek Giec Upper Silesian Medical Centre, Medical University of Silesia in Katowice., who were in remission at the time of participation. The patients were being treated for schizophrenia, affective disorders, organic mental disorders, and pervasive developmental disorders. Taking part in the study was voluntary and anonymous, and all participants provided informed consent prior to inclusion. Of 22 individuals enrolled in the study, two were excluded due to inconsistent responses and difficulties with cooperation, resulting in a final sample of 20 patients.

The study utilized a mixed-methods approach based on a structured questionnaire consisting of both closed- and open-ended questions. Open-ended questions encouraged participants to describe their vision of full recovery, conditions necessary to achieve it and their personal definitions of health. The respondents first completed a demographic section covering age, gender, place of residence and education level. The following coding was applied to demographic variables: gender was assessed as 1 - female, 2 - male; age was classified into 5 intervals: 1 – 18–26 years old, 2 – 27–35, 3 – 36–45, 4 – 46–60, 5 – > 60, place of residence: 1 – village, 2 – > 100,000 inhabitants, 3 – city of 100,000–500,000 inhabitants, 4 – city > 500,000 inhabitants and education level was grouped as: 1 – primary, 2 – vocational, 3 – secondary, 4 – higher education. Additionally, participants were asked to assess their attitude towards AI before the study using a scale: 1 - positive, 2 - neutral, 3 - negative. Next, a series of open questions focused on expectations and understanding of the recovery process.

Based on participants' responses, visual representations were generated using ChatGPT Plus - GPT-4o, Open AI. During the initial testing phase, no information regarding the physical appearance of the participants was provided to the language model GPT-4o when generating visuals. However, since many participants noted the lack of resemblance and personal connection between the AI-generated characters and themselves, the adjustment was made. Subsequently, physical appearance features were taken into account when giving instructions to the GPT-4o project. The prompt provided to the model was: "Create a realistic image in response to a question posed to a patient in a psychiatric rehabilitation day ward about how they envision their recovery. The patient is aged X, (patient description). Gender: The following is the patient's response: Please note that the image should be as realistic as possible". After initial attempts produced overly unrealistic images or randomly displayed age numbers on the graphic, the prompt was modified to include: "I am not interested in graphics/ posters. Do not include the patient's age in the image."

These images were then presented to each respondent. For every participant, two imagined recovery visuals were generated. The patients were asked whether they liked the image and if they desired any changes; they were given the opportunity to propose one edit per image. Not every respondent felt the need to request modifications. The participants were then asked to rate the degree to which each image reflected their personal concept of recovery, on a scale: 0 - very weakly, 1 - weakly, 2 - moderately, 3 - strongly, 4 - very strongly. Later, edited versions of the images were also evaluated using the same scale.

During the data collection period in February/March 2025 - GPT-4o was automatically updated, resulting in a change to a more realistic visual style of the generated images. Below two exemplar graphics are presented one before and one after the update along with the corresponding prompts.

Figure 1A show patient's characteristics, "he wants to be a good father and take care of the family bonds". Figure show patient's characteristics, "car trip to the meadow, where a woman is resting and observing nature".

