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DEPRESSIVE SYMPTOMS AMONG MULTIPLE SCLEROSIS PATIENTS

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ABSTRACT
Background: Individuals living with multiple sclerosis (MS) very commonly experience depressive symptoms. These symptoms are influenced by level of disability and add to the person's disease burden. The effect MS has on the individual's social life and ability to work is worsened by depressive symptoms. Patients with MS need early psychological evaluation and intervention to help them cope with their lifelong disease. Adaptive coping strategies can help them by mitigating the impact of symptoms and improving their ability to function in daily life. This case study investigates the prevalence of depressive symptoms in individuals with MS in Saudi Arabia.
Methods: This is a case study of five individuals diagnosed with MS who were followed over the course of four clinical sessions that included assessment and two cognitive-behavioral therapy (CBT) sessions. The participants were selected from an outpatient multiple sclerosis clinic. Tools used for evaluation and data collection included the clinical interview, the Patient Health Questionnaire-9, and the Hospital Anxiety and Depression Questionnaire.
Results: Three women and two men, aged 27 to 56 years participated. Most patients were found to have moderate-to-severe depression. Th greater levels of depression were found to affect disease duration and severity. Adaptive coping strategies were found to be useful in increasing patient abilities and reducing the negative impact of disease.
Conclusion: Depressive symptoms are very common among MS patients, especially those with greater disability. Symptoms of depression are considerably influenced by MS symptoms such as uncertainty of disease course, incurability, and physical impairment. Early psychological assessment and intervention is crucial in this population.
Keywords. depressive symptoms, multiple sclerosis, adaptive coping, chronic illness, Saudi Arabia

INTRODUCTION

Multiple sclerosis (MS), a chronic demyelinating disease causing progressive disability, is the most common cause of disability in young adults (Barone et al., 2016; Noseworthy et al., 2000). The disease has a prevalence of 2.9 million globally (Atlas of Multiple Sclerosis International Federation, 2023). With a female predominance, MS symptoms usually manifest in the second to the fourth decades of life (Kirchner & Lara, 2011; World Health Organization & Multiple Sclerosis International Federation, 2023). In the Middle-East, studies show that MS is increasing in prevalence (Haussleiter et al., 2009), with an estimated 40 cases per 100,000 (Al Deeb, 2009; Bohlega et al., 2013) and a projected prevalence of 62 cases per 100,000 among Saudi nationals (AlJumah et al., 2020). The disease course is characterized by recurrent relapses of previous symptoms or development of new ones (Confavreux et al., 2000; Polman et al., 2011), ultimately progressing to permanent disabling symptoms in the long run (Tekin et al., 2014). Individuals with MS have a 13% to 30% risk of developing depression (50% lifetime risk), making depressive symptoms common in this population (Siegert & Abernethy, 2005). The prevalence in a recent report was as high as 58.8% among 328 MS patients (Alharbi et al., 2022). In fact, there have been reports showing a direct link between the two (Fruehwald et al., 2001).
Due to the influence MS and depression have on the individual's general health, it is crucial to shed more light on how the two disorders interact. However, reports in this area are limited for the Saudi community. This investigation looks at the prevalence of depressive symptoms and their effects in MS patients in Saudi Arabia.

METHODS

This is a qualitative study of five cases of MS. The study was carried out at King Fahad University Hospital (KFUH) in Dammam, Saudi Arabia, from May to December 2022. The study included any patient, 18 to 60 years old, diagnosed with MS attending the MS clinics at KFUH; patients of other neurological disorders were excluded.
Participating patients attended 4 clinical sessions over the 7-month period of the study; each session lasted approximately 50 minutes. The first session focused on the clinical interview and history taking along with alliance building, explaining the research, and obtaining consent. In the second interview, the therapist carried out a psychological assessment and educated the patients on how symptoms of depression may affect persons living with MS. Results of the psychological assessment were discussed with the patients in the third and fourth sessions. Brief cognitive-behavioral therapy (CBT) was also initiated to teach patients behavioral strategies based on their individual abilities. The CBT sessions focused on identifying negative automatic thoughts, cognitive restructuring, and Socratic questioning in the cognitive component and behavioral activation, social skills, and graded task assignment in the behavioral component. Patients identified as having moderate-to-severe depressive symptoms were offered referral to the Department of Psychiatry for continued care. All sessions were held in a private room.

