Logbook 24-25

Rough Plan

Oct. 10 to Nov. 1- Choose topic (ASAP) and get the background information/research done

Nov. to Dec. – Get the first draft done

Winter Break – Edit first draft and make in the final draft

Oct. 10, 2024

Today I started to really consider what I was going to be doing for my science fair. My teacher explained to us what the science fair encompassed, and I realized that I am already very far behind all my peers (this is my first year at Louis Riel and prior to this I have never done a science fair or science project this large). I only started thinking of ideas today so this is going this is going to be quite messy.

Ideas for Science Fair:

- I like space and physics, so maybe something to do with astrophysics, What conditions need to be present on a planet in order for it to be able to sustain life?
- A little more specific (but totally different), What are some cancer treatment methods and what is the optimal one considering efficiency, cost, difficulty on the human body, difficulty preforming, and recovery?
- Computer science, What is the best way to protect your computer from being hacked/ data being stolen?, What are the most common hacking methods and how to avoid falling for the traps?, Cybersecurity, what is it and why is it so important? OR Somehow combine all of that into one question??maybe, maybe
- Superconductors (aka WHERE ARE THE FLYING CARS THAT WE WERE PROMISED??), How to make superconductors accessible and why aren't there room temperature superconductors?

Oct. 11, 2024

Had a good idea for science fair, but I am really struggling to find a topic I am truly passionate about and interested in.

Idea: water filtration/ water treatment, could do an experiment trying different methods to purify water contaminated with pathogens and dirt/river water, could try to develop my own water treatment method

Oct. 12, 2024

Have my top two ideas (not fully developed questions, but ideas):

- Psychological side effects of the covid-19 pandemic (the pandemic and presence of the virus, not actual effects from having the disease), Effects of the Pandemic, Adults and Children
- Water filtration and treatment methods (already explained on Oct. 11)

Oct. 14, 2024

(Edited Oct. 15, 2024, Oct. 23, 2024)

I finally decided on my topic today.

Question (to be edited): ~~What are the effects of war the mental health of civilians. (How does the person mentally change, short-lasting effects/long-lasting).~~ **What pharmacological treatment of panic disorder has proven to be the most optimal when considering, how quickly the mental state of the patient improves, how long the treatment lasts, the dropout rate, and how effective it is in treating the phycological and cognitive symptoms?** (Things in yellow may change according to what information I find available) (Oct. 23, 2024)

Since I can't really conduct any experiments for my chosen topic, I will have to chose how to do my research. So far, from what I've learned, my main two choices are meta-analysis and literature review (or I may do a rapid review as I have only about 2-3.5 months to do this). I don't know anything about either of those methods so let's start with that.

Meta-analysis

Overview: A meta-analysis is the statistical process of analyzing and combining results from several similar studies.

Pros:

- Greater statistical power
- Confirmatory data analysis
- Greater ability to extrapolate to general population affected
- Considered an evidence-based resource

Source: Meta-Analysis - Study Design 101 - Research Guides at George Washington University (gwu.edu)

Cons:

- Difficult to find appropriate studies
- Not all studies provide adequate data for your research and requirements
- Requires advanced statistical techniques
- Are very time consuming to write

Source: Meta-Analysis - Study Design 101 - Research Guides at George Washington University (gwu.edu)

I'm not sure about this as I don't have that much time to do this. It would require me to learn some statistics, and while I do like math, this isn't exactly the point of this science fair.

Note: When and how to perform a meta analysis | CW Authors states that it takes several months to do a proper meta-analysis.

Rapid Review

Overview: A rapid literature review (RLR) is an alternative to systematic literature review (SLR) that can speed up the analysis of newly published data. The objective is to identify and summarize available information to quicky get the answer to a question of interest. Source: Rapid literature review: definition and methodology - PMC (nih.gov)

Pros:

- Shorter time frame allows for quicker outcomes
- Uses fewer databases or limits types of studies
- Follow the same methods and protocols as a systematic review, although components can be simplified and can be omitted if required

Source: Introduction - Rapid Reviews - Library Guides at James Cook University (jcu.edu.au)

Cons:

- Reviews aren't as comprehensive as less databases are used
- Uses fewer databases or limit types of studies
- Interpretation of the findings can only be limited or cautious due to limitations in review process

Source: Introduction - Rapid Reviews - Library Guides at James Cook University (jcu.edu.au)

Note: According to Rapid Review vs. Systematic Review: What are the differences? – ISC (iscollab.org) rapid reviews usually take four months or less.

After looking at several websites and comparing the two options, I've decided to do a rapid review as it takes significantly less time than a systematic literature review or meta-analysis. Now all that's left to do is to do the background research, find good and reliable sources, write the essay, and make the presentation. Sounds easy, right?

Oct. 29, 2024

Did a lot of reading on rapid reviews the past couple of days, and now I understand what to do, which is nice because before I didn't.

Sources about rapid reviews: Steps: Rapid Review - Rapid Review Protocol - Research Guides at Virginia Commonwealth University, How to Conduct A Rapid Review.pdf

Nov. 3, 2024

I haven't had much time to work on my science fair project. I'm still trying to figure out how to do a rapid review but I hope that in the next few days/weeks I can get back on track.

Background Information:

Oct. 17, 2024 (Edited: Oct. 19, 2024, Oct. 29, 2024, Nov. 3, 2024, Nov. 14, 2024, Nov. 15, 2024, Nov. 17, 2024)

What is mental health?

- Psychological/mental **wellbeing**
- Not just the presence or absence of mental disorders, but also phycological wellbeing (**Am I ok?** Etc.)
- Can **impact our physical health**
    - Ex. Anxiety/ depression leads to insomnia that leads to higher ricks to physical heath such as high blood pressure/ heart problems, from:
- Mental health directly impacts **nervous system**, but can indirectly impact other systems such as cardiovascular (heart, blood), endocrine (glands, hormones), and immune systems (antibodies, white blood cells)
- Most people start to experience mental health problems when exposed to **poverty, violence, disability and inequality**
    - Ex. War, racism, sexism, geopolitical unrest, debt, poor financial situation, etc.
- Usually easily treatable, but the topic is not often talked about/ help provided can be very poor quality.
- Includes **mental disorders** and **psychosocial disabilities**
    - People with these types of conditions are **more likely to experience lower levels of mental well-being**, but this is not always or necessarily the case.
- According to WHO, in 2019, **970 million people** globally were living with a mental disorder, with **anxiety** and **depression** the most common
- On average, people with severe mental disorders will die 10-20 years than the average human lifespan
    - Serious mental illness (SMI) include but are not limited to:
        - psychotic disorders
        - bipolar disorder
        - major depression with psychotic symptoms
        - treatment-resistant depression

Sources:

- Background - Disparities Within Serious Mental Illness - NCBI Bookshelf
- Mental health
- In brief: What are the organs of the immune system? - InformedHealth.org - NCBI Bookshelf, Understanding insomnia as systemic disease

- Insomnia: Definition, Symptoms, Causes, Diagnosis, and Treatment (webmd.com)

What can make you more prone to having mental health problems?