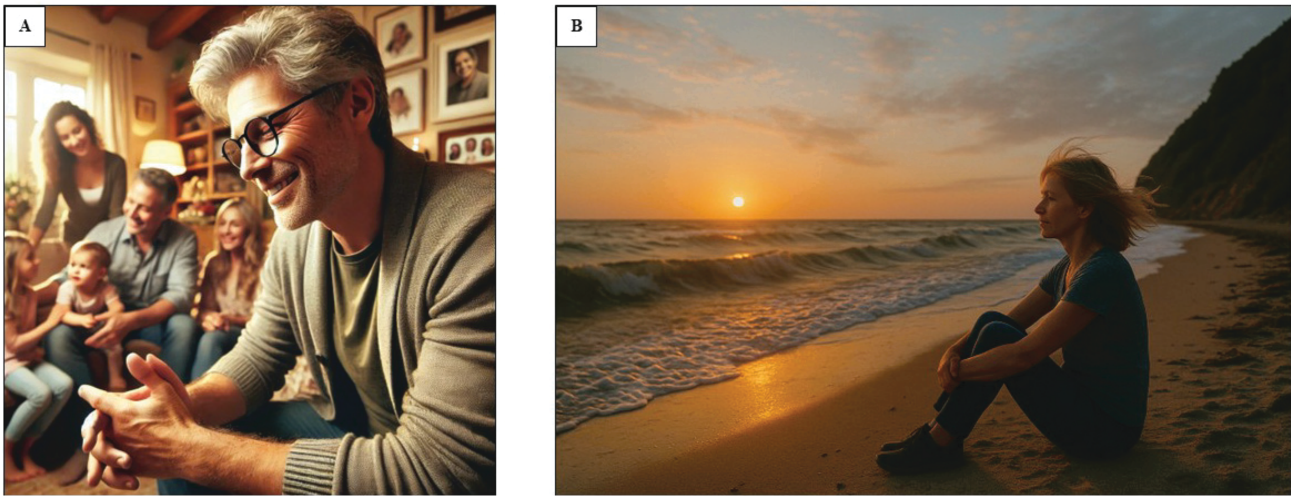

Figure 1. Examples of AI-generated graphics presented to participants
Figure 1A. Example of AI-generated graphic presented to participants pre-update (generated using ChatGPT Plus (GPT-4o, OpenAI, January 2025). **Figure 1B.** Example of AI-generated graphic presented to participants post-update (generated using ChatGPT Plus (GPT-4o, OpenAI, May 2025)

Subsequently, the respondents were asked to assess their attitude towards AI after the study and whether they saw any potential use for generating graphics using AI in psychiatric practice. One question also assessed whether the visuals motivated them to pursue their personal vision of recovery on a scale: 0 - demotivates, 1 - weakly motivates, 2 - no effect, 3 - motivates, 4 - strongly motivates.

The survey data were collected and later subjected to data cleaning and visualisation using Microsoft Excel (2019), while Jamovi (2.6.44) was employed for descriptive and inferential statistics, including correlation analysis, paired t-tests, and logistic regression, however the results should not be interpreted quantitatively due to a small sample (n=20). Data processing, and cluster analysis were conducted using Python (3.12) with the pandas, matplotlib, and scikit-learn libraries. No correction for multiple comparisons was applied, given the exploratory nature of the study.

Descriptive statistics (means and standard deviations) were calculated for key quantitative variables, including participants' attitude towards artificial intelligence before and after the survey, ratings of AI-generated graphics and perceived motivational impact. Openness to use of the AI tools in psychiatric consultations was explored by calculating each percentage of yes and no answers.

P values were calculated to determine associations between demographic factors and variables from the survey including: attitude towards AI, ratings of the graphics, motivational impact and openness to the use of graphics in psychiatric consultations. A p value of < 0.05 was considered statistically significant. To assess the relationship between general attitudes towards AI and openness to using AI-generated images in psychiatric consultations, Spearman's rank-order correlation coefficient (Spearman's rho) and the corresponding p value were used. Spearman's rank correlation coefficient (ρ) was calculated to examine the strength and direction of the monotonic relationship between variables and due to the suspected non-normal distribution of the data. The value of Spearman's ρ ranges from -1 to +1 and the strength of correlation was interpreted using standard thresholds: $\rho < 0.3$ = weak, 0.3–0.5 = moderate, and > 0.5 = strong. For visualisation purposes, linear regression trend lines were plotted in Excel based on the Pearson method, which is the default, but these were used for illustrative purposes only and do not reflect the non-parametric statistical tests applied.

Cluster analysis was conducted using Python to identify attitudinal profiles among the participants based on their attitude towards AI-generated graphics, ratings of visual stimuli, motivational impact and openness to using such graphics in psychiatric practice. This exploratory approach intended to discover underlying patterns within the sample that might inform future research or clinical practice. By means of bar charts, each of three clusters was illustrated to facilitate its interpretation. For the purpose of cluster analysis, an aggregate measure of graphic evaluation was created for each participant by calculating the mean score across all AI-generated images they had assessed, including both original and edited versions when applicable. This average score served as a comprehensive indicator of each participant's general response to the visual representations. The use of a composite rating allowed for more consistent and interpretable comparisons across clusters, reducing the influence of individual graphic variations and emphasizing broader patterns in perception of the AI-generated content. Moreover, no missing data was observed.