Instruments

The clinical interview

For the present study, the interview was conducted in Arabic using a modified Arabic clinical interview (Saleh, 2010). The participants were also asked about the course of their disease alongside demographic data including age, sex, level of education, and socioeconomic, employment, and marital status.

Patient Health Questionnaire-9

A validated Arabic translation of the Patient Health Questionnaire-9 by AlHadi et al. (2017) was used to screen for depressive symptoms. Originally developed by Spitzer et al. (1999), the questionnaire consists of 9 items that are rated on a 4-point Likert scale, from “Not at all” to “Nearly every day,” which are given a score from zero to 3. The total score, ranging from zero to 27, indicates the severity of depression, with a range from no or minimal depression (scores from 0 to 4) to severe depression (scores ≥ 20) (AlHadi et al., 2017; Kroenke et al., 2001).

Hospital Anxiety and Depression Questionnaire

An Arabic translation of the Hospital Anxiety and Depression Questionnaire (HADS) (el-Rufaie & Absood, 1995) was used for this study. The original HADS developed by Zigmond and Snaith (1983) is a self-assessment screening tool for anxiety and depression in the outpatient clinic setting. The questionnaire comprises 7 items for anxiety and 7 for depression (14 total). Each item is scores on a scale from zero to 3 based on how the respondent has been feeling in the preceding week, with a possible total score of zero to 21 for each of the two subscales (Alharbi et al., 2022). The resulting score indicates the severity of depression or anxiety.

Data analysis

Based on the case study design, the researcher carried out an in-depth inquiry into the psychodynamic mechanism by which MS affects patients’ mood, particularly in relation to depressive symptoms. Questionnaire results were also analyzed qualitatively.

Ethical considerations

The purpose of the study was explained to all patients, and their consent for participation was obtained before the sessions. They were also informed that they may withdraw at any time without consequences. All obtained data were kept confidential and anonymous. This research followed ethical guidelines for the involvement of human subjects; no participant was discriminated against for their color, race, ethnic origine, or religion.

RESULTS

Five patients, 2 men and 3 women aged 27 to 56 years, participated, as indicated in Table 1 (Appendix). All patients were Saudi nationals.

Case 1

Mr. A. L., a 65-year-old retired widower living with his daughter and son, was diagnosed with MS in 1995 with progressive symptoms leading him to require the use of a wheelchair. A. presented with symptoms and signs of major depressive disorder. He had difficulty accepting his diagnosis and reported not feeling safe at times. Along with his physical disability he reported poor concentration, decreased appetite, lack of motivation, sleep disturbance, and inability to feel joy. A. expressed that only death could grant him relief. He lacked social support and felt isolated from his family. Since his diagnosis, he experienced poor mood, irritability, and a decline in his social life.

At the time of the interview, he was experiencing physical symptoms in his right hand and forearm that disturbed his sleep and daily activities. Before retirement, his work was considerably affected owing to his advancing age and the functional changes brought on by disease severity. He also experienced panic attacks during disease flare-ups. His past medical history revealed multiple disease relapses predominantly of motor type involving most parts of his body. Table 2 (Appendix) presents a case formulation summary for Mr. A.

