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A Literature Review: An Analysis of the Widespread Effects of Solitary Confinement/Social Isolation on Mental Illness and Mortality

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ABSTRACT

Solitary confinement or isolation is widespread globally and has been used as a form of punishment, reform, reflection, and cleansing throughout time. The devastating impacts of not having social interactions for extended periods of time have been documented and noted.[1] These impacts include severe mental health disorders such as schizophrenia, bipolar disorder, anxiety, depression, post-traumatic stress disorder (PTSD), suicide, motor disturbances, biological changes, and increased mortality.[1-3] The analysis of how the United States became the country with the largest prison system and mentally ill population is addressed in this thesis including understanding how the prison-industrial complex was built. Understanding how the prison-industrial complex was built aids in the dismantling of the system. A case study of Kalief Browder along with several others is also discussed throughout this paper, in support of the real-life manifestations of solitary confinement. Research from several disciplines will be presented to support the vast amount of research supporting the outlaw of solitary confinement of all types. The findings discussed in this research paper are compiled and extracted from peer-reviewed articles, systematic reviews, and meta-analyses published between 1999-2019. This research paper examines the strengths and limitations of the reviewed articles.

Keywords: Solitary Confinement, Social Isolation, Mental Health, Psychosis, PTSD, Depression, Anxiety, Schizophrenia, Deinstitutionalization, Kalief Browder, Health Disparities.

INTRODUCTION

Solitary confinement in the United States varies from prison to prison, but usually functions as staying in a cell 23 hours a day with one hour out or complete isolation with human interaction only occuring when food is slid through a slot in the door. [4] Solitary confinement has been deemed as cruel and unusual punishment by the United Nations and is outlawed in juvenile prison systems.[5] If this is so, why do we still use it in American prison systems today and what are the lasting impacts? The use of solitary confinement is still used under the legal justification of protecting the larger prison community and society as a whole.[6] After research, I do not agree with this justification and will present several reasons supporting the abolishment of solitary confinement. Solitary confinement has been shown consistently across the literature to induce and/or exacerbate mental health conditions such as schizophrenia, bipolar disorder, post-traumatic stress disorder (PTSD), anxiety and depression.[1-3,6,7] Symptoms of these disorders often present with paranoia, hallucinations and self-injurious behavior (SIB).[1-3] Due to the substantial documented and studied negative effects of solitary confinement, this thesis will argue against its use and offer potential solutions.

BACKGROUND

A brief history of solitary confinement:

Solitary confinement varies across prison systems, but generally is defined as 23 to 24 hours a day confined to a small, steel-doored cell. [4] Prisoners are under extensive surveillance and security controls without social interaction from anyone other than guards.[4] Those in solitary confinement are restricted to three to five hours a week of recreation which is allowed only in caged enclosures.[4] Very little educational, vocational, or other purposeful activities (i.e., programs) are allowed. [8] Solitary confinement, social isolation, isolation and segregation are interchangeable in the literature and this paper.

The origins of solitary confinement have religious affiliations. Beginning in 1829, the Quakers believed that isolating a man in a stone room with only a bible would allow him time to repent and pray.[9] Despite the seemingly good intent, solitary confinement has been documented as a form of torture with severe and lasting effects.[4-6,9] There are several reports of man becoming unhinged after even a short stint in solitary confinement.[10] U.S. Justice Supreme Court Samuel Freeman Miller comments on the significant number of confined prisoners who fell into a "self-fatous condition" from which it was next to impossible to arouse them, and others became violently insane, others still, committed suicide.[10] The effects of solitary confinement are documented, varied and can include anxiety, fatigue, pain, depression, hallucinations, stomach and muscle pains, headaches, insomnia, apathy, trembling, oversensitivity to stimuli, feelings of inadequacy, inferiority, withdrawal, isolation, rage, anger, fear, aggression, distortion of the sense of time, altered memory, concentration issues, and dizziness.[1-3,8] In addition, solitary confinement can be fatal. [11-12]Alexis de Tocqueville stated "the absolute solitude is beyond the

strength of man. It destroys the criminal without intermission and without pity; it does not reform, it kills".[5,10] Both Europe and the United States have over a century of documented detriments of solitary confinement, yet it has remained in use in our prison systems. Fortunately, in 2016, President Barack Obama outlawed solitary confinement for juveniles.[5] This was propelled when a sixteen-year-old boy named Kalief Browder committed suicide after three years of solitary confinement.[5,13-14,36]