RESULTS

This section details the results of a qualitative analysis presenting the reception of AI-generated visuals by a sample of 20 psychiatric patients. Table 1 summarizes that the group included 40% women (n=8) and 60% men (n=12), aged between 18-60 (mean age 42.1), with most participants having secondary and higher education and all residing in the cities.

Table 1. Participants' Demographic

Variable	n (%)	Mean (SD)
Gender		
Female	8 (40)	
Male	12 (60)	
Age group (years)		42.1 (9.6)
18-26	1 (5)	
27-35	4 (20)	
36-45	8 (40)	
46-60	7 (35)	
Education		
Primary	1 (5)	
Vocational	3 (15)	
Secondary	8 (40)	
Higher	8 (40)	
Place od residence		
City <100k	5 (25)	
City 100-500k	14 (70)	
City >500k	1 (5)	

Note: Mean age calculated using midpoints of age groups

As shown in Table 2, the patients' general attitudes towards artificial intelligence before the questionnaire were neutral to positive (M=2.15, SD=0.67), subsequently a slight improvement was indicated after the intervention (M=1.70, SD=0.80) as lower scores represent more positive attitudes. The participants' ratings of the AI-generated graphics based on a 0-4 scale were found to be moderate, with Graphic 1 scoring M=2.80 (SD=1.15) and Graphic 2 scoring noticeably higher M=3.25 (SD=0.91). Both of the graphics were rated within the range of moderate to strong reflection of the participants' recovery visions. Edited versions received comparable scores. However, ratings for the edited graphics were not provided by the entire sample, as not all participants indicated that they would like any changes. Specifically, Graphic 1 was edited based on feedback from 15 participants, and Graphic 2 based on feedback from 10 participants. On average the patients' motivation impact varied between motivating and strongly motivating (M=3.15, SD=0.75). Furthermore, 12 respondents (60%) saw the AI-generated graphics as a potentially useful tool for visualisation during psychiatric consultations, whereas 8 (40%) did not see such potential.

In the next step, p-values were calculated (see Table 3), in order to determine if the examined outcome variables varied across demographic groups and whether these differences reached statistical significance. The results showed that for all tested demographic factors: age, gender, place of residence and education - p-values exceeded 0.05, indicating no statistically significant differences in any of the examined outcomes.

Table 2. Ratings of graphics before and after editing, motivation impact and perceived usefulness in psychiatric consultations

Outcome Variable	Mean	SD	Yes, n (%)	No, n (%)
Attitude towards AI (pre)	2.15	0.67		
Attitude towards AI (post)	1.70	0.80		
Graphic 1 rating	2.80	1.15		
Graphic 2 rating	3.25	0.91		
Graphic 1 edited rating	3.00	1.20		
Graphic 2 edited rating	3.30	1.06		
Motivation impact	3.15	0.75		
Openness to using of graphics in psychiatric consultations			12 (60)	8 (40)

Note: Edited ratings were only available for participants who responded positively to this option. 15 participants wanted editing of Graphic 1 and 10 of Graphic 2

Table 3. p-values for differences in ratings and motivation across demographic groups

Outcome Variable	Gender p-value	Age p-value	Place of residence p-value	Education p-value
Attitude towards AI (pre)	0.197	0.461	0.369	0.490
Attitude towards AI (post)	0.207	0.582	0.314	0.894
Graphic 1 rating	0.598	0.633	0.566	0.423
Graphic 1 edited rating	0.967	0.344	0.394	0.159
Graphic 2 rating	0.257	0.551	0.288	0.941
Graphic 2 edited rating	0.156	0.471	0.897	0.618
Motivation impact	0.647	0.643	0.272	0.256
Openness to using of graphics in psychiatric consultations	0.263	0.830	0.357	0.490

Instead, a positive relationship between participants' general attitude towards AI and their openness to using AI-generated graphics during psychiatric consultations was observed, demonstrated by Spearman's strong positive correlation (ρ=0.65, p=0.002). Pearson's correlation was lower ($R^2 = 0.4011$), indicating a moderate positive linear correlation. However, this value did not serve for in-depth interpretation purposes and rather for regression line visualisation (see Figure 2).