Sessions

A. attended the first session accompanied by his daughter. He was cooperative and calm. In the second session A. was noted to describe himself as being incapable and a burden. He had a pessimistic view of his current and future physical health. His evaluation results indicated moderately severe depression (he scored 15 on the PHQ-9) and abnormality based on his score of 19 on the HADS. In the third session, the therapist was able to gain a better understanding of A.'s perspective related to being uncapable because of his reliance on a wheelchair. Cognitive restructuring illustrated his fear of the future, death, and the unexpected; his old life that he lost with the diagnosis; his loneliness after losing his wife; and his lack of familial support. To assist A. in changing how he thinks, the therapist used Socratic questioning, as shown in Table 3 (Appendix). A. attended the last session accompanied by his eldest son. Both A. and his son reported slight improvement in his mood, personal hygiene, and interaction with family members. This session focused on behavioral intervention. The therapist used behavioral activation to address behaviors that caused A.'s depressive mood to persist, such as social isolation, and suggested other behaviors that would help him to cope, such as social skill training, as indicated in Table 4 (Appendix). A. was encouraged to refrain from negative social behaviors with friends and family, such as complaining, and resort to positive ones like complementing instead. For behavioral activation, A. was asked to list all of his daily activities and give each a rating based on pleasure and mastery. Through collaborative efforts, a list was established of activities that are likely to be rewarding for him. The therapist suggested that A. carry out assignments in small steps to avoid feeling overwhelmed owing to his reduced physical abilities. He also suggested that A. take on some volunteer jobs through email or phone calls to help him feel a sense of accomplishment. A. was also taught relaxation and breathing exercises to help manage panic attacks.

Case 2

Ms. H., a 27-year-old married woman of good socioeconomic status living with her parents and two brothers, was a law student at the time of the sessions. After being diagnosed with MS in 2018, she began to lose interest in social activities with friends and experience sudden crying episodes, low mood, and a decline in her academic performance. She described her relationship with her immediate family as distant and formal; her mother, critical and intrusive; her father—with whom she constantly argued, old fashioned, overprotective, and living in a different city. She lacked support from her husband, who leaves her to suffer alone through pain episodes and never attends appointments with her. H. reported that she was always anxious, overthinking, and worrying about when her next relapse would happen and how her health would worsen with time. She also reported experiencing panic attacks and loss of appetite during relapses, causing her to be very weak. Her academic performance was poor due to lack of motivation to do the work and frequent absences from physical pain and fatiguability. She preferred to spend her time alone and reported feeling blue and a sense of despair. Despite that, she had good insight; she understood that she needed psychotherapy. Table 5 (Appendix) summarizes Ms. H.'s case.

Sessions

H. attended sessions alone. In the first session, she was cooperative and calm and provided information openly. For the second session, she arrived late because she felt fatigued and did not want to leave her bed. The third session was extended an hour because she would not be able to attend the next one. She scored 9 on the PHQ-9 (mild depression) and 10 on the HADS (borderline abnormal). H. received educating on sleep hygiene to help her overcome sleep issues. Tables 6 and 7 (Appendix) summarize her automatic negative thoughts with cognitive restructuring and the graded task assignment.

Case 3

Ms. A. Z., a 36-year-old single woman living with her family, was a dentist and had never been to a mental health clinic. She was diagnosed in 2016 after experiencing problems with her eyesight and since then experienced 3 MS attacks involving neck pain and weakness, stiffness, and coordination issues in her hands. She reported having low energy and severe exhaustion at times. Before her diagnosis, A. Z. was a practicing dentist; her symptoms, especially those involving her hands, led her to leave the profession and pursue a new career. She was studying administrative management at the time of the sessions. Her career change was disappointing and difficult for her to accept. She was not doing well in her studies due to lack of motivation, difficulty concentrating, and frequent absence from pain episodes. Her social life suffered, and she found herself sleeping long hours to avoid her emotions. She reported having a normal childhood and that her family supported her during her illness. See Table 8 (Appendix) for A. Z.'s case formulation.

Sessions

A. Z. was cooperative and gave a good history during the first two sessions. Her mother attended with her for the third session. A. Z. scored 14 on the PHQ-9 (moderate depression) and 10 on the HADS (borderline abnormal). See Tables 9 and 10 (Appendix) for a summary of the CBT sessions.

Case 4

Ms. M., a 33-year-old divorcee with two children living with her family, was a medical secretary and held a bachelor's degree. She was diagnosed in 2009 and had symptoms involving her whole body causing her to be imbalanced and prone to falls. She was receiving medication for MS in the form of regular injections, which she decided to stop on her own a year later. She was able to get married and have two children, but continued to have relapses after childbirth that rendered her incapable of caring for them. Her symptoms continued to worsen leading her to require a walker then a wheelchair. M. felt hopeless and progressed to experience a negative mood, crying, and sleep disturbance, and her relationships with her siblings, children, and husband were deteriorating. She reported having suicidal thoughts, but that her faith kept her from acting on them. Table 11 (Appendix) summarizes M.'s case.

