Wellness in Mental Health: Examining Its Neurobiology and Clinical Application

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Key Objectives

- Examining the neurobiology of wellness interventions and appreciating the associated clinical implications
- Review data from a 30-day prescriptive wellness program
- Discuss wellness strategies focusing on the importance of accountability
What Factors Define “Wellness”? 

![Diagram showing various wellness factors]

*Information based on Dr Jain’s own experience in psychiatric settings.

Health Is Complex and Entails Many Factors

“[Health is] a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”
—World Health Organization

Are Traditional Treatment Goals Comprehensive?

Symptom reduction + Improved functionality = Improved outcomes

Is This Formula More Complete?

Symptom reduction

Improved functionality

Wellness*

Improved outcomes

*Information based on Dr Jain's own experience in psychiatric settings.
The WILD 5 Wellness Program is composed of 5 interventions targeting distinct components of wellness

Component 1: Exercise

“Physical fitness is not only one of the most important keys to a healthy body, it is the basis of dynamic and creative intellectual activity.”

—John F. Kennedy

Physical Inactivity Is Correlated With Numerous Chronic Health Issues

Physical inactivity can lead to reduced quality of life and premature death

- Stroke
- Cognitive decline
- Liver disease
- Arthritis
- Osteoporosis
- Hypertension
- Cardiovascular disease
- Diabetes
- Cancer
- Erectile dysfunction
- Other systemic complications:
  - Obesity
  - Metabolic syndrome
- Reduced quality of life
- Premature death

Exercise Can Improve Gray Matter Density and Brain Connectivity

Study Design
- 16 young (ranging from 20-42 years of age), overweight, and obese volunteers participated in 60 minutes of supervised physical training twice per week for 3 months
  - Training consisted of 15 minutes of warm up/cool down, 15 minutes of biking or running, and 30 minutes of strength training
- MRI images were taken at the beginning and at the end of the study

HDL-C increase* was correlated with gray matter density increase in hippocampal regions and fractional anisotropy

HDL-C, high-density lipoprotein cholesterol; MRI, magnetic resonance imaging.
*Highlighted areas in the fMRI scans show the differences before and after completion of the 3-month fitness course.
Exercise Can Improve Gray Matter Density and Brain Connectivity (cont)

After 3 months of regular, supervised physical training, participants experienced

- ↓ BMI ($P=0.008$)
- ↓ Serum leptin ($P=0.044$)
- ↑ HDL-C ($P=0.003$)
- ↑ GMD ($P<0.05$)
  - Hippocampus, insular cortex, and cerebellum
- Altered serum BDNF
- Exercise-dependent changes of diffusivity parameters found in surrounding white matter structures and the corpus callosum

Results of this study suggest that exercise may lead to weight loss and improved metabolic and neurotrophic function

BDNF, brain-derived neurotrophic factor; BMI, body mass index; HDL-C, high-density lipoprotein cholesterol; GMD, gray matter density.
Component 2: Mindfulness

“Mindfulness is about being fully awake in our lives. It is about perceiving the exquisite vividness of each moment. We also gain immediate access to our own powerful inner resources for insight, transformation, and healing.”

—Dr. Jon Kabat-Zinn
University of Massachusetts Medical School

What Is Mindfulness?

“Paying attention, on purpose, in the present moment, non-judgmentally.”

—Dr Jon Kabat-Zinn

Mindfulness May Reduce Stress

**Study 1 (N=130)**
Greater amygdala-ACC connectivity was observed in those with perceived stress vs unstressed adults ($P<0.001$)

**Study 2**
Mindfulness meditation training significantly decreased amygdala-ACC connectivity in unemployed job-seeking adults

Results from the first study showed that stress increased amygdala-ACC connectivity. In the second study, mindfulness meditation training, but not relaxation training, decreased this connectivity and improved perceived stress.

ACC, anterior cingulate cortex; MRI, magnetic resonance imaging.

*P*<0.05, postretreat mindfulness compared with preretreat mindfulness parameter estimates.