After these direct findings, attitudinal profiles were studied and a cluster analysis was conducted to identify distinct participant groups based on the consecutive variables: attitudes towards AI, ratings of the graphics, motivational impact and openness to using AI-generated visuals in psychiatric consultations. To facilitate cluster comparisons, overall graphic ratings were summarised, providing an adequate representation of each participant's general impression of the AI-generated graphics.

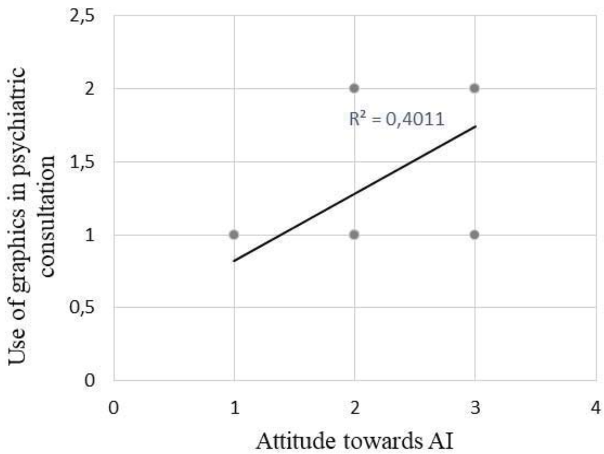

Figure 2. Relationship between attitude towards AI and use of graphics in psychiatric consultation (Prepared by the authors based on their own dana)

Table 4. Participant cluster based on: attitudes towards AI, graphic ratings, motivation impact and openness to use

Cluster	Description	n (%)	Attitude to AI (M)	Graphic ratings (M)	Motivation impact (M)	Openness to use (M)
1	Positive adopters	12 (60)	1.8	3.25	2.4	1.0
2	Sceptics with minimal engagement	5 (25)	2.6	1.2	2.4	1.8
3	Emotionally engaged but technologically sceptical	3 (15)	2.7	3.67	3.33	2.0