Prevalence of mental health issues in America:

Mental illness has been around for as long as human life has been present, showing up in all aspects of culture such as art, music, drawing, and literature. Despite its established existence, there is a societal stigma or taboo aspect to mental health.[15] It is hypothesized that the stigma toward mental health in the western world is due to the inability to see it, touch it, and cure it.[15] The way medicine is taught and practiced in the U.S. is heavily based on pathophysiology, biological reasoning, and diagnostic studies. Mental illness doesn't follow this same trend. Some mental health conditions are due to neurotransmitter imbalances, neurological masses, or other metabolic deficiencies, in addition to emotion and/or psychological injury.[16] Solitary confinement can be that trigger for many people with or without pre-existing mental conditions. Before further discussion surrounding the impacts of solitary confinement, first we will understand several mental health conditions that can be affected by confinement. Major depressive disorder, anxiety, bipolar disorder, and schizophrenia are mental health conditions that are highly prevalent and may develop due to prolonged social isolation.[1-3,8]

Major depressive disorder (MDD) is the 11th leading cause of disability or mortality in the world and has a global lifetime prevalence of 12%.[17] In the United States, MDD is the

second leading cause of disability with high recurrence rates.[17] The DSM-5 defines MDD as "1) depressed mood or 2) loss of interest of pleasure with at least three of the following; weight change, insomnia or hypersomnia, psychomotor agitation or retardation nearly everyday, fatigue or loss of energy, feelings of worthlessness, inability to think or concentrate, recurrent thoughts of death, recurrent suicidal ideation"[18] . Symptoms listed must be present for two weeks and cause significant impairment of life and functioning.[18] As a provider, there is a responsibility to diagnose clinically with support of PHQ-9 assessment and refer or offer treatment for MDD. Treatment usually consists of antidepressant therapy such as Selective Serotonin Reuptake Inhibitors (SSRI) in combination with psychotherapy.[19] Due to a remission rate of over 50%, lifetime continued pharmacologic and/or psychotherapy is encouraged as well as concrete support systems for patients.[19] Many patients may have a co-occurring anxiety disorder or develop due to treatment.[19-20] These patients have poorer prognosis, prolonged disease and higher rates of recurrence. [19-20]

Generalized anxiety disorder (GAD) is characterized according to the DSM-5 as excessive and persistent worrying that is hard to control, causes significant distress and occurs more days than not for at least 6 months.[18] Other symptoms include agitation, irritability, apprehension, fatigue, muscular tension and palpitations.[18,20] Similar to MDD, SSRIs are the most common route for treatment along with psychotherapy, specifically cognitive behavioral therapy (CBT).[20] Lifetime prevalence of this disorder globally is 5.1%-11.9%.[20] With GAD being one of the most common diagnoses in primary care, it is essential that providers are knowledgeable of signs, symptoms, diagnosis, and treatment.[20] As mentioned earlier, the recognition of co-occurring mental health disorder such as MDD, schizophrenia, bipolar, posttraumatic stress disorder, substance use, and obsessive compulsive disorder(OCD) and

phobias is essential to quality and holistic treatment of patients.[1-3] Family history of mental health disorders, social determinants of health such as poverty or a high adverse child experience (ACE) score are also thought to correlate with a higher chance of development GAD.[21]

Similar to major depressive disorder and generalized anxiety disorder, both schizophrenia and bipolar disorder are associated with high ACE scores, poverty and family history of mental health disorders. [21] Schizophrenia is characterized by persistent or recurring psychosis with associated limited social and occupational functioning.[18] Schizophrenia is said to be one of the most debilitating and economically costly medical disorders ranking among the top 10 illnesses contributing to global disease by the World Health Organization.[22] Schizophrenia requires both positive and negative symptoms.[18,23] Positive symptoms include hallucinations, delusions and disorganized thoughts and behavior.[23] Hallucination can be auditory which is most common, visual, somatic, olfactory or gustatory.[23] Approximately 80% of persons diagnosed with schizophrenia experience delusions, which are false beliefs with clear and bizarre implausible context usually associated with grandiosity and or paranoia.[18,23] Delusions often are associated with secret messaging through the television or radio.[23] Since schizophrenia is a thought disorder, disorganized thoughts and behavior can include tangential or circumferential speech, derailment, or word salad.[18,23] Schizophrenia also includes negative symptoms which are diminished or absence of normal functioning.[23] Examples of negative symptoms are apathy, flat affect, fatigue or lack of energy, diminished expression, anhedonia, lack of motivation, lack of social interest, inattention, decreased cognitive input.[18,23] These symptoms are often resistant to treatment and can exist simultaneously while a person is in a psychotic episode. [23] The identification of schizophrenia is essential due to its degenerative and debilitating nature, but also because it often co-occurs with diabetes, hyperlipidemia, and hypertension.[23] Treatment of co-