Component 3: Sleep

“A good laugh and a long sleep are the best cures in the doctor’s book.”  
—Irish Proverb


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Insomnia Increases the Risk of Mental and Physical Conditions

The Norwegian population-based HUNT3 study (N=24,715 adult participants) found insomnia significantly* increased the risk of some mental and physical conditions.

Adjusted model, odds ratio

<table>
<thead>
<tr>
<th>Condition</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>1.5</td>
</tr>
<tr>
<td>Asthma</td>
<td>1.5</td>
</tr>
<tr>
<td>Headache</td>
<td>1.5</td>
</tr>
<tr>
<td>Arthrosis</td>
<td>1.7</td>
</tr>
<tr>
<td>Whiplash</td>
<td>1.7</td>
</tr>
<tr>
<td>RA</td>
<td>1.9</td>
</tr>
<tr>
<td>Fibromyalgia</td>
<td>2.0</td>
</tr>
<tr>
<td>Anxiety</td>
<td>2.1</td>
</tr>
<tr>
<td>Depression</td>
<td>2.4</td>
</tr>
</tbody>
</table>

HUNT, Nord-Trøndelag Health Studies; MI, myocardial infarction; RA, rheumatoid arthritis.

*Statistically significant associations in the adjusted model are shown.

Neuroimaging Shows Various Brain Areas Are Involved in Insomnia Pathophysiology

Several brain areas have been identified that may be involved in insomnia physiology:

- **Anterior cingulate cortex**: Increased volume
- **Thalamus**: Increased activity during sleep
- **Caudate head**: Reduced recruitment
- **Frontal cortex**: Reduced volume and task-related activity
- **Amygdala**: Increased activity
- **Hippocampus**: Reduced volume

From neuroimaging studies, overactivity of the arousal, emotion-regulating, and cognitive systems may be involved in the pathophysiology of insomnia.

Component 4: Social Connectedness

“There is no hope of joy except in human relations.”

—Antoine de Saint-Exupery

Social connectedness

Physical and Social Pain May Share Similar Neural Circuitry

Affective regions (dACC, AI) and sensory regions (PI, S2) show neural activity in response to physical and social pain tasks.

Brain regions associated with social pain have been shown to overlap with regions that process physical pain.

AI, anterior insula; dACC, dorsal anterior cingulate cortex; PI, posterior insula; S2, secondary somatosensory cortex.

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Social Group Membership May Be Protective Against Relapse in Depression

In a study analyzing 4 years of population data of respondents with a history of depression (N=339), the number of groups a person belongs to was a strong predictor of subsequent depression.

In patients with a history of depression, belonging to more social groups predicted a lower rate of relapse.

Component 5: Nutrition

Nutrition

“It seems that the simple act of writing down what you eat encourages people to consume fewer calories.”
—Dr Jack Hollis
Center for Health Research, Kaiser Permanente

In elderly adults without dementia (N=674), high adherence to a Med diet, higher fish intake, and lower meat intake were associated with less brain atrophy, as measured by MRI.

*P<0.05 vs low.

Med diet, Mediterranean diet; MRI, magnetic resonance imaging.

In elderly adults without dementia (N=674), high adherence to a Med diet, higher fish intake, and lower meat intake were associated with more cortical thickness, as measured by MRI.

In this study of elderly adults, those eating a Med diet, more fish, and less meat had less brain atrophy.

Med diet, Mediterranean diet; MRI, magnetic resonance imaging.
Select Foods Are Associated With Diet-Related Chronic Illness

An assessment of 304 pooled/meta-analyses and systematic reviews showed the association of select foods with diet-related chronic disorders, such as CVD, cancer, obesity, and mental illness.

References indicating association with diet-related chronic diseases, %

- Whole grains: Protective association
- Fruits and vegetables: Protective association
- Fish: Protective association
- Wine: Protective association
- Dairy: Protective association
- Milk: Protective association
- Sweetened beverages: Protective association
- Red/processed meat: Protective association

Plant-based food groups are more protective against diet-related chronic diseases than animal-based food groups.