Sessions

M. was accompanied by her sister, and was anxious and cautious during the first session. In the second, she was accompanied by her maid, and she displayed a calmer and more cooperative demeanor. M. scored 13 on the PHQ-9 (moderate depression) and 18 on the HADS (abnormal). In the final session, she reported that her mood improved by 60%. Tables 12 and 13 (Appendix) show examples of her CBT sessions.

Case 5

Mr. A. B., a 37-year-old single man, was unemployed and living with his family because of his disabilities. His chief complaint was a decline in his mood and communication and loss of interest in hygiene as well as loss of appetite and weight. He had no previous psychiatric problems. His mother reported that he also experienced sleep problems and felt guilty and worthless. He was diagnosed in 2015 after experiencing fatiguability, pain, and falls; and his MS progressed to a point where he became immobile. His medical history was also positive for high blood pressure and diabetes mellitus with nephropathy. His disease led him to lose interest in social activities, but he had good relationships with his siblings. He lost many jobs, which was difficult for him and his family who were of low socioeconomic status. Table 15 (Appendix) summarizes his case.

Sessions

A. B. was always accompanied by a family member. In the first two sessions, he was calm, cooperative, and open to therapy. His scores were 15 on the PHQ-9 (moderately severe depression) and 18 on the HADS (abnormal). After discussing the evaluation results with A. B. in the third session, the therapist taught him good sleep and personal hygiene practices. A. B. reported in the last session that he noticed a 40% improvement in his mood, and his brother reported that A. B. was more compliant with his medications. Tables 16 and 17 (Appendix) show examples of the CBT sessions with A. B.

ANALYSIS OF RESULTS

All five patients were diagnosed with MS and exhibited symptoms of depression. Results showed a discrepancy between marital status and MS and depressive symptoms. Those who were married felt unsupported by their spouse. Educational level had no effect on extent of disability and how it affected depression in the present sample. Employment and income were among factors that could contribute to depressive symptoms. The patients with more extensive disability exhibited greater depressive symptoms.

Social life deterioration after being diagnosed with MS was noticed in all five patients, which is not uncommon. A person who has no social support is less able to deal with stressors and cope, which in itself can worsen depressive symptoms. Interpersonal relationships seem to help individuals adopt positive behaviors and enhance adaptive coping. The patients in this study all experienced maladjustment at the time of their first diagnosis as a result of fear of the disease, disability, lack of knowledge, and fear of what their future might be like.

MS also affects the individual's capabilities and ability to work, as observed in A. Z.'s case, who left her career as a pediatric dentist due to the deterioration of her fine motor skills; or H., whose frequent need for sick leaves affected her academic performance. Some of the participants even became incapable of holding a job, which added an economic dimension to the effects of their disease. All of these factors influence depressive symptoms.

Individuals experiencing depressive symptoms may become frustrated and resort to maladaptive coping mechanisms that impact their relationships, which, in turn, can lead to more loneliness and isolation in a vicious cycle. Impaired mobility and pain, reported by all interviewed patients, are other factor that influence functional ability, independence, ability to work, and depressive symptoms.

Depressive symptoms in MS patients adds to the burden of disease and may be a reflection of an uncertain future. It may cause them to be less diligent with medication or rehabilitation visits and impact their social and work lives, making them more prone to depression.

DISCUSSION

This study followed a case report design to explore how depressive symptoms affect individuals with MS. The main findings from this study are that (1) individuals with MS experience symptoms of depression, especially with disease worsening, as other studies have shown (Patten et al., 2003), and (2) reduced productivity, inability to work, and lack of social interaction all influence depressive symptoms. Three out of the five interviewed patients in the present study were women; several studies have reported MS being more common in females (AlJumah et al., 2020; Daif et al., 1998; Koch-Henriksen & Sørensen, 2010; Kurtzke, 2000). In agreement with other reports (Alharbi et al., 2022), the patients in the present study were found to have mild-to-moderate depression. Of note also is that the individuals with greater disability were more prone to have depressive symptoms, as several others have reported (Barnwell & Kavanagh, 1997; Pakenham, 1999).