Note: Lower scores on attitude and openness indicate more positive responses

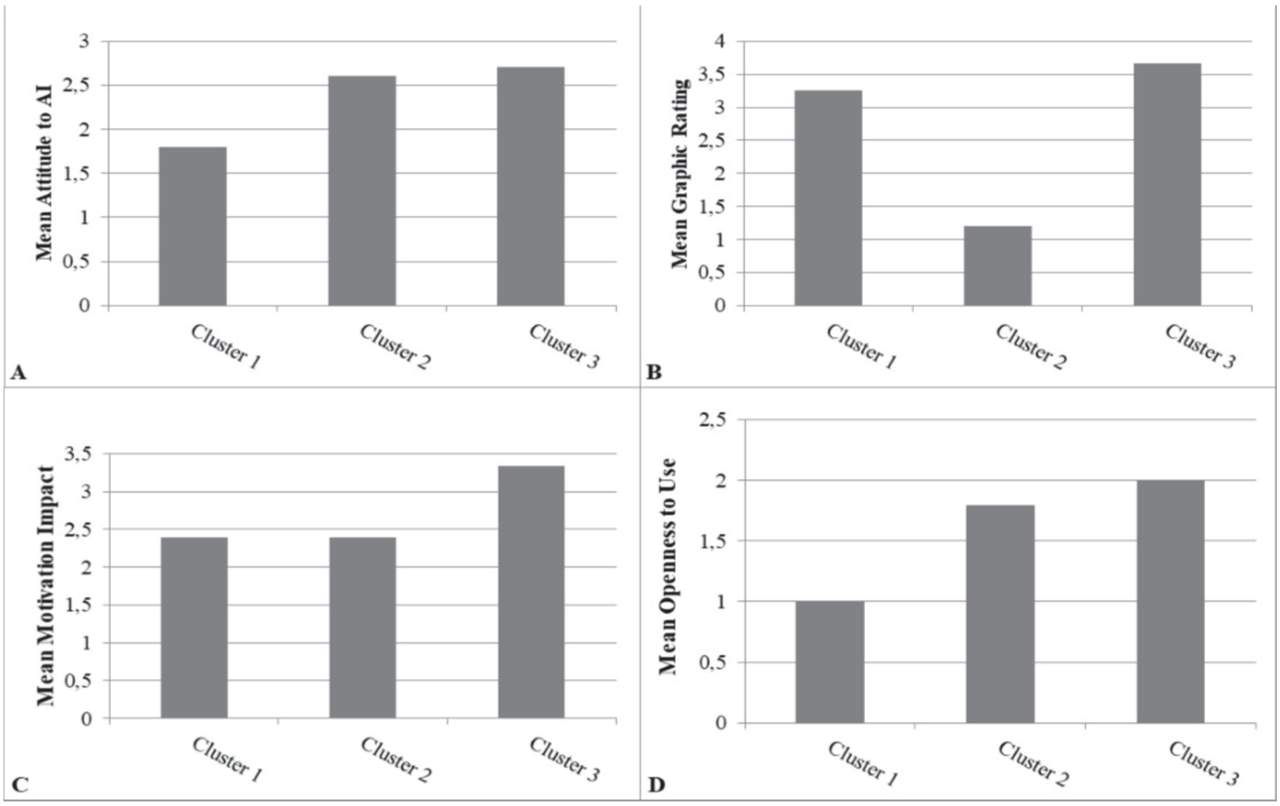

Figure 3. Bar charts representing differences between Clusters 1, 2, and 3.
A. Mean attitudes towards AI across clusters. Lower scores indicate more positive attitudes (1 = positive, 3 = negative)
B. Mean ratings of AI-generated graphics by cluster. Higher scores reflect more favourable evaluations
C. Mean motivational impact of AI-generated graphics by cluster. Values closer to 4 indicate stronger motivational effects
D. Mean openness to using AI-generated graphics in psychiatric consultations by cluster. Lower scores indicate greater openness (1 = yes, 2 = no)

Data from Table 4 demonstrates 3 found clusters.

Cluster 1 - 'positive adopters' (n=12, 60%), importantly represented the largest group among the participants. They presented a positive to neutral attitude to AI (M=1.8), high graphic ratings (M=3.25), low to moderate motivational impact (M=2.4) and most importantly open to using AI graphics in psychiatric consultations (M=1.0 ~yes).

Cluster 2 - 'sceptics with minimal engagement' (n=5, 25%), with a negative attitude towards AI (M=2.6), low ratings of the graphics (M=1.2), low to moderate motivation (M=2.4) and in majority were unwilling to use graphics in clinical practice (1.8 ~closer to no).

Cluster 3 - 'emotionally engaged but technologically sceptical' (n=3, 15%), despite their negative attitude towards AI (M=2.7), this group rated the graphics very highly (M=3.67), felt motivated by them (M=3.33) and yet did not consider their use in psychiatric practice (M=2.0 ~ no).

Moreover, Figure 3 visually illustrates the differences between clusters. Figure 3A confirms the fact that Cluster 1 was the most technologically optimistic, while Clusters 2 and 3 were more sceptical. Figure 3C displays comparable motivational impact in Clusters 1 and 2, whereas Cluster 3 shows a higher one. Figure 3D presents that Cluster 1 was the most open in terms of using AI-generated graphics in psychiatric practice, however Clusters 2 and 3 were less inclined. Figure 3B depicts graphic rating by cluster, emphasizing particularly high ratings in Cluster 3, despite their overall scepticism towards AI.

The analysed bar charts support cluster descriptions presented in Table 4 with visual representation of the group attitudinal profiles.

DISCUSSION

The objective of the present study was to investigate the attitudes of psychiatric rehabilitation patients towards AI-generated graphics and their potential use as a therapeutic tool in clinical practice. According to the statistical analyses, no significant demographic differences were revealed among participants' responses in the questionnaire. Therefore, it may suggest that AI-generated graphics may have broader applicability in diverse patient populations, regardless of their gender, age, place of residence or education, and are rather focused on attitudinal profiles.

Attitudes towards AI ranged from enthusiastic to sceptical, but generally improved after completion of the questionnaire. This might be explained by the positive impression of the AI-generated visuals, which the patients could emotionally relate to or which simply provided a concrete example of how AI could be applied, thereby reducing abstract fears or prior scepticism. This finding aligns with previous research which showed that prejudice against AI often results from lack of knowledge and exposure to it (Zhang et al. 2023). Moreover, the study emphasized the importance of the appropriate education provided by mental health professionals to ensure patients feel informed and supported.