- Being exposed to **risk factors** can make people more prone to developing a **mental health condition**, but many people who are exposed to risk factors do not, and vice versa, people who aren't exposed to risk factors can develop conditions
- In the case of my project the risk factor will be **war**
- Certain **genetic factors** can make you more prone to mental illnesses just like with physical health problems such as diabetes
    - Ex. History of depression in family

Source: Mental illness - Symptoms and causes - Mayo Clinic

What is panic disorder? (Nov. 14, 2024)

- People with panic disorder experience frequent and unexpected **panic attacks**
    - Panic attacks are the core symptom of panic disorder
- Panic attacks are a very sudden a **wave fear or discomfort or a sense of losing control** even when there is no clear danger or trigger
    - They can hit out of nowhere, like a brick wall
- Not everyone who has a panic attack will develop panic disorder, as they will likely never happen again after the stressful time ends
    - **Panic disorder develops when panic attacks are frequent/recurrent**
    - Patients with panic disorder are usually preoccupied with fear of having more attacks, some even go about changing their entire lives to prevent them
- When a patient is experiencing a panic attack, they may think that they are having a heart attack or that they're dying

Symptoms of panic disorder:

- Sudden and repeated panic attacks of overwhelming anxiety and fear
- A feeling of being out of control, or a fear of death or impending doom during a panic attack
- An intense worry about when the next panic attack will happen
- A fear or avoidance of places where panic attacks have occurred in the past
- Physical symptoms during a panic attack, such as:
    - Pounding or racing heart
    - Sweating
    - Chills

- Trembling
- Difficulty breathing
- Weakness or dizziness
- Tingly or numb hands
- Chest pain
- Stomach pain or nausea

Information derived from: Panic Disorder: When Fear Overwhelms - National Institute of Mental Health (NIMH)

What are treatments for panic disorder?

- Panic disorder is generally treated with psychotherapy (talk therapy/cognitive behaviour therapy) and/or medications
    - In the case of my research, I will only be looking at medications
- Treatments are prescribed according to your preference, medical history, severity of the panic disorder, and availability of healthcare providers that specialize in panic disorders and ones who can prescribe medication
    - What medication is best is usually chosen by the patient themselves, but for the sake of this project I will be using standardized data gathered from many patients
- The three **medications** used for treatment of panic disorder are:
    - **Antidepressants**
        - SSRIs (selective serotonin reuptake inhibitors) and SNRIs (serotonin-norepinephrine reuptake inhibitors)
    - **Beta blockers**
        - Control physical effects of panic disorder rapid heartbeat, sweating, etc.)
    - **Benzodiazepines (Anxiety Medication)**
        - Sedatives, central nervous system depressants

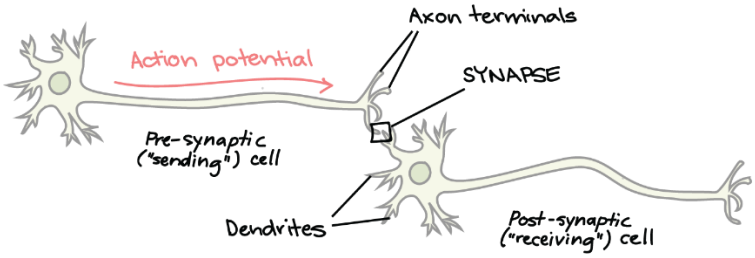
Information derived from: Panic Disorder: When Fear Overwhelms - National Institute of Mental Health (NIMH)

Was compared to information from Panic Attacks & Panic Disorder: Causes, Symptoms & Treatment and Panic attacks and panic disorder - Diagnosis and treatment - Mayo Clinic to ensure credibility

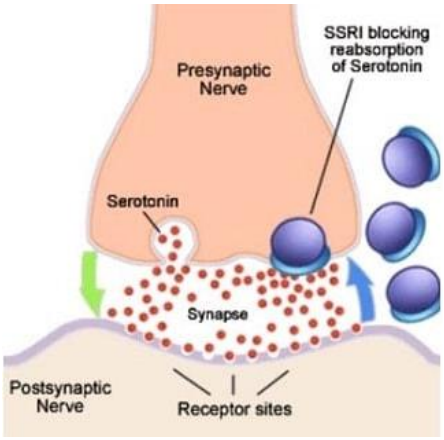
In this project I will only be comparing antidepressants (likely SSRIs) and benzodiazepines, as only hey directly treat the phycological symptoms of panic disorder.

How do antidepressants (SSRIs) work?

- Created to treat depression but has proven to be able to treat other mental health conditions including panic disorder and a number of other anxiety disorders
    - **Selective serotonin reuptake inhibitors (SSRIs)** are the most common antidepressant prescribed to treat panic disorder
    - Prescribed more often than other antidepressants because it has relatively less side effects
- SSRIs work by affecting the use of **serotonin**, a **neurotransmitter**, in the brain
    - Neurotransmitters are **messenger chemical** that carries signals between nerve cells, called **neurons**, in the brain
    - SSRIs are called selective because they mainly only affect serotonin rather than other neurotransmitters
    - Serotonin is believed to positively affect mood, emotion, and sleep
- Very basically, SSRIs work like this:
    - After carrying a message/signal the serotonin would usually be reabsorbed by the nerve cells (reuptake)
    - The SSRI would then block (inhibit) the reuptake, meaning more serotonin is available to pass further messages between nearby nerve cells
    - They do not stimulate the brain into producing more serotonin, but rather make the brain use it more efficiently
    - Its wrong to say that depression and other similar mental illnesses are caused only be low serotonin levels, so this would not be solving the entire problem, but it does still help patients
        - It can also make patients more responsive to other forms of treatment
- More in depth, SSRIs work like this:
    - During neurotransmission when the serotonin is released into the **synaptic cleft** (also called the synaptic gap or synapse), the serotonin can either be transported to receptors on the **postsynaptic** neuron (important for this), destroyed by enzymes (not important for this), or reabsorbed back into the **presynaptic** neuron, which releases the neurotransmitter (this is important)
        - The last described process is called **reuptake**
    - SSRIs work by inhibiting or blocking the reuptake of serotonin into the presynaptic neuron
        - Because of this more serotonin will remain in the synaptic cleft, meaning that the likeliness of it reaching the receptors on the postsynaptic higher
        - If this happens, more serotonin will be working in the brain, resulting in increases in mood and feelings of happiness, because that is what serotonin does
            - Instead making more serotonin the brain uses the serotonin it already has better/more efficiently



Picture for context, Credit: The synapse (article) | Human biology | Khan Academy



Another picture for context, Credit: Types of Antidepressants and How They Work

Source: Types of Antidepressants and How They Work

Information was compared to information from Overview - SSRI antidepressants - NHS, Selective serotonin reuptake inhibitors (SSRIs) - Mayo Clinic, and Selective Serotonin Reuptake Inhibitors - StatPearls - NCBI Bookshelf for credibility

What are benzodiazepines?