Several factors influence how depressive symptoms could be affected by MS, such as type of MS, degree of disability, and disease duration and severity, as well as individual factors like age, educational level, and social support (AlSaeed et al., 2022; Crnošija, 2017; Sommers-Flanagan et al., 2015). In the present sample, those with greater physical and functional disability reported more depressive symptoms. On the other hand, depressive symptoms can also affect the individual's job and social interactions (Algahtani et al., 2017).

Depressive symptoms in MS patients probably result from a complex interaction of neurological, psychological, and social factors. Although other factors may also be at play, such as genetic and immunological (Goldman Consensus Group, 2005). In individuals with MS, depressive symptoms can cause them to be less inclined to take medications regularly or attend follow-up visits, thus, worsening their disease and quality of life and even raising their risk of suicide (Fruewald et al., 2001; Feinstein, 1997, 2002; Katon, 2011). This strengthens the need for early psychological evaluation and intervention in MS patients (Minden et al., 2014), as many individuals with depressive symptoms may go undiagnosed and untreated (Skokou et al., 2012).

In summary, compared with other chronic illnesses, patients with MS have a high prevalence of depressive symptoms. Depression in this population can affect disease progression and immunity. Living with MS is a lifelong burden of constantly having to cope with relapses and adapt to impairment and disease progression. MS is a chronic disease of unpredictable course and uncertainty that causes great emotional distress to those living with it (Gulick, 2001; Williamson, 2000) and affects their ability to adapt (McNulty et al., 2004). The uncertainty experienced by the five interviewed patients led them to resort to isolation and avoidance in trying to adapt, maladaptive mechanisms that could only worsen their quality of life.

STRENGTHS AND LIMITATIONS

Case studies are useful in providing an in-depth look at certain phenomena. In this study each patient's case was presented with rich qualitative information to help understand the psychological factors at play in a chronic disease such as MS.

This study has three main limitations. First, it is a single-center study, which greatly limits generalizability of results. Second, the study relied on self-reported questionnaires rather than objective tests. Third, it did not consider medication side effects or subtype of MS; most of the sample had relapsing-remitting MS. Apart from these limitations, this study ads insight about the effects of depressive symptoms in MS patients and may be a starting point for future studies. It would be helpful to incorporate psychological interventions in future studies in this population.

CONCLUSION AND RECOMMENDATIONS

It is crucial to address depressive symptoms in patients living with MS. Most of the patients had moderate-to-severe depression, and the severity of their symptoms was influenced by degree of disability. Thus, including psychological assessment early on in the care of MS patients must be considered to provide them with psychological support. Therapy should focus on problem-focused strategies to reduce stress rather than emotion-based ones. MS symptoms could also be influencing depressive symptoms. Patients need to be taught the use of adaptive coping skills to deal with their illness. Different medical settings should include a psychologist to administer psychological interventions. Future research could focus on longitudinal studies and clinical trials to understand how depression affects MS in Saudi Arabia.

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APPENDIX

Table 1. Participant sociodemographic variables and questionnaire scores

	Sex	**Marital status**	**Educational level**	**Age**	**PHQ-9**	**HADS**
Case 1	Male	Married	Diploma	56	15 (moderately severe depression)	19 (abnormal case)
Case 2	Female	Single	University student	27	9 (mild depression)	10 (borderline abnormal)
Case 3	Female	Single	Bachelor's degree	36	14 (moderate depression)	10 (borderline abnormal)
Case 4	Female	Divorced	Bachelor's degree	33	13 (moderate depression)	18 (abnormal case)
Case 5	Male	Divorced	Intermediate school	37	15 (moderately severe depression)	18 (abnormal case)

PHQ-9 = Patient Health Questionnaire-9; HADS = Hospital Anxiety and Depression Scale

Table 2. Case formulation for Mr. A. L. (Case 1)