CVD, cardiovascular disease.
RESULTS FROM THE 30-DAY WILD 5 WELLNESS PROGRAM
Disclaimer

The resources and programs presented in this section are based on reviews of the recent scientific literature and publicly available, evidence-based professional society or government resources.

Dr. Jain developed the Wild 5 system described in the next section. The supporters of this educational content do not have vested interests in specific educational tools or resources and do not necessarily promote or condone the use of any one resource over another.

Healthcare professionals should use their own medical judgment in deciding whether a tool or resource is right for their practice.

Individuals should always seek advice from their treating doctor or other qualified professional before undertaking or considering a specific strategy.
WILD 5 Wellness

Wellness Interventions for Life’s Demands*

The WILD 5 Wellness Program is a simple, prescriptive, and trackable program that may lead to overall improvements in wellness

*Information based on Dr Jain’s own experience in psychiatric settings.
Simple Suggestions for Implementing Interventions Toward Achieving Wellness*

- Exercise 30 minutes 6 of 7 days per week for 30 days at moderate intensity
- Text or call a family member or friend daily for 30 days
- Log what you eat daily for 30 days
- Practice mindfulness >8 minutes each day for 30 days
- Implement pro-sleep hygiene practices each day for 30 days

*Information based on Dr Jain’s own experience in psychiatric settings.
### Examples of Pro-Sleep Hygiene Practices

1. Avoid electronic activities (including e-readers) 90 minutes before bedtime
2. Avoid napping during the day
3. Eliminate ambient light in your bedroom (e.g., light from clock radios, cell phones, and windows). Blackout shades or a night mask may also block out excess light
4. Take a warm relaxing bath or shower before bedtime
5. Establish and stick to a regular bedtime each night, including weekends
6. Avoid caffeinated drinks after 12:00 PM

Tracking Forms Are Available to Track Accountability

30-Day WILD 5 Wellness Program: Study Designs

Patients (N=133) were recruited from private practices in Texas, California, Oregon, and Canada\(^1,2\)

Study 1: Mental health (N=82)
All patients had a major psychiatric disorder\(^1\)

Study 2: Pain (N=51)
All patients had chronic pain\(^2\)

Both studies included wellness interventions\(^1,2\)
1. ≥30 minutes daily exercise
2. ≥8 minutes daily mindfulness meditation
3. Sleep hygiene interventions
4. Social connectedness enhancement
5. Nutrition optimization

Patients were assessed at baseline and at the end of the 30-day interventions on scales assessing\(^1,2\)
- Depression
- Anxiety
- Sleep quality
- Diet
- Mindfulness
- Social connectedness
- Emotional eating patterns

30-Day WILD 5 Wellness Program
Improved Depressive Symptoms: PHQ-9

Changes in PHQ-9 responses\textsuperscript{1,2,*}

\begin{itemize}
\item \textbf{43\% Improvement} \hspace{2cm} \textbf{43\% Improvement}
\item \begin{tabular}{ll}
Mental health study & \begin{tabular}{l}
Baseline: 11.4  \\
After 30-day intervention: 6.4
\end{tabular} \\
(N=82) & \\
\end{tabular}
\item \begin{tabular}{ll}
Pain study & \begin{tabular}{l}
Baseline: 11.9  \\
After 30-day intervention: 6.7
\end{tabular} \\
(N=51) & \\
\end{tabular}
\end{itemize}

PHQ-9, Patient Health Questionnaire 9.

*PHQ-9 is a 9-item scale with total score ranging from 0 to 27; lower score denotes improvement.\textsuperscript{3} †P<0.0001 vs baseline measurement.