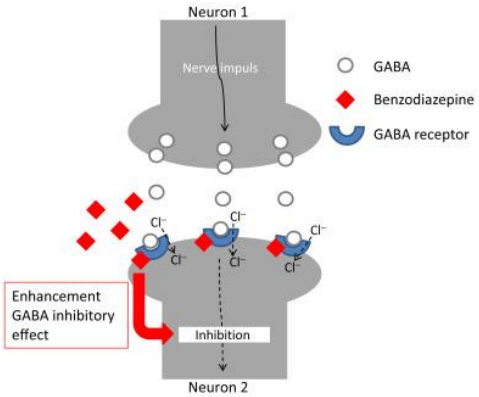
- Benzodiazepines are central nervous system (CNS) depressants
    - It is slightly unclear as to how they work
- CNS depressants slow down brain activity and because of that effects such as anterograde amnesia (temporarily block of the formation of new memories) may occur
- Benzodiazepines are often used to treat anxiety and similar mental health conditions
    - Its distribution is very limited, and they can only be bought with a prescription
        - Benzodiazepines are controlled because they can have dangerous effects and side effects, especially when misused
            - If your nervous system's activity drops too low, it can have dangerous or even deadly effects
        - They can also be very addictive, so they are not recommended to patients that have had problems with substance and drug abuse

- CNS depressants are a broad category of medication (which include but are not limited to benzos) that are split into three categories/types
    - The types are as follows:
        - Sedatives
        - Hypnotics
        - Tranquilizers
    - They all work a bit differently and have slightly different effects but generally they all lower brain activity

Sources: Benzodiazepines: What They Are, Uses, Side Effects & Risks, CNS Depressants: How Do They Impact Your Health?

Information was compared to information from Central Nervous System Depressants for credibility

- Benzos work by enhancing the effects of GABA
    - GABA is a neurotransmitter that lessens the ability of a nerve cell to receive, create or send chemical messages to other nerve cells
    - It is known for producing a calming effect
- GABA inhibits the activity of signal-receiving neurons by interacting with the $GABA_A$ receptor, which are a channel-forming protein, on these cells
    - When GABA molecules connect to their receptor and activate it, the channel of the receptor temporarily opens and allows the passage of negatively charged molecules (chloride ions), to go inside the cell
        - This lowers the cell's excitability (cell's ability to make electrical signals)/nerve impulses (response to stimulation through electrical reaction, action potential), meaning that it's response to a stimulus will be slowed, decreased, or stopped (in the worst-case scenario)
        - When this happens on a large scale it slows down the central nervous system, thus the name, Central Nervous System Depressants
- To enhance the effects of GABA, benzos attach themselves to $GABA_A$ receptors or the area around them allowing more chloride ions to pass through, decreasing the response to stimuli



Picture for context, Credit: J.M. Marraffa, in Encyclopedia of Toxicology (Third Edition) , 2014 in Benzodiazepine - an overview | ScienceDirect Topics

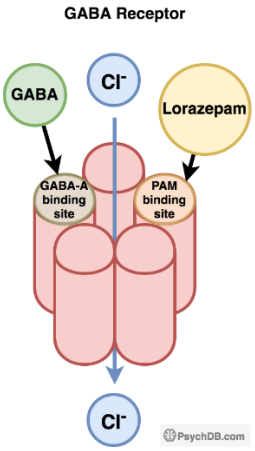
Definitions (for picture, as it doesn't provide enough information):

Nerve Impulse – Action potential

Neuron 1 – Presynaptic neuron

Neuron 2 – Postsynaptic neuron

Cl- – Chloride Ion



Another picture for context, Credit: Introduction to Benzodiazepines - PsychDB

*Lorazepam is a type of benzo

Nov. 22, 2024

Yesterday I submitted my project for review by the ethics and care committee. Still waiting for a response.

Almost finished background research report. Used graphic organizers provided by school, really helped.

Nov. 26, 2024

Finished background research and got feedback from Pelayo.

Main feedback-

- Good overall
- Work on wording clarity
- Check what type of citations are needed
    - I'm supposed to do APA citations

Resources for research and writing

How to Use Endnote

Step 5. Remove Duplicate Records - Systematic Search for Systematic Review - Guides & Tutorials at The Hong Kong Polytechnic University

?

Chapter 9 Methods for Literature Reviews - Handbook of eHealth Evaluation: An Evidence-based Approach - NCBI Bookshelf

Information Diagram

PRISMA Flow Diagram Example - DistillerSR

APA Citation Generator

Free APA Citation Generator | With Chrome Extension - Scribbr

Nov. 27, 2024

RESEARCH

Exclusion Criteria

Studies that cannot be easily accessed or fully accessed.

Studies that were done poorly according to an assessment.

Studies that were funded by a private organization and may be biased.

Studies that do not directly compare SSRIs and benzodiazepines.

Studies with patients with other mental of physical conditions that could impact the result, ie. agoraphobia.

EDIT (Dec. 23, 2024) Unfortunately, due to the lack of available articles I am forced to include studies where patients have agoraphobia.

Inclusion criteria

Studies in English are preferred.

Studies of good quality and not biased.

Studies published in the last 15 years.

Studies with patients from 25 to 55 years of age (range = 30)

Studies with a sufficient amount of subjects (n > 25)

Studies with appropriate patient ages (n > 25).

Studies that have been verified and peer reviewed.

The following types of studies are preferred:

- Systematic reviews
- Meta- analyses
- Clinical trials

Studies that reference one or more of the following criteria:

- How quickly the mental state of the patient improves (how quickly the medicine goes into effect),
- How long the medication is allowed to be prescribed,
- Dropout rate,
- How effective it is in treating the psychological and cognitive symptoms

Databases (yellow was used):

- Embase, https://www.embase.com/
- ScienceDirect, https://www.sciencedirect.com/

- Scopus, https://www.scopus.com/home.uri
- Psycnet, https://psycnet.apa.org/home
- PubMed, https://pubmed.ncbi.nlm.nih.gov/
- Cochrane Library, https://www.cochranelibrary.com/
- CINAHL/EBSCO, EBSCO Information Services
- PsycINFO, APA PsycInfo

Dec. 1, 2024

Filter was set to prevent studies more that were published more than 15 years ago from this day (Dec. 1, 2024) from showing up in results (only on PubMed and Science Direct because I couldn't figure out how to do it on the other databases, I excluded articles that were too old from other databases by hand by during the screening process).

Search terms used:

- Panic Disorder AND Benzodiazepine AND SSRI
- Panic Disorder AND Benzodiazepines AND SSRIs
- Panic Disorder AND Pharmacological AND Treatments
- Panic disorder AND Treatment (only on Psycnet)

Search Results:

PubMed: (n=90)

Science Direct: (n=1111)

Psycnet: (n=243)

Cochrane Library (n=15)

Screening

All results were exported to EndNote.

Then, 180 duplicates were removed using the duplicate remover.

The remaining articles were screened manually.

Dec. 11, 2024

Screening continues, several articles were selected to go onto the next screening level. Found article comparing two SSRIs that doesn't exactly fit the 15-year time frame but can be used as a last resort.

https://pubmed.ncbi.nlm.nih.gov/11434404/

Dec. 19, 2024

Screening. Shall I say more?

Dec. 23, 2024

I really hope that I finish in time. Screening has proven to be a very long and tedious process, and I still will need to write the entire report afterward. I think I will start to write the report while I'm screening as some things, such as the introduction, can be written without any data.

Found a resource to help with writing the introduction.

Introductions - Writing: Literature Review Basics - AZHIN at Arizona Health Information Network

I may be able to use these two articles.