occurring disorders is essential in addition to establishing psychotherapy and a lifelong antipsychotic regime due to the illness being severe and persistent.[18-32]

Bipolar disorder, MDD, and anxiety often co-occur with each other which is why providers need a thorough understanding of those conditions. [18-24] The complex symptoms and mixed presentations make treating these conditions more difficult. Bipolar disorder is a mental health disorder with a strong association with family history and co-occurring depression, psychosis and anxiety conditions or symptoms.[18,24] The DSM-5 characterizes bipolar disorder occurring with mania, hypomania, and/or MDD.[18] Bipolar disorder often is undiagnosed until a patient presents with a manic episode.[24] Due to the potential severity of these episodes including successful suicide completion, this is very dangerous, hence why early detection via pattern recognition is essential.[18,24] Manic episodes often present as significant changes in mood, behavior, energy, activity, sleep, and cognition.[24] An excess or abundance of good, euphoric, high mood with decreased disinhibition, disregard for social rules or boundaries, promiscuity and inflated sense of self is common.[18,24] Along with these symptoms, pressured speech, racing thoughts, psychosis, paranoia, distractibility, and dissociation are also likely. [18,24] Another key sign that a patient is experiencing a manic episode due to bipolar disorder is going days without sleep and not feeling exhausted or tired.[18,24] Treatment for this condition is a lifelong regime of lithium and/or antipsychotics or antidepressants.[24] Management of the associated depression and anxiety is essential to increase the patient's quality of life. [18-24]

With an illustration of the most common mental health conditions that incarcerated people may be experiencing, one can understand how forced solitary confinement or social isolation can trigger or exacerbate these conditions and lead to poor outcomes. With the high prevalence of these mental health conditions in the general population, the forced solitary

confinement or social isolation which can trigger these conditions to develop is inhumane, especially since we are aware of the life-long mental and physical struggles with these conditions.[1,2,4]

A brief history on deinstitutionalization

After understanding the history of solitary confinement and the common mental illnesses that develop due to the isolation, it is important to understand how America got to this point. Approximately 25% of the 2.3 million inmates detained today have mental illness.[25] Although intended for rehab, with these numbers, the United States prison system is the nation's largest mental health facility.[25,26] Between 1955-1994, the government and Food and Drug Administration (FDA) passed several laws, invented drugs, & transformed psychiatric care. These changes led to mentally ill people making up a large portion of the prison population.[27] The invention of antipsychotic drugs, specifically chlorpromazine for psychotic episodes, entered the market in 1954.[27] Before this, the only treatments for psychosis were lobotomies and electroconvulsive shock therapy.[27] This piloted the release of approximately 487,000 previously institutionalized individuals onto the streets with this new medication.[28] With this freshly released mental health population, communities needed to develop outpatient facilities, community centers, to support them. The government made a decision to decrease spending on institutions and refocus on community health centers as a solution to asylums.[27] The societal views towards mental health also shifted in the 1960s, from a “lock them up” mindset to a treatment and support focus.[27,28]

The intent of deinstitutionalization was a positive one, but the hardships that the mentally ill population faced once released onto the street with no support, education, shelter, food, or family led to a large homeless population.[27,28] Harvard reports at least one third of the current homeless population has major mental health disorders and does not receive any treatment.[29] Even with access to the government funded community centers, many people did not meet criteria to access their services due to the severity of their conditions and under-resourced nature of the community health centers.[27] Without treatment for their severe mental health disease, many of these past offenders were unable to secure stable housing resulting in living on the streets without their basic needs getting met.[27] This resulted in the homeless to prison pipeline where many people were arrested and criminalized for violent acts due to their untreated mental illness and acts of survival. [27]