30-Day WILD 5 Wellness Program
Improved Anxiety: GAD-7

Changes in GAD-7 responses$^{1,2,*}$

40% Improvement

<table>
<thead>
<tr>
<th>Mental health study (N=82)</th>
<th>Baseline</th>
<th>After 30-day intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean score</td>
<td>9.9</td>
<td>5.9</td>
</tr>
</tbody>
</table>

39% Improvement

<table>
<thead>
<tr>
<th>Pain study (N=51)</th>
<th>Baseline</th>
<th>After 30-day intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean score</td>
<td>10.3</td>
<td>6.2</td>
</tr>
</tbody>
</table>

GAD-7, generalized anxiety disorder 7-item scale.

*GAD-7 is a 7-item scale with total score ranging from 0 to 21. Lower score denotes improvement.$^3$ $^{†}p<0.0001$ vs baseline measurement.

30-Day WILD 5 Wellness Program
Improved Sleep Quality: PSQI

Changes in PSQI responses\textsuperscript{1,2,*}

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>After 30-day intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health study (N=82)</td>
<td>10.3</td>
<td>7.3</td>
</tr>
<tr>
<td>Pain study (N=51)</td>
<td>11.8†</td>
<td>8.3†</td>
</tr>
</tbody>
</table>

PSQI, Pittsburgh sleep quality index.

*PSQI is a 9-item scale with scores ranging from 0 to 27. Lower score denotes improvement.\textsuperscript{3} \textsuperscript{†} P<0.0001 vs baseline measurement.

30-Day WILD 5 Wellness Program
Improved Wellness: WHO-5

Changes in WHO-5 well-being index responses\textsuperscript{1,2,*}

\begin{align*}
\text{60\%} & \quad \text{Improvement} \\
\text{Baseline} & \quad 8.2 \\
\text{After 30-day intervention} & \quad 13.2
\end{align*}

\begin{align*}
\text{57\%} & \quad \text{Improvement} \\
\text{Baseline} & \quad 8.3 \\
\text{After 30-day intervention} & \quad 13.1
\end{align*}

WHO-5, 5-item World Health Organization well-being index.
\textsuperscript{*}WHO-5 is a 5-item scale with total score ranging from 0 to 25. Higher score denotes improvement.\textsuperscript{3} \textsuperscript{†}P<0.0001 vs baseline measurement.

“Wellness Deficit Disorder”

Not a recognized disorder, but should it be??
“Wellness Deficit Disorder” – will it be a part of the next DSM update?
## DSM-5 Diagnostic Category Changes

### THE DSM-5 GROUPS INCLUDE:

1. Neurodevelopmental Disorders
2. Schizophrenia Spectrum and Other Psychotic Disorders
3. Bipolar and Related Disorders
4. Depressive Disorders
5. Anxiety Disorders
6. Obsessive-Compulsive Spectrum
7. Trauma- and Stressor-Related Disorders
8. Dissociative Disorders
9. Somatic Symptom and Related Disorders
10. Feeding and Elimination Disorders
11. Sleep-Wake Disorders
12. Sexual Dysfunctions
13. Gender Dysphoria
14. Substance-Related and Addictive Disorders
15. Neurocognitive Disorders
16. Personality Disorders

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HERO: An Anonymous Online Survey

N = 757.
Who’s Your HERO?

1. Mother Teresa
2. Nelson Mandela
3. Dalai Lama
4. Martin Luther King Jr.
5. Abraham Lincoln
6. Malala Yousafzai
We All Have an Internal HERO

Agreed, but can we strengthen these wellness traits?
Let’s Take 5 & Check Our Inner HERO

HERO Wellness Survey
Anonymous Online Survey

N = 757.
### HERO Survey Results – Happiness

**Anonymous Online Survey**

<table>
<thead>
<tr>
<th>Condition</th>
<th>No Condition</th>
<th>Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>490</td>
<td>169</td>
</tr>
<tr>
<td>Age Range</td>
<td>25–86</td>
<td>18–81</td>
</tr>
<tr>
<td>Male:Female</td>
<td>170:320</td>
<td>32:137</td>
</tr>
<tr>
<td>Level of Happiness</td>
<td>6.5</td>
<td>4.9</td>
</tr>
</tbody>
</table>