Antidepressants and benzodiazepines for panic disorder in adults - PMC

Cons:

- Little direct information
- Doesn't directly compare benzodiazepines and SSRIs

SciELO Brazil - Psychopharmacotherapy of panic disorder: 8-week randomized trial with clonazepam and paroxetine

Cons:

- Includes patients with and without agoraphobia

Dec. 24, 2024

Not in timeframe, doesn't clearly compare benzodiazepines and SSRIs but its better than nothing

(PDF) Meta-analysis of randomized controlled comparisons of psychopharmacological and psychological treatments for anxiety disorders

Good one but a lot of confusing graphs

Antidepressants and benzodiazepines for panic disorder in adults - PubMed

May be completely useless but can have useful references

Psychological therapies versus pharmacological interventions for panic disorder with or without agoraphobia in adults - PubMed

Dec. 26, 2024

Great but closed access:

Selective serotonin reuptake inhibitors and benzodiazepines in panic disorder: A meta-analysis of common side effects in acute treatment - PubMed

Risks and benefits of medications for panic disorder: a comparison of SSRIs and benzodiazepines - PubMed

Dec. 27, 2024

Great info and open access:

Drug treatment for panic disorder with or without agoraphobia: systematic review and network meta-analysis of randomised controlled trials - PMC

I'll probably finish the introduction (LATER THAT DAY (9 pm): never mind) and the screening today. There's a chance this might actually work, but I don't want to jinx it.

Updated: Dec. 29, 2024

Schedule:

2024

Day	To-Do	What was done
DEC 29	Select articles and studies to use in rapid review Fill in PRISMA table *if time allows, do quality/bias assessment	Selected articles that are going to be used Finished PRISMA table
DEC 30	Unless already done, complete quality/bias assessment Find psychiatrist to email, prepare email, think of questions to put on email Analyse data found in articles and start putting into graphs	Wasted time on a quality assessment and trying to find a bias assessment I can use and decided to hold off on both Started writing email Watched Crash Course videos to learn statistics
DEC 31	Finish email and let someone proofread it Finish putting data into graphs	Finished email Learned more statistics and understand data better Looked for common data in articles Sent email to ask about bias and quality assessments Finished agoraphobia section in background research

2025

Day	To-Do	What was done
JAN 1	Write introduction and method – consult PRISMA guidelines and Cochrane Handbook for Systematic reviews	Finished introduction and objective sections

JAN 2	Write method section Find common data in articles and try to put them in graphs	Finished method section Looked at possible presentation templates on SlidesGo Tried to find psychiatrist to email
JAN 3	Write and send email	Wrote email for Dr. Bousman from U of C Chose presentation template
JAN 4	Put data into graphs Make chart of study characteristics	Put data into rough charts Made characteristics of studies chart
JAN 5	Start results section	Started results section

On the 29th of December, I have finally selected my articles. There are four of them. They have a lot of math in them, but nonetheless, I am quite happy that I was able to find any at all.

:)

Update: Jan. 2, 2025

For some reason number 4 is not longer open access, also it refers to all of the anxiety disorders as one, so never mind.

Full-Text Links:

1.Antidepressants and benzodiazepines for panic disorder in adults - PMC

2. Drug treatment for panic disorder with or without agoraphobia: systematic review and network meta-analysis of randomised controlled trials - PMC

3. Pharmacological treatments in panic disorder in adults: a network meta-analysis - PMC

4. Trajectory and magnitude of response in adults with anxiety disorders: a Bayesian hierarchical modeling meta-analysis of selective serotonin reuptake inhibitors, serotonin norepinephrine reuptake inhibitors, and benzodiazepines | CNS Spectrums | Cambridge Core (EXCLUDED)

Because 75% of articles I chose are meta analysis and the remaining one has a meta analysis inclinations, I will have to watch a lot of crash course and random tutorial videos.

REMINDER:

The PRISMA tool for flow charts wants to be cited – don't forget

Dec. 30, 2024

For some reason I cannot figure out which bias assessment tool to use or how to use it. I think I'm supposed to use ROBVIS as it is most commonly used for systematic reviews. Unfortunately, the website will not work.

Using AMSTAR-2 for quality assessment

It's a long checklist but I should get through at least two (articles) today.

Never mind, that quality assessment turned out basically useless.

Dec. 31, 2024

Email for expert (psychiatrist):

Dear _____,

I am a student at Louis Riel School in the 8th grade and I am participating in my school's science fair to have a chance to attend CYSF (Calgary Youth Science Fair). I have several questions I would like to ask you or a different member of your clinic regarding my project – I am currently in the process of writing a literature review comparing SSRIs and benzodiazepines for the treatment of panic disorder with or without agoraphobia. I was hoping that you could answer some of the questions that I have or refer me to somebody else who would be able to (the questions are related to the treatment of anxiety disorders, particularly panic disorder, with medication).

1. As a psychiatrist, how do you develop treatment plans? What are some of the things you consider?

2. What is usually your first recommended treatment after a panic disorder diagnosis? Would it be CBT or an intervention with medication?

3. SSRIs are typically considered the first line of medication for panic disorder rather than benzodiazepines because of the latter's higher risk of adverse effects and addition, but have you seen any difference in the outcome (rate of remission)?

4. At the end of treatment, are people generally more pleased with the outcomes from SSRIs or benzodiazepines? Are there any trends or is it individual to every patient?

5. Do you feel like enough research was done to explain the effects of psychotropic medications on the human central nervous system?

6. How often do you find that you have to prescribe an off-label medication for panic disorder? What is the main reason?

7. Overall, do you find that you prescribe more SSRIs or benzos? Is there a particular reason for that?

8. When analysing the data I've gathered I noticed that benzodiazepines have a lower dropout rate than SSRIs despite having more adverse effects. Does that happen because most prescribed benzodiazepines are fast acting so patients see an almost instant improvement?

Thank you so much for thanking the time to read my email and respond to the questions. I hope you have a wonderful rest of your day.

Dec. 31, 2024

Common Data:

#1 and #2:

- Dropout rate
- Not quite common but it was failure to remit (1) and remission rates (2)
- Depression and anxiety score but for 1 it didn't specify what measurement was used
- Adverse effects but they were measuring just slightly different things

Jan. 3, 2025

Email for expert (professor):

Dear _____,

I am a student at Louis Riel School in the 8th grade and I am participating in my school's science fair to have a chance to attend CYSF (Calgary Youth Science Fair). I have several questions I would like to ask you

or a different member of your department regarding my project – I am currently in the process of writing a literature review comparing SSRIs and benzodiazepines for the treatment of panic disorder with or without agoraphobia in adults. I was hoping that you could answer some of the questions that I have or refer me to somebody else who would be able to (the questions are primarily related to the treatment of anxiety disorders, particularly panic disorder, with medication).

1. While there is no clear cause for panic disorder genetic and environmental risk factors have been identified. Is it possible that this disorder is caused by epigenetics? If so, can gene therapy be an option for patients in the future? If it is not possible that the disorder is caused by epigenetics why is that?