Overall, the graphics were rated moderately to highly, which demonstrates their positive reception. AI-generated visuals thus have the capacity to resonate with patients' personal experiences and visions of recovery, regardless of their general approach towards technology. Incorporating such graphics into psychiatric practice may enhance emotional engagement, support motivation and treatment adherence. This positive reaction aligns with previous findings showing that patient-facing image generation by AI holds promise for helping to regulate emotions and support therapy in personalized environments (Sezgin & McKay 2024) and extends these insights by suggesting the potential utility among psychiatric rehabilitation patients.

Furthermore, a significant positive Spearman's correlation (ρ=0.65) between attitude to AI and openness to use graphics in psychiatric consultations was found, which indicates that patients more AI-positive are simultaneously more accepting towards possible applications of AI in psychiatry and this link was further explored through cluster analysis.

The analysis revealed three distinct clusters: positive adopters, sceptics with minimal engagement, emotionally engaged but technologically sceptical. Identifying these distinct patient profiles is critical for designing effective strategies to implement AI-based tools in clinical care.

Cluster 1 (positive adopters) was characterised by openness to AI and technology. Notably, this was the largest group in the study, comprising 60% of all participants. These patients are highly receptive to innovation and may represent the ideal initial target group for introducing AI tools into psychiatric care. The literature on the implementation of new technologies distinguishes an analogous group of "early adopters", reported in the Diffusion of Innovations theory (Rogers 2003), who are the first to accept innovations in practice and it was also confirmed in AI context by Ibrahim et al. work (2025).

In contrast, Cluster 2 (sceptics with minimal engagement) is distinguished by low acceptance of AI, limited engagement and reluctance towards AI in psychiatry. This cluster may include the "late majority", described in the literature, consisting of individuals who accept new technologies only when they become standard or under the influence of the environment (Ibrahim et al. 2025). Fritz et al. (2025) note that low digital competence and lower perceived AI usefulness may contribute to scepticism towards such innovations. This suggests that increasing digital competence and understanding may enhance openness to AI adoption within this group.

Cluster 3 (emotionally engaged but technologically sceptical) reveals yet a different set of characteristics including high emotional openness, a positive reaction to the graphics, however, they are sceptical about the practical implementation of AI. Their concerns may stem from technological factors such as limited digital trust, lack of understanding regarding AI functionality and fear about data security (Fritz et al. 2025; Ibrahim et al. 2025). Although these specific factors were not directly assessed in the current study, they represent important avenues for future research.

Interestingly, the present study showed the existence of two contrasting groups - cluster 1 and 3. The first was more open to AI but emotionally did not engage fully with the graphics presented, while the other had a sceptical attitude towards AI and was emotionally engaged. This contrast implies that certain people may need different forms of support: some emotional-based, whereas the others more rational-based. Trust in technology and perceptions of usability are key to implementing such digital tools (Fritz et al. 2025; Ibrahim et al. 2025) Overall, these patient typologies show diversity of attitudes towards AI innovations, highlighting the importance of tailoring implementation strategies to address specific needs within each group.

The findings of this study can be compared with previous research on other than drug treatment methods in psychiatry. Although the use of AI is unconventional in psychiatry, it has been increasingly adopted in medicine and mental health care over the years (Badnjević et al. 2020).

Stewart et al. (2022) found that conscious and clear goal planning can contribute to psychiatric patients' determination to persist in therapy, while joint goal-setting with staff increases patient engagement and treatment effectiveness. Also, lack of clear goals was associated with poorer outcomes, higher levels of symptoms, and weaker therapeutic alliance (Geurtzen et al. 2020). According to this study the majority of patients declared that the presented visuals motivated them to engage in treatment and pursue their goals, which is consistent with previous findings. As positive emotional reactions have beneficial effects on treatment and negative visions decrease patient motivation (Holmes & Mathews 2010), participants seeing AI-generated graphics consistent with their vision of recovery and depicting a positive future, can increase their motivation.