Brief summarizing statement	A 56-year-old retired Saudi widower who exhibited signs and symptoms indicative of major depressive disorder.
Predisposing factors	- Low self-image (not accepting the physical changes from his MS) - Rigid and negative cognitive style (he did not accept the diagnosis and believed that he would only find relief from depression in death)
Precipitating factors	Physical changes caused by MS and the lack of support from friends and family precipitated the current episode.
Perpetuating factors	His chronic illness (MS), physical disability, and lack of support, as well as his response to being diagnosed with a chronic disease.
Protective factors	- His good response to medication, leading to disease remission. - Not using negative coping strategies like substance use. - Having a good multidisciplinary health care team (including a physiotherapist, a neurologist, and a psychologist).

MS = multiple sclerosis.

Table 3. Examples of cognitive restructuring in Mr. A. L.'s case (Case 1)

Negative automatic thought	**Evidence that doesn't support the thought**	**Alternative thought**
"I am using a wheelchair, so I am weak."	The wheelchair helps me move easier.	Using a wheelchair improves my ability to move.
"I am always relying on my family."	I can still take care of myself.	I am able to do many things physically by myself, even when I use a wheelchair.

Table 4. Behavioral activation used with Mr. A. L. (Case 1)

Identified behavior associated with lack of reward	**Mood rating**	**Alternative behavior**	**Mood rating**
Spending a long time in my room watching TV.	4	Getting out of bed early in the morning and going to the cinema with a family member.	8
Spending a long time in bed.	4	Going to the beach with a friend.	7

Table 5. Case formulation for Ms. H. (Case 2)

Brief summarizing statement	A 27-year-old married woman who presented with signs and symptoms of major depressive disorder.

Predisposing factors	She was predisposed by her gender (female) and insecure attachment style, as she had an uninvolved father and described her mother as unfair, critical, and intrusive.
Precipitating factors	Her current symptoms were precipitated by relationship stressors with friends and an unsupportive husband.
Perpetuating factors	Her difficulties were perpetuated by her chronic illness (MS), physical disability, academic stressors, poor coping skills such as not eating much, being isolated from friends and family, and lack of empathy from family. She had negative beliefs about the disease and that she will get worse with time.
Protective factors	Despite experiencing difficulties with symptoms, she was insightful regarding her need for psychotherapy.

Table 6. Examples of Ms. H.'s negative automatic thoughts (Case 2)

Negative automatic thought	**Evidence that doesn't support thought**	**Alternative thought**
"The future attack will cause total impairments."	Adherence to medication can reduce the negative effect of future attacks.	I have experienced attacks in the past, and I am still able to cope based on physical ability.
"I am unable to take care of myself."	I can still take care of myself.	I am able to do many things physically, even when I have physical pain.

Table 7. Behavioral activation used in Ms. H.'s case (graded task assignment) (Case 2)

	Step	**Distress level (0-10)**
1	Study for 30 minutes a day.	6
2	Study for 45 minutes a day.	5
3	Study for one hour and discuss the assignments with a classmate.	6
4	Discuss the assignment with the doctor.	7

Table 8. Ms. A. Z.'s case formulation (Case 3)

Brief summarizing statement	A 36-year-old woman diagnosed with MS, who has never been seen by a psychiatrist.
Predisposing factors	She was predisposed because of her gender (female) and her early temperament as being an easy child.
Precipitating factors	Her current episode appeared to be precipitated by visual impairment, motor difficulties, and work stressors, as she changed her job as a dentist and started to study administrative management.
Perpetuating factors	Her difficulties were perpetuated by her chronic illness (MS), physical disability, lack of treatment for her depressive symptoms, and maladaptive coping in the form of avoidance through sleeping long hours.
Protective factors	Despite her difficulties with symptoms, she did have positive coping strategies (probably because of her medical background) She did not turn to negative coping strategies such as substance use. Positive relationships and a supportive family. She was hardworking and still studying. Good response to medication. Positive sense about her life.