2. Panic attacks in panic disorder are known to be seemingly untriggered, but abnormalities relating to serotonin (5-HT) were linked to them. Is the problem with the production of serotonin (not enough serotonin being produced or the brain "doesn't know/can't" produce it, kind of like with diabetes, explaining why SSRIs don't work for everyone) or is it with the serotonin receptor (does not signal properly or doesn't properly bind with serotonin)? Is it possible that the seemingly untriggered panic attacks (in panic disorder) are like the body's reaction to a deficiency from serotonin, almost like a withdrawal reaction?

3. Do you feel like enough research was done to explain the effects of psychotropic medications on the human central nervous system? What are the limitations of such research?

4. Are SSRIs and benzodiazepines a "mask" and just temporarily "hide" the symptoms (high rate of relapse, even if it takes several years) or can they make substantial long-term changes (lower rate of relapse)? If it is the latter, how does it happen since the effects of the medication eventually wear off? Is the patient simply calmer allowing more serotonin to be produced?

5. SSRIs are typically considered the first line of medication for panic disorder rather than benzodiazepines because of the latter's higher risk of adverse effects and addition, but have you seen any difference in the outcome (rate of remission)?

6. Are SSRIs and benzodiazepines a "mask" and just temporarily "hide" the symptoms (high rate of relapse, even if it takes several years) or can they make substantial long-term changes (lower rate of relapse)? If it is the latter, how does it happen since the effects of the medication eventually wear off? Is the patient simply calmer allowing more serotonin to be produced?

Thank you so much for taking the time to read my email and respond to the questions. I hope you have a wonderful rest of your day.

Regards,

Anastasiya Khomichenko

Student

Louis Riel School

Calgary

Emailed this email to Dr. Chad Bousman for the University of Calgary.

Jan. 4, 2025

Chart of common data of interest:

	Dropout rate	Remission rate	Adverse effects
Bighelli et al. (2016)		(Has fail to remit only)	
Chawla et al. (2022)			
Guaiana et al. (2023)			

Data Table

	Dropout	Remission	Adverse effects
Bighelli et al. (2016)	(RR 1.71, 95% CI 1.03 to 2.84) SSRIs vs BZDs Reversed stats: (RR 0.58 95% CI = 0.35 to 0.97)	*Failed to remit (RR 1.12, 95% CI 0.79 to 1.59) SSRIs vs BZDs Slightly more people failed to remit in the BZDs category but didn't cross equivalence range – No difference Reserved (BZDs vs SSRIs) stats for remission are the same as original because you just reverse it twice	(RR 1.03, 95% CI 0.92 to 1.15) SSRIs vs BZDs No difference Reserved (BZDs vs SSRIs) stats for less averse effects are the same as original because you just reverse it twice
Chawla et al. (2022)	(RR 0.51, 95%CI 0.38 to 0.67) BZDs vs SSRIs	(RR 1.07, 95% CI 0.96 to 1.19) BZDs vs SSRIs	(RR 1.47, 95% CI 1.18 to 1.84) BZDs vs SSRIs

		But not statistically significant	(SSRIs have less adverse effects)
Guaiana et al. (2023)	(RR 0.62, 95% CrI 0.44 to 0.83) BZDs vs SSRIs	-	-

Characteristics of studies

Author	Study Type	Published	Agoraphobia	Group	Sample Size	Age (years ± SD)
Bighelli, I	Systematic Review	2016	Some	SSRIs	77	39.1 ± 11.1
				BZDs	77	39.5 ± 12.5
Chawla, N.	Systematic Review and Network Meta-Analysis	2022	Some	SSRIs	77	NA
				BZDs	83	NA
Guaiana, G.	Network Meta-Analysis	2023	Some	SSRIs	452	NA
				BZDs		NA

Jan. 5, 2025

Got a response from Dr. Bousman. He answered all my questions, I'll copy the answers below.

The email:

Hi Anastasiya,

These are good questions. I have provided some thoughts for you to consider. Hope this helps you with your project. Good luck!

1. Yes, it is possible that panic disorder has an epigenetic component. Gene therapy, though not yet feasible for panic disorder, holds potential as our understanding of the epigenetic and genetic underpinnings of psychiatric disorders grows. However, the complexity of panic disorder, means that any future treatments will likely need to address multiple biological and psychological systems, not just genetic or epigenetic factors alone.

2. Serotonin dysregulation in panic disorder likely involves a combination of production, release, and receptor function abnormalities. While it's not entirely accurate to liken panic attacks to a serotonin "withdrawal", the

analogy captures the idea that serotonin dysfunction might mimic a deficiency state, leading to over-activation of the brain's panic pathways. Addressing this complexity may require personalized treatments targeting both serotonin and other involved systems, such as the GABAergic and noradrenergic pathways.

3. In short, no. While considerable progress has been made, the understanding of psychotropic medications is far from complete. Limitations in research methods, the complexity of the CNS, and individual variability make it difficult to fully explain how these drugs work or why they fall short for some patients. Addressing these gaps requires a multidisciplinary approach, combining advanced neuroscience, genetics, and patient-centered studies to develop safer and more effective treatments.

4. Benzodiazepines generally “mask" symptoms without inducing long-term changes and are best used as short-term or adjunctive treatments. SSRIs have the potential to create lasting changes in brain function and structure, particularly when combined with psychotherapy or behavioral interventions. However, their effects vary, and relapse is common if underlying vulnerabilities are not addressed. The key to long-term success often lies in a combination of medication, therapy, and lifestyle changes, addressing both the biological and psychological aspects of the disorder.

5. Studies suggest that remission rates for SSRIs and benzodiazepines are similar in the short term, but SSRIs are more effective in maintaining remission over time. SSRIs are preferred for panic disorder because they offer better long-term outcomes and fewer risks of adverse effects. Benzodiazepines are best reserved for short-term use or adjunctive therapy during acute phases. Combining SSRIs with psychotherapy is the most effective approach to achieving and maintaining remission in panic disorder.

Best,
Chad

Jan. 8, 2025

Asked a lot of teachers about statistics but they couldn’t really help me. I think that I won’t do the meta-analysis unless I get selected for CYSF. Instead, I’ll just present my results in a narrative way.

Jan. 12, 2025

My research question:

What are the comparative results of benzodiazepines versus selective serotonin reuptake inhibitors (SSRIs) in the treatment of panic disorder with or without agoraphobia in adults when considering dropout rate, rate of remission, and adverse effects?

Jan. 16, 2025

Making graphs for results section

Table of raw data

Outcomes

Study Name	Dropout Rate	Remission	Adverse Effects
Bighelli et al. (2016)	(RR 1.71, 95% CI 1.03 to 2.84) SSRIs vs BZDs	*Failed to remit (RR 1.12, 95% CI 0.79 to 1.59) SSRIs vs BZDs	(RR 1.03, 95% CI 0.92 to 1.15) SSRIs vs BZDs
Chawla et al. (2022)	(RR 0.51, 95%CI 0.38 to 0.67) BZDs vs SSRIs	(RR 1.07, 95% CI 0.96 to 1.19) BZDs vs SSRIs	(RR 1.47, 95% CI 1.18 to 1.84) BZDs vs SSRIs
Guaiana et al. (2023)	(RR 0.62, 95% Crl 0.44 to 0.83) BZDs vs SSRIs	-	-

Outcomes (Risk Ratios and Confidence Intervals)

Study Name	Dropout Rate	Remission	Adverse Effects
Bighelli et al. (2016)	(RR 0.58 95% CI 0.35 to 0.97) BZDs vs SSRIs	(RR 1.12, 95% CI 0.79 to 1.59) BZDs vs SSRIs	(RR 1.03, 95% CI 0.92 to 1.15) BZDs vs SSRIs
Chawla et al. (2022)	(RR 0.51, 95%CI 0.38 to 0.67) BZDs vs SSRIs	(RR 1.07, 95% CI 0.96 to 1.19) BZDs vs SSRIs	(RR 1.47, 95% CI 1.18 to 1.84) BZDs vs SSRIs

Jan. 17, 2025

Going to start writing discussion tomorrow. Not really sure how to do it so I'll just try to follow this checklist.