**1. On average, during the last 7 DAYS, how happy have you felt?**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not at all happy</td>
</tr>
<tr>
<td>1</td>
<td>Mildly happy</td>
</tr>
<tr>
<td>2</td>
<td>Moderately happy</td>
</tr>
<tr>
<td>3</td>
<td>Highly happy</td>
</tr>
<tr>
<td>4</td>
<td>Extremely happy</td>
</tr>
</tbody>
</table>

N = 757.
HERO Survey Results – Enthusiasm
Anonymous Online Survey

2. On average, during the last 7 DAYS, how enthusiastic have you felt?

<table>
<thead>
<tr>
<th></th>
<th>0 Not at all enthusiastic</th>
<th>1 Mildly enthusiastic</th>
<th>2 Moderately enthusiastic</th>
<th>4 Highly enthusiastic</th>
<th>6 Extremely enthusiastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Condition</td>
<td>490</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health</td>
<td>169</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 757.
### Resilience

**HERO Survey Results – Resilience**

**Anonymous Online Survey**

<table>
<thead>
<tr>
<th>Condition</th>
<th>No Condition</th>
<th>Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Range</td>
<td>25–86</td>
<td>18–81</td>
</tr>
<tr>
<td>Male:Female</td>
<td>170:320</td>
<td>32:137</td>
</tr>
<tr>
<td>Level of Resilience</td>
<td>7.2</td>
<td>5.9</td>
</tr>
<tr>
<td><em>last 7 days</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. On average, during the last 7 DAYS, how resilient have you felt?

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not at all resilient</td>
</tr>
<tr>
<td>1</td>
<td>Mildly resilient</td>
</tr>
<tr>
<td>2</td>
<td>Moderately resilient</td>
</tr>
<tr>
<td>3</td>
<td>Highly resilient</td>
</tr>
<tr>
<td>4</td>
<td>Extremely resilient</td>
</tr>
</tbody>
</table>

N = 757.

4. On average, during the last 7 DAYS, how optimistic have you felt?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all optimistic</td>
<td>Mildly optimistic</td>
<td>Moderately optimistic</td>
<td>Highly optimistic</td>
<td>Extremely optimistic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 757.
5. On average, during the last 7 DAYS, how would you rate your mental wellness?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all good</td>
<td>Mildly good</td>
<td>Moderately good</td>
<td>Markedly good</td>
<td>Extremely good</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 757.
Based on this data, should we incorporate “Wellness Deficit Disorder” into our clinical thinking and conversations?

Before we decide, let’s look at something else that may help us make a well-informed decision about “Wellness Deficit Disorder”.

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The Neurobiology Behind HERO
Neurobiology of Positive Emotions
(such as Happiness, Enthusiasm, Resilience, and Optimism)

Positive Emotions, such as:
- Happiness
- Enthusiasm
- Resilience
- Optimism

Regions Involved in Positive Emotions:
- Ventral Striatum
- Amygdala
- Orbital PFC

Neurotransmitters Involved In Positive Emotional Processing:
- Dopamine
- GABA
- Opiate Receptors
- Endogenous Opiates
- Endogenous Endocannabinoids

GABA = gamma-aminobutyric acid; PFC = prefrontal cortex
Resilience (A Pillar of Mental Wellness) and Wellness Interactions

Wellness Interventions & Epigenetic Changes

Wellness Interventions (such as Exercise, Mindfulness, Sleep Hygiene, Social Connectedness, and Optimized Nutrition) through Epigenetic Mechanisms, promote Resilience in the Brain.

Can a Wellness Trait like Optimism Change the Brain?

Many studies have shown that dispositional optimism is beneficial to physical and psychological well-being. Participants with higher levels of optimism, compared with pessimists, have a lower risk of future cardiovascular disease.