Patients who experience prolonged negative symptoms and who struggle with function-limiting psychiatric diseases may develop a sense of hopelessness. Given that hopelessness predicts poor treatment outcomes in schizophrenia (Hoffmann et al. 2000), interventions that promote hopeful imagery - such as ChatGPT-generated recovery images, may enhance motivation and therapeutic engagement.

To date, no studies have specifically examined the use of AI-generated recovery visuals to support motivation in psychiatric patients, even though AI is used in medical practice. This study represents a novel approach by integrating generative AI technology into imagery-based interventions, potentially providing a scalable and accessible method to enhance motivation in psychiatric care.

Limitations

The small, single-centre sample limits applicability, creates possibility for false positive results and p-values are sensitive to unstable estimates. Voluntary participation introduces potential self-selection bias, as more technologically open patients may have been overrepresented. Additionally, the AI chatbot automatically upgraded during data collection period, producing more realistic graphics for later participants; the ratings thus come from an even smaller group and may not be directly comparable. Digital competence was not formally assessed, and clinical confounders such as the patient's history were not controlled. Another limitation is the potential social desirability bias as participants' responses may have been influenced by the researcher's presence which leads to more subjective results. These constraints limit the conclusions and highlight the need for larger, multi-centre studies with objective measures of digital literacy and tighter control of clinical variables.

CONCLUSION

The present study investigated the attitudes of psychiatric rehabilitation patients towards AI-generated recovery graphics and their potential use as a therapeutic tool. The findings indicate that these visuals were generally well-received, regardless of demographic characteristics, and positively influenced patients' motivation for treatment goals. Attitudes towards AI improved after exposure to the graphics, suggesting that direct experience with chatbots may reduce scepticism and foster acceptance. A significant strong positive correlation was found between openness to AI and willingness to use such visuals in therapy, highlighting the role of attitudinal profiles in implementation.

Given that lack of clear and precise goal, also the sense of hopelessness predicts poorer outcomes in psychiatry, integrating generative AI visuals depicting hopeful recovery scenarios may enhance patient engagement and treatment adherence.

The usefulness of the tool depends on patients' attitudes towards artificial intelligence and the survey itself, as well as the individual course of the illness, since, it was found during the survey, not all patients were able to answer the questions and two of them were excluded.

As this is the first study exploring such applications, future research should examine the clinical impact of AI-generated recovery visuals in larger samples and explore its long-term effects on treatment adherence and outcomes.

Acknowledgements: *None.*

Ethical compliance: The study was conducted in compliance with Polish law which does not require a bioethics committee approval for this kind of research.

Conflict of interest: *None to declare.*

Contribution of individual authors:

Agata Łosiewicz: conceptualisation, methodology, data collection, data analysis, writing - original draft, writing - review and editing.

Barbara Kwaśnica: conceptualisation, methodology, data collection, writing - original draft.

Maciej Loska: conceptualisation, methodology, data collection, data analysis, validation, writing - original draft, writing - review and editing.

Anna Kożuch: data collection, writing - original draft.

Krzysztof Krysta: project administration.

All authors approved the final manuscript.