1. Begin with a clear statement of the principal findings. This will reinforce the main take-away for the reader and set up the rest of the discussion.

2. Explain why the outcomes of your study are important to the reader. Discuss the implications of your findings realistically based on previous literature, highlighting both the strengths and limitations of the research.
3. State whether the results prove or disprove your hypothesis. If your hypothesis was disproved, what might be the reasons?
4. Introduce new or expanded ways to think about the research question. Indicate what next steps can be taken to further pursue any unresolved questions.
5. If dealing with a contemporary or ongoing problem, such as climate change, discuss possible consequences if the problem is avoided.
6. Be concise. Adding unnecessary detail can distract from the main findings.

Credit: How to Write Discussions and Conclusions - PLOS

Jan. 18, 2025

Just finished writing out the results, going to start on the individual graphs from the sections.

Dropout rate

Study Name	Risk Ratio	Confidence Interval (95%)
Bighelli et al. (2016)	0.58	0.35 to 0.97
Chawla et al. (2022)	0.51	0.38 to 0.67
Study Name	Risk Ratio	Credible Interval (95%)
Guaiana et al. (2023)	0.62	0.44 to 0.83

Remission Rate

Study Name	Risk Ratio	Confidence Interval (95%)
Bighelli et al. (2016)	1.12	0.79 to 1.59
Chawla et al. (2022)	1.07	0.96 to 1.19

Adverse effects

Study Name	Risk Ratio	Confidence Interval (95%)
Bighelli et al. (2016)	1.03	0.92 to 1.15
Chawla et al. (2022)	1.47	1.18 to 1.84

I think I'm going to call my review a systematic review as it more fits into that category.

Jan. 23, 2025

Showed report to Ms. Davis and a couple others, said it was all good.

Started to work on presentation and trifold.

Jan. 28, 2025

Kind of starting to freak out about science fair because my trifold isn't done, but its going to be fine.

Jan. 29, 2025

It might not be fine.

Jan. 30, 2025

Never mind, it's fine.

Feb. 5, 2025

Got selected for CYSF!!

Feb. 6, 2025

Things to do before CYSF:

- Meta analysis (maybe)
- Contact more experts and maybe try to do some hands-on lab work
- Learn more about the chemical properties of the medication
- Learn about connections to chemistry that my project has

Feb. 8, 2025

Judge's feedback:

Areas of Strength

- Comprehensive understanding and analysis of the scientific material

- Clear process for identifying relevant studies and rationale for including or excluding research papers

- Full scientific paper was written

- Sources were properly cited

- Effort was taken to streamline information presented for non-specialist audience

- Polite, well-spoken, spoke directly to judges, well-prepared to present

- Overall exceptionally executed

- Clear passion and investment in the research and its outcomes.

Areas for Growth

- Visual is perhaps a /bit/ text heavy - we could maybe reduce the analysis, conclusions to key bullets

Feb. 14, 2025

Preparing data for meta analysis:

- BZDs vs SSRIs
- RRs and Cis
- Guaiana et al. (2023) is excuded because it's Bayesian

	Dropout	Remission	Adverse effects
Bighelli et al. (2016)	(RR 0.58 95% CI = 0.35 to 0.97)	(RR 1.12, 95% CI 0.79 to 1.59)	(RR 1.03, 95% CI 0.92 to 1.15)
Chawla et al. (2022)	(RR 0.51, 95%CI 0.38 to 0.67)	(RR 1.07, 95% CI 0.96 to 1.19)	(RR 1.47, 95% CI 1.18 to 1.84)

sample size:

SSRIs – 154

BZDs – 160

Code:

Step 1- Prepare Data

```
meta_data <- data.frame(
  study   = c("Bighelli et al.", "Chawla et al."),
  RR      = c(0.58, 0.51),
  CI_lower = c(0.35, 0.38),
  CI_upper = c(0.97, 0.67),
  n1      = c(77, 77),
  n2      = c(77, 83)
)
```

Step 2- Convert to LogRR (required for meta package)

```
meta_data$logRR <- log(meta_data$RR)
meta_data$SE <- (log(meta_data$CI_upper) - log(meta_data$CI_lower)) / 3.92
```

Step 3- Conduct Meta-Analysis

```
m <- metagen(TE = logRR,
             seTE = SE,
             studlab = study,
             data = meta_data,
             sm = "RR",
             comb.fixed = TRUE, comb.random = FALSE,
             method.tau = "REML")
```

Step 4- View Results

```
summary(m)
forest(m)
```

Well, the good news is that the meta-analysis worked, and my review can soon be a systematic review and meta-analysis, but the bad news is that I don't understand it at all (except RR and CI).

Feb. 20, 2025

Talked to Hotzel who agreed to help me with my statistics.

Produced Results (Dropout Rate):

RR 95%-CI %W(common)

Bighelli et al. 0.5800 [0.3475; 0.9681] 23.6

Chawla et al. 0.5100 [0.3835; 0.6782] 76.4

Number of studies: k = 2

RR 95%-CI z p-value

Common effect model 0.5257 [0.4098; 0.6744] -5.06 < 0.0001

Quantifying heterogeneity:

tau^2 = 0; tau = 0; I^2 = 0.0%; H = 1.00

Test of heterogeneity:

Q d.f. p-value

0.18 1 0.6672

Details of meta-analysis methods:

- Inverse variance method

- Restricted maximum-likelihood estimator for tau^2

- Calculation of I^2 based on Q

Data For Remission:

```
meta_data <- data.frame(
  study   = c("Bighelli et al.", "Chawla et al."),
  RR      = c(1.12, 1.07),
  CI_lower = c(0.79, 0.96),
  CI_upper = c(1.59, 1.19),
```

```
  n1     = c(77, 77),
  n2     = c(77, 83)
)
```

Produced Results (Remission):

```
                RR          95%-CI %W(common)
Bighelli et al. 1.1200 [0.7895; 1.5889]       8.6
Chawla et al.   1.0700 [0.9611; 1.1913]      91.4

Number of studies: k = 2

                    RR          95%-CI    z  p-value
Common effect model 1.0742 [0.9694; 1.1904] 1.37  0.1717

Quantifying heterogeneity:
 tau^2 = 0; tau = 0; I^2 = 0.0%; H = 1.00

Test of heterogeneity:
    Q d.f. p-value
 0.06    1  0.8067

Details of meta-analysis methods:
- Inverse variance method
- Restricted maximum-likelihood estimator for tau^2
- Calculation of I^2 based on Q
```