Results: Individual dispositional optimism were significantly and positively correlated with gray matter volume in a cluster that mainly included areas in the left thalamus/left pulvinar, which extended to the left parahippocampal gyrus

- x = −14, y = −39, z = −1, cluster size = 748 voxels, t = 4.61, \(P < .05\)

Additionally, individuals with higher levels of Optimism have:

1. Lower activation of amygdala when viewing negative stimuli
2. Higher activation of ACC when viewing positive stimuli

ACC = anterior cingulate cortex.
Happiness and Its Relationship to Inflammation

Interferon γ – an Inflammatory Cytokine

Higher Perceived Happiness

LOWER Interferon γ levels

HIGHER Interferon γ levels

Lower Perceived Happiness

Additionally, touching and warm/positive emotion induction by touch of a loved one, REDUCED Interferon γ levels

Examining the Complex Interactions between Wellness and Resilience

**Resilience-promoting factors and approaches for child rearing**
- Loving and supportive environment (family, community, school, and society)
- Positive relationships with adults and peers
- Supportive, attentive and responsible parenting (especially maternal care)
- Prosocial romantic attachments
- Avoid repeated exposure to uncontrollable stress and trauma (e.g., abuse, war)
- Avoid early entry into adult roles (e.g., teenage pregnancy)
- Experiences of overcoming manageable life challenges
- Individual or group cognitive-behavioral trainings (e.g., stress inoculation training)
- Supportive, responsible foster care and adoption

**Psychosocial characteristics of Resilience**
- Realistic optimism
- Active coping and high coping self-efficacy
- High cognitive functioning and autonomy
- Planfulness, motivation, positive risk-taking
- Strong cognitive reappraisal and emotion regulation
- Secure attachment, trust
- Strong social skills and social network
- Self-confidence, positive identity
- Religious belief that gives meaning of life
- Humor, positive thinking
- Altruism, generosity

**Individual Characteristics & Behavior that promote Wellness/Resilience:**
- Optimism
- Active Coping
- Positive Recall
- Exercise
- Social Support
- Humor
- Physical Exercise

In Conclusion: What the Neurobiology of Wellness Teaches Us

- Wellness has a neurobiological & anti-inflammatory footprint

- Lower levels of Wellness have a negative neurobiological imprint. The reverse is equally true.

- Wellness traits can be improved via wellness practices/exercises
This is a **wellness program** so what about wellness markers?

Will we see improvements in what we’ve called a “**Wellness Deficit Disorder**”?

Let’s take a look…
WILD 5 Wellness Program: Wellness Markers

HERO Wellness Scale

- **Happiness**
  - Increased by 30%
  - (4.0 to 5.2; \( P < .0001 \))

- **Enthusiasm**
  - Increased by 51%
  - (3.3 to 5.0; \( P < .0001 \))

- **Optimism**
  - Increased by 45%
  - (3.7 to 5.4; \( P < .0001 \))

- **Resilience**
  - Increased by 63%
  - (3.3 to 5.4; \( P < .0001 \))

N = 82.
Based on this data, "Wellness Deficit Disorder" is changeable! With specific practices, we can strengthen our inner HERO.
Conclusions

Interventions that address specific areas of wellness (such as exercise, mindfulness, sleep, social connectedness, nutrition) may be of benefit in some clinical situations.

Measurement-based and tracking tools may be used to incorporate wellness interventions into clinical practice.

The combination of exercise, mindfulness, sleep, social connectedness, and nutrition provides an intervention that may improve wellness on the basis of a 30-day pilot program.
QUESTIONS
## Upcoming Virtual Fora*

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| Implementing Integrated Dual Disorder Treatment Programs: A Case Study | • Mark Lowis, MSW, LMSW  
• Jennifer Harrison, PhD, LMSW, CAADC | January 30  | 12:00pmET  |
| Caring For The Patient With Schizophrenia: Nursing, Pharmacy, & Social Work Perspectives | • Brooke Kempf, NP  
• Michael Townsend, MSW  
• Shauna Garris, PharmD | February 5  | 12:00pmET  |
| Antidepressant Utilization In Bipolar Disorder: What Is The Evidence? | • Gary Sachs, MD  
• Joseph Goldberg, MD | March 28    | 12:00pmET  |

*Register for these programs at https://www.PsychU.org/events*