References

1. *Badnjević A, Avdihodžić H & Gurbeta Pokvić L: Artificial intelligence in medical devices: past, present and future. Psychiatr Danub 2021; 33(Suppl 3):S336–S341. https://www.psychiatria-danubina.com/UserDocsImages/pdf/dnb_vol33_noSuppl%203/dnb_vol33_noSuppl%203_S336.pdf*
2. *Fritz, B., Eppelmann, L., Edelmann, A., Rohrmann, S., & Wessa, M. (2025). How mental health status and attitudes toward mental health shape AI acceptance in psychosocial care: A cross-sectional analysis. BMC Psychology, 13(1). https://doi.org/10.1186/s40359-025-02954-z*
3. *Geurtzen, N., Keijsers, G. P. J., Karremans, J. C., Tiemens, B. G., & Hutschemaekers, G. J. M. (2020). Patients' perceived lack of goal clarity in psychological treatments: Scale development and negative correlates. Clinical psychology & psychotherapy, 27(6), 915–924. https://doi.org/10.1002/cpp.2479*
4. *Hoffmann, H., Kupper, Z., & Kunz, B. (2000). Hopelessness and its impact on rehabilitation outcome in schizophrenia - an exploratory study. Schizophrenia research, 43(2-3), 147–158. https://doi.org/10.1016/s0920-9964(99)00148-6*
5. *Holmes EA & Mathews A: Mental imagery in emotion and emotional disorders. Clinical Psychology Review 2010; 30:349–362. https://doi.org/10.1016/j.cpr.2010.01.001*
6. *IBM. (2024, August 9). What is artificial intelligence (AI)? https://www.ibm.com/think/topics/artificial-intelligence*
7. *Ibrahim, F., Münscher, J.-C., Daseking, M., & Telle, N.-T. (2025). The technology acceptance model and adopter type analysis in the context of Artificial Intelligence. Frontiers in Artificial Intelligence, 7. https://doi.org/10.3389/frai.2024.1496518*
8. *Institute for Health Metrics and Evaluation. (2021). Global Health Data Exchange (GHDx). https://vizhub.healthdata.org/gbd-results*
9. *Jiang, S., Jia, Q., Peng, Z., Zhou, Q., An, Z., Chen, J., & Yi, Q. (2025). Can artificial intelligence be the future solution to the enormous challenges and suffering caused by schizophrenia? Schizophrenia, 11, Article 32. https://doi.org/10.1038/s41537-025-00583-4*
10. *LoParo, D., Dunlop, B.W., Nemeroff, C.B. et al. Prediction of individual patient outcomes to psychotherapy vs medication for major depression. npj Mental Health Res 4, 4 (2025). https://doi.org/10.1038/s44184-025-00119-9*
11. *NASA. (2024, May 13). What is artificial intelligence? https://www.nasa.gov/what-is-artificial-intelligence/*
12. *Rogers, E. M. (2003). Diffusion of innovations (5th ed.). Free Press.*
13. *Sezgin, E., & McKay, I. (2024). Behavioral health and generative AI: A perspective on future of therapies and patient care. npj Mental Health Research, 3, 25. https://doi.org/10.1038/s44184-024-00067-w*
14. *Stewart, V., McMillan, S. S., Hu, J., Ng, R., El-Den, S., O'Reilly, C., & Wheeler, A. J. (2022). Goal planning in mental health service delivery: A systematic integrative review. Frontiers in psychiatry, 13, 1057915. https://doi.org/10.3389/fpsyt.2022.1057915*
15. *Trakhtenberg E. C. (2008). The effects of guided imagery on the immune system: a critical review. The International journal of neuroscience, 118(6), 839–855. https://doi.org/10.1080/00207450701792705*
16. *Vaidyam, A. N., Wisniewski, H., Halamka, J. D., Kashavan, M. S., & Torous, J. B. (2019). Chatbots and Conversational Agents in Mental Health: A Review of the Psychiatric Landscape. Canadian journal of psychiatry. Revue canadienne de psychiatrie, 64(7), 456–464. https://doi.org/10.1177/0706743719828977*
17. *World Health Organization. (2024, July 8). Bipolar disorder. https://www.who.int/news-room/fact-sheets/detail/bipolar-disorder*
18. *World Health Organization. (1948, April 7). Constitution of the World Health Organization. https://www.who.int/about/governance/constitution*
19. *Yeomans, D., Taylor, M., Currie, A., Whale, R., Ford, K., Fear, C., … Burns, T. (2010). Resolution and remission in schizophrenia: getting well and staying well. Advances in Psychiatric Treatment, 16(2), 86–95. https://doi.org/10.1192/apt.bp.108.006411*
20. *Zhang, M., Scandiffio, J., Younus, S., Jeyakumar, T., Karsan, I., Charow, R., Salhia, M., & Wiljer, D. (2023). The adoption of AI in mental health care: Perspectives from mental health professionals. JMIR Formative Research, 7, e47847. https://doi.org/10.2196/47847*

Correspondence:
Agata Łosiewicz, medical student
Students' Scientific Association, Department and Clinic of Rehabilitation Psychiatry,
Faculty of Medical Sciences in Katowice, Medical University of Silesia
40-055 Katowice, Poland
E-mail: agalos100@gmail.com