Data For Adverse Effects:

```
meta_data <- data.frame(
  study   = c("Bighelli et al.", "Chawla et al."),
  RR      = c(1.03, 1.47),
  CI_lower = c(0.92, 1.18),
  CI_upper = c(1.15, 1.84),
  n1      = c(77, 77),
```

n2 = c(77, 83)

)

Produced Results (Adverse Effects) *random effects model was used:

RR 95%-CI %W(random)

Bighelli et al. 1.0300 [0.9213; 1.1516] 53.8

Chawla et al. 1.4700 [1.1772; 1.8356] 46.2

Number of studies: k = 2

RR 95%-CI z p-value

Random effects model 1.2140 [0.8576; 1.7186] 1.09 0.2742

Quantifying heterogeneity (with 95%-CIs):

tau^2 = 0.0552; tau = 0.2350; I^2 = 87.3% [50.3%; 96.7%]; H = 2.80 [1.42; 5.54]

Test of heterogeneity:

Q d.f. p-value

7.87 1 0.0050

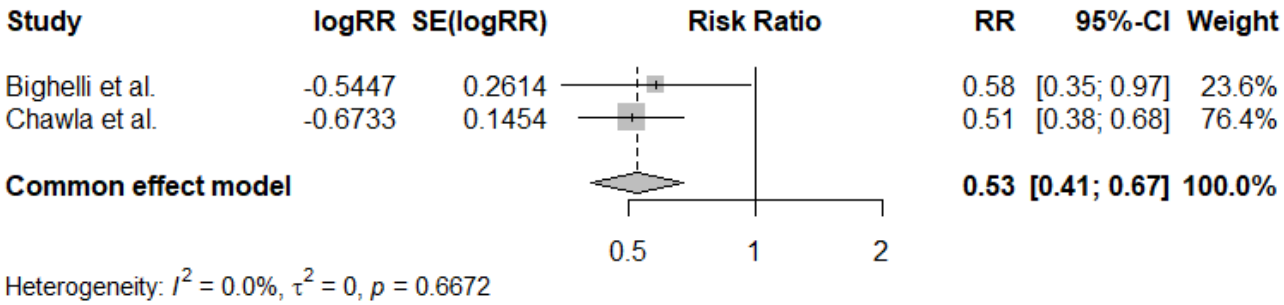
Details of meta-analysis methods:

- Inverse variance method

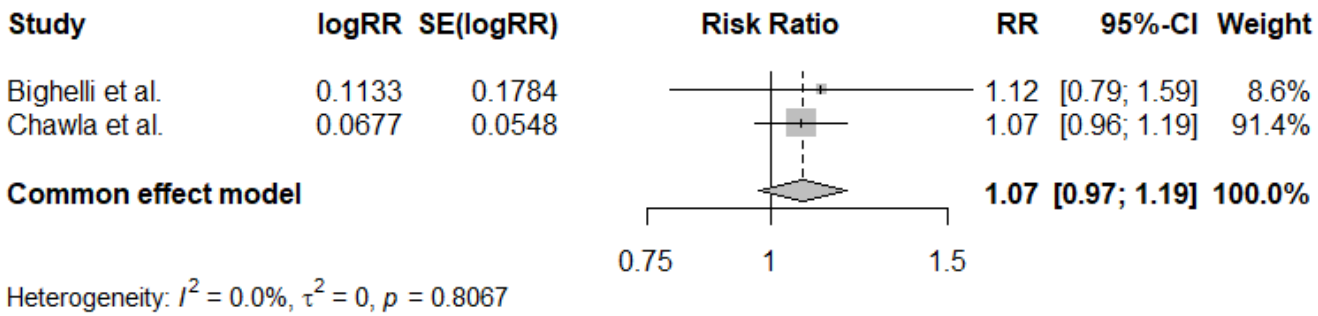
- Restricted maximum-likelihood estimator for tau^2

- Calculation of I^2 based on Q

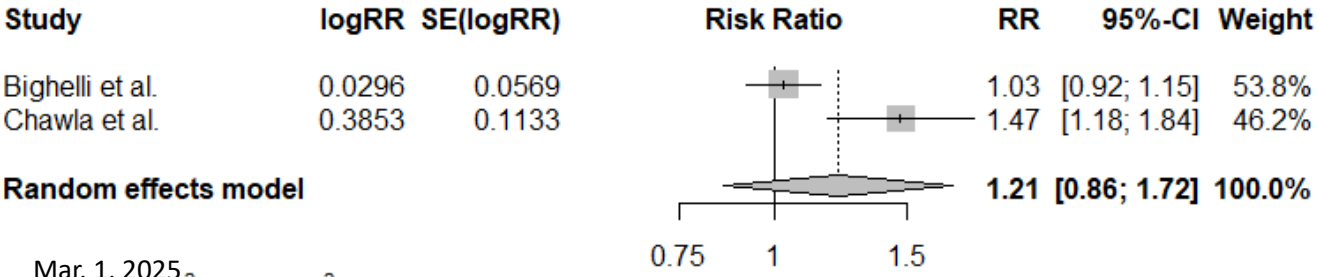
Dropout Rate (Fixed effects model)



Remission Rate (Fixed effects model)



Adverse Effects (Random effects model)



Mar. 1, 2025

- Trying to write discription of meta analysis but not sure how to
- Sent an email to Calgary Phychiatry to get another expert opinion

Mar. 4, 2025

- Sent two more emails for expert opinions (Village Health & Wellness, Calgary Psychiatry, and Baxter Forensics Groups)
- Got a response from Chythia Baxter
    - Arranged a call for this Friday to answer my questions
    - Waiting on response from others

Mar. 5, 2025

- Filling in information on CYSF website
    - Completeted sections:
        - Problem
        - Background research
        - Data
- Found the smaller independent studies included in Bighelli and Chawla
    - Bighelli:
        -
    - Chawla:

- SciELO Brazil - Psychopharmacotherapy of panic disorder: 8-week randomized trial with clonazepam and paroxetine Psychopharmacotherapy of panic disorder: 8-week randomized trial with clonazepam and paroxetine
- Sertraline and Alprazolam in the Treatment of Panic Disorder | Biomolecules and Biomedicine

Mar. 8, 2025

Response from Dr. Baxter:

1. As a psychiatrist, how do you develop treatment plans? What are some of the things you consider?

   The first thing that we should do, obviously, is talk to the patient and get a full history. Not just what symptoms they have but their background, where they come from, their medical history, and a very comprehensive analysis of them and their behavouir. Afterward, you may collect collateral information, and that means collecting old records. If they've been seeing someplace else, or depending on the scenario, talking to family members. It also it may be important to do certain laboratory tests to rule other possiblities. For example, thyroid disorders. They can replicate the symptoms of anxiety disorders.

   Generally, when we decide on treatment, we follow clinical practice guidelines. Most physicians would be expected to follow the guidelines for the condition that you're treating as well as considering the risks and benefits of each of the treatment options. You would consider that patient preference and avaliblility is a real issue as many things would be ideal for a patient to have, but that may not be possible. Taking into account other medical conditions is also very important.

2. What is usually your first recommended treatment after a panic disorder diagnosis? Would it be CBT (cognitive-behavioural therapy), psychotherapy (talk therapy), or an intervention with medication?