Along with the deinstitutionalization of mental health patients onto the streets, the war on drugs is also believed to be a major driver in prisons housing people with mental health disease. From 1980 to 2016, the number of individuals incarcerated for drug offenses increased form 41,000 to 450,000.[30] With evidence of racial disparities in the justice system, it is no surprise that black and latinx persons are at least 10x more likely to be arrested and charged with a drug conviction.[31] This is prevalent in our prison system in terms of numbers. There are 6-7x more black men in prison than white men despite black people making up 14% of the United States population.[31] In addition to racial disparities, the social determinants of health that impact people of color are evident. These include poverty, lack of housing, educational and health disparities, violence, environmental injustice, generational trauma, and racism to name a few.[32] These are all intense stressors which put people of color at higher risk of developing mental health conditions due to the evident connection between stress and mental health/mortality development.[33] The

lack of healthcare access leads to short term mental health care, if any, followed by mental deterioration. Untreated mental illness leads to crimes being committed that most likely would not have committed if the person were medicated and supported.[34]

Combining the injustices in the judicial system for black, brown, and poor people with the stressors that correlate with those identities, explains why our prison system is a holding space for the non-white persons with mental health conditions.[31-34] Our system is reactive instead of proactive which disproportionately impacts black and brown people. In 2020, we are still under-resourced in terms of mental health treatment in the public and prison systems. The Bureau of Justice statistics reports approximately 80 billion dollars is spent annually by the United States government on incarceration. In contrast, the U.S. spends 71 billion in mental health treatment, mostly on depressive disorder treatment via pharmacologic intervention.[34] A nine billion dollar difference favoring keeping people behind bars in comparison to treating mental health conditions. Until we value mental health as a society and back that value with funding, people will continue to suffer.

Solitary confinement of persons with pre-existing mental illness

In the United States, there are three times more people with mental illness in prison than in hospital.[34] Solitary confinement and the induction and/or exacerbation of severe major mental health disorders has been documented extensively.[1-4,6,8,34] The stress of isolation, lack of social interactions, and unstructured days all contribute to the recurrence or exacerbation of mental health symptoms.[8] With this knowledge, solitary confinement of people with mental health disabilities is deemed unconstitutional.[4,8] The violation of the eighth amendment right, the

infliction of cruel and unusual punishment, is what the exception of mental health individuals being confined.[4,6] The ruling was made on the grounds that the preexisting conditions cause mentally ill people to be more vulnerable to the harmful effects of social isolation. The case that ignited this was *Madrid v Gomez* who characterized solitary confinement of a mentally ill patient akin to "putting an asthmatic in a place with little air to breathe".[6] The cells that inmates are confined to in solitary are often unfit for human habitation due to being "poorly ventilated, decrepit, vermin infested, and dirty".[34] These reported conditions have resulted in several civil lawsuits filed against the Department of Justice for the torture experienced during incarceration.[34]

As a result of these unsuitable conditions, prisons suffering from mental health disease can become acutely decompensated leading to dangerous self-injurious behavior.[14] Symptoms that have been commonly reported after mentally ill persons are isolated are "rubbing feces on themselves, sticking pencils in their penises, bite chunks of their own flesh, slash themselves, hallucinations, starting at walls, mumble incoherently, and extreme outbursts of aggression.[34] Less severe symptoms reported include anxiety, depression, cataonia, withdrawn, loss of appetite, crying, and increased anger.[34] It is hypothesized that due to the lack of social stimulus and the neurological changes that result from isolation, inmates lose the innate ability to protect themselves from danger and actually inflict the pain they feel emotionally in a physical form against themselves. As a result, suicide attempts are the highest while in solitary confinement.[35] Unfortunately, sometimes suicide attempts are seen only as malingering and prisoners are subject to disciplinary force instead of receiving the resources they desperately need for untreated mental illness.[14,34] The only group that has been deemed equally and potentially more vulnerable to the

effects of solitary confinement than persons with mental illness are juveniles, defined as persons under the age of eighteen.[5,7]

A Kalief Browder Story

Kalief was a sixteen year old black youth who was arrested in New York City in 2010 for allegedly stealing a backpack.[36] Michael Bloomberg was the Mayor of New York City at the time and championed a "stop and frisk policy" in an attempt to combat the war on drugs.[35,36] This allowed for police officers to stop anyone they deemed suspicious. With immense documented bias toward black and latinx men and the disproportionate patrolling of their neighborhoods in comparison to their white counterparts, this policy ignited the overpopulation of black and brown men in our prison systems today.[35] Kalief, barely out of middle school, spent three years at Rikers island, one of the most violent prisons in the country, without actually ever being found guilty of the crime[36] Kalief spent two out of the three years of incarceration in solitary confinement due to minor infractions and suffered abuse at the hands of guards and other prisoners. His incarceration and confinement could have been avoided if his family was able to afford his less than $1000 bail.[36] However, they could not and this example exposes the connection of imprisonment and poverty. If you can make bail, you can avoid suffering. If you cannot, you sit in prison, sometimes even without being convicted of an offense. Ultimately, Kalief was released after three years and no conviction. However, he struggled to reintegrate into society and had no support for the trauma he sustained during solitary confinement and the subsequent untreated mental health disease that developed.[36] Unfortunately, Kalief committed suicide, proving that the damage caused by solitary confinement does not disappear when someone is released.[36]

Solitary confinement of juveniles

Because of stories like Kalief's, solitary confinement has been condemned by professional and human rights activists stating the impacts of social isolation are particularly harmful to adolescents due to the immaturity and vulnerability of their brains.[5] Exposure of mammals to early-life social isolation or maternal separation profoundly affects brain development and adult behavior, and may facilitate the occurrence of psychiatric disorders, such as depression and schizophrenia.[37] These effects are, at least in part, mediated by epigenetic mechanisms which will be explained later. There are approximately 54,000 juveniles detained at any time in the United States.[38] Though all of the incarcerated youth have not been studied, there are several examples of the impacts of solitary confinement on juveniles. The office of Juvenile Justice and Delinquency Prevention conducted a study which surveyed 7,073 youth. [38] Results showed that over a quarter of them have spent some time in solitary confinement while detained. The same study surveyed the detention center staff, and half of them reported locking youth in isolation for more than four hours at a time. Due to the fragility of the adolescent brain, prolonged isolation has led to suicide attempts, and approximately 100 completions as of 2009. Over half of those completed suicides were during times where the youth were confined to their rooms.[14,39] Similarly, a study was done between the years 2010-2012 which analyzed juvenile self-injurious behavior (SIB). They found that solitary confinement and young age were the two strongest correlates in predicting SIB.[14] Kalief Browder attempted to commit suicide a total of 5 times while incarcerated.[36] During an interview after being found innocent and released from custody, Kalief said, "People tell me because I have this case against the city I'm all right. But I'm not alright. I'm messed up. I know that I might see some money from this case, but that's not

going to help me mentally. I'm mentally scarred right now. That's how I feel. Because there are certain things that changed about me and they might not go back." He also said, "Before I went to jail, I didn't know about a lot of stuff, and, now that I'm aware, I'm paranoid I feel like I was robbed of my happiness".[13] In 2012, the American Academy of Child and Adolescent Psychiatry released a policy statement supporting the cessation of solitary confinement or isolation for juveniles.[5]

Along with self-injurious behavior, solitary confinement can cause substantial changes to how a person interacts with the world. Social isolation in any form can have deleterious neurological results including lack of social cues, social awareness, empathy, poverty of eye to eye gaze, and preoccupations.[40] Several retrospective studies among Romanian orphans illustrated the profound negative impacts social isolation can have on the brain during development.[40-43] After the orphans were starved of interaction, food, and stimulation, their later developmental stages were notable for lack of eye contact and minimal social awareness.[40-43] In addition, these children suffered emotional difficulties, negative effects on motor development, neural circuit disruptions involved in recognition of facial expressions, similar presentation to autism spectrum disorder (ASD).[40-43] With the large social stigma associated with autism spectrum disorder, I want to be clear that this is not to say isolation causes autism, but it is important to analyze the correlation between lack of social stimuli and the deficits in terms of abilities, especially with adolescents.

The increased vulnerability of the adolescent brain in comparison to the adult brain has consistent support amongst the literature. Many people use the Adverse Childhood Experiences (ACE) study when addressing adolescent function. ACE scores came from a CDC-Kaiser Permanete study which is one of the largest child abuse and neglect studies every conducted.[21]

This is appropriate to examine in correlation to SIB due higher ACE scores being associated with an increased likelihood of suicide attempt as an adult.[21] This is serious enough to draw the attention of President Obama, who