Table 9. Examples of A. Z.'s negative automatic thoughts (Case 3)

Negative automatic thought	Evidence that doesn't support the thought	Alternative thought
"I cannot be alone. I always need my family's help."	I am currently able to be independent.	Even with physical limitations, I am able to do my tasks, and I need my family's help occasionally.
"I am a failure, as I could not succeed as a dentist. My life never goes the way it should."	I still can find new opportunities such as studying a new major.	I can continue my studies and succeed in a different major.

Table 10. Behavioral activation used in A. Z.'s Case (Case 3)

Identified behavior associated with lack of reward	Mood rating	Alternative behavior	Mood rating
Sitting at home and thinking about my issues.	3	Meeting with close friends once a week and increase that gradually.	7
Spending a long time in bed.	2	Enrolling in online courses. Going for a walk with a family member.	6

Table 11. Case Formulation for Ms. M (Case 4)

Brief summarizing statement	M is a 33-year-old Saudi woman who is divorced, has two sons, and lives with her parents in the Western region. She is a medical secretary.
Predisposing factors	She is predisposed from her sensitive temperament. (There could also be a genetic factor since her brother was also diagnosed with MS)
Precipitating factors	Her current episode appears to be precipitated by nonadherence to medication, pregnancy, sleep deprivation, and being separated from her husband.
Perpetuating factors	Her difficulties are perpetuated by chronic illness (MS) and physical disability.
Protective factors	Despite her difficulties with depression and MS symptoms, she does have positive coping strategies in the positive connection to spirituality that prevented her from attempting suicide. In addition, no substance use is a protective factor

MS = multiple sclerosis.

Table 12. Examples of M.'s negative automatic thoughts (Case 4)

Negative automatic thought	Evidence that doesn't support the thought	Alternative thought
"I am using a wheelchair. I am weak."	I am able to be independent.	I have more physical limitations than I used to, and I could receive help from family as needed.
"I am unable to take care of my children."	I can still be able to take care of children.	I am able to provide many valuable things and spend quality time with them.
"I am a burden to my friends."	I can contribute with friends in meaningful ways.	I can initiate activities with friends from time to time.

Table 13. Behavioral activation used in M.'s case (Case 4)

Identified behavior associated with lack of reward	Mood rating	Alternative behavior	Mood rating
Lying on the couch watching TV.	3	Meet close friends once a week and increase frequency and duration gradually.	7

Table 14. Examples of graded task assignments (Case 4)

Assignment	Small steps
Discussing positive activities with friends.	Gradually increasing the duration of time, and activities.
Making plans for joint activities with friends.	Starting with once a week, with one friend, then increase gradually.

Table 15. Case formulation for Mr. A. B. (Case 5)

Brief summarizing statement	A 37-year-old single male who lives with his family in the Western region.
Predisposing factors	He was predisposed by his low socioeconomic status and work stressors, as he had different jobs and was unemployed because of his physical disability. Early in his childhood he was separated from his mother as result of his parents' divorce.
Precipitating factors	Chronic illness/chronic pain from MS, type 2 diabetes mellitus, hypertension, and diabetic nephropathy. He experienced sever physical pain that caused him to be immobile.
Perpetuating factors	His difficulties were perpetuated by poor finances due to unemployment.
Protective factors	Regardless of difficulties with depression and MS, he had an easy temperament as a child and had good relationships with his siblings.

MS = multiple sclerosis.

Table 16. Examples of A. B.'s negative automatic thoughts (Case 5)

Negative automatic thought	Evidence that doesn't support the thought	Alternative thought
"I have many chronic diseases, so medication is not helpful."	I am better off than most people.	Medication will help to control symptoms and increase my unctionality.
"I am jobless, I am a burden to my family."	I can provide support and love to my family in meaningful ways.	I can initiate activities with friends from time to time.

Table 17. Behavioral activation used in A. B.'s case (Case 5)

Identified behaviors associated with lack of reward	Mood rating	Alternative behaviors	Mood rating
Spending a long time on his cell phone.	3	Meeting a close friend at a café or at home once a week, then increasing the frequency and duration gradually.	7

Lying on bed all morning.	4	Waking up early morning, getting dressed, and reading a book. Spending time in nature.	8 7