   It would be CBT for sure (cognitive behavioral therapy), thatwould absolutely be first line. The trouble is that many people don't have access to therapy. Take Calgary for example. An appointment at Alberta Health Services clinics, which people can access for free, can be very difficult to arrange, and all you've got is a panic disorder diagnosis. Private therapy, on the other hand, is incredibly expensive. I think the going rate for psychology these days is around 230 dollars an hour. For us to consider intervention with medicaion the symptoms would have to be pretty severe. However, both the doctor and the patient need to be realistic that it's probably not going to solve the issue, it just might make it a bit better.

3. SSRIs are typically considered the first line of medication for panic disorder rather than benzodiazepines because of the latter's higher risk of adverse effects and addition, but have you seen any difference in the outcome (rate of remission)?

   Clinically, that's not really a question anymore. The safety of benzodiazepines has been shown to really be problematic. It used to be given out a lot because it dampened down anxiety quite quickly and quite effectively, but it has many issues. There are lots and lots of potential risks, it's highly addictive, so nowadays benzodiazepines are seen as relatively unsafe. So in my practice, I actually don't prescribe them at all. The only scenario where you'll get me to prescribe a benzodiazepine is after a highly tramatic event. They certainly are not safe long term but some physicians will give them for a couple of weeks until the SSRI kicks in. Your question, "have you seen any difference in the outcome of rate to remission?" Well, we just wouldn't see it because not many people are being treated with benzodiapines anymore.

4. Do you feel like enough research was done to explain the effects of psychotropic medications on the human central nervous system? What are the limitations of such research?

   Of course not because how could we? The brain is an incredibly complicated organ that we're really only starting to understand. There's lots of hypotheses and theories about what causes depression, anxiety, addiction, and even psychosis. So, lots of theories, but at the end of the day, we actually still don't really know. We'll really have to do more effective research, because if we only know what we know right now, we only have limited ways of assessing the brain. At this point we don't really have the knowledge of we're supposed to do in order to investigate the brain. So, people do their best, and we go by theories, but it would be a mistake to think that we really understand the brain at this moment.

5. How often do you find that you have to prescribe an off-label medication for panic disorder? What is the main reason?

   For a panic attacks, it would be pretty common to prescribe something like a beta blocker. Propranolol, for example. It would be common to give that kind of medication to somebody who's having a panic attack because it literally blocks the adrenaline from having its effects. That would be a common one that we would use off label for panic attacks because it's pretty safe.

6. While there is no clear cause for panic disorder, genetic and environmental risk factors have been identified. Is it possible that this disorder is caused by epigenetics? If so, can gene therapy be an option for patients in the future?

   It's certainly an interesting advancement for lots of different disorders, being able to modify how DNA is expressed without actually changing it. But what we know about mental health and psychiatric disorders is that they are extremely complicated and that they are very rarely casues by only one factor like epigenetics. As for gene therapy, while everyone is quite excited and hopeful there is no guarantee that everyone will benefit from it or that it will be particularly effective at all.

Mar. 16, 2025

- Finished filling writing meta analysis additions and filling in CYSF website
- Going to film presentation video on Wednesday
- Wrote to Alberta Psychiatric Association for another expert opinion

Mar. 18, 2025

- Got referred to Dr. Sivapalan, waiting for reply

Mar. 20, 2025

- Finshed filling in CYSF website
- Got reply from Dr. Sivapalan
- Started practicing presentation and making trifold

Response from Dr. Sivapalan

1. What is usually your first recommended treatment after a panic disorder diagnosis? Would it be CBT (cognitive-behavioural therapy), psychotherapy (talk therapy), or an intervention with medication?

Depending on age and severity of presentation, most clinicians will consider CBT and psychotherapy first. However, sometimes it is important to gain some control over the intensity of the symptoms and so medications may be introduced early on. In a younger population, the guidelines will suggest medications as second line. One of the challenges in many jurisdictions is getting access to good quality CBT or psychotherapy in a timely fashion.

2. Would prescribing benzodiazepines still be clinically relevant for panic disorder or other anxiety disorders, considering some of their risks?

Benzodiazepines can still have a role in the treatment of panic disorder when used appropriately. This may mean have a small dose available to be taken at the onset of the panic episode. They can be fairly effective when used this way, but requires monitoring. The goal is to take the edge off the episode, but to not become reliant on taking a benzodiazepine as the only management tool. The role of benzodiazepines should primarily be limited to the early phase of treatment while using other medications such as SSRIs and/or psychotherapy/CBT. Benzodiazepines are generally not recommended as a first line treatment for any anxiety disorders.

3. SSRIs are typically considered the first line of medication for panic disorder rather than benzodiazepines because of the latter's higher risk of adverse effects and addition, but have you seen any difference in the outcome (rate of remission)?

In terms of directly treating the anxiety, benzodiazepines are generally considered to have a greater effect size than SSRIs. This has also been my clinical observation, although I do not have any specific statistics. However, as you indicate, the safety concerns, especially with longer term use often outweigh the benefits and so SSRIs/SNRIs are considered first line.

4. At the end of treatment, are people generally more pleased with the outcomes from SSRIs or benzodiazepines? Are there any trends or is it individual to every patient?

I'm not sure I have seen a huge difference in terms of patient preference with outcomes. Benzodiazepines, even in the short terms can be cognitively blunting, overly sedating, withdrawal reactions, dizziness and contribute to respiratory problems. Many people find it difficult to tolerate those side effects. SSRIs/SNRIs on the other hand can lead to GI upset, headaches, sleep disruption, sexual side effects, and weight changes. The severity of side effects can vary with the individual, the dose, and can be dependent on what other medications the person may be taking.

5. Do you feel like enough research was done to explain the effects of psychotropic medications on the human central nervous system? What are the limitations of such research?

There are been a fair amount of research, however, more is needed. The biggest limitations are often around ethical considerations, available technology (i.e. type of neuroimaging), and time. This takes significant funding to do, and the amount of money spent on Mental Health Research is often limited compared to other diseases/illnesses.

6. How often do you find that you have to prescribe an off-label medication for panic disorder? What is the main reason?

I will often use other medications off label instead of starting someone on a benzodiazepine. One of the reasons it is considered off-label use is that the manufacturer of the medication did not apply for the indication, but the understanding of pharmacokinetics suggest its benefit.

7. While there is no clear cause for panic disorder, genetic and environmental risk factors have been identified. Is it possible that this disorder is caused by epigenetics? If so, can gene therapy be an option for patients in the future?

Definitely, genetics appears to play a role. In the future, gene therapy may be an option, but given the theory that there are likely hundreds of genes involved, it would be very difficult to design an appropriate therapy with current technologies.

8. Overall, do you find that you prescribe more SSRIs or benzodiazepines? Is there a particular reason for that?

Overall, I suspect that I prescribed more SSRIs/SNRis than I do benzodiazepines. Usually after the benefits and side effects of the options, both short term and long terms, most of my patients will choose to try the SSRI first anyway. If someone is referred to me already taking benzodiazepines, I will not automatically discontinue them, but it becomes part of the longer discussion around treatment goals and options. I do have a few patients whose anxiety is primarily managed with benzodiazepines that they have been on for some time and would find it quite difficult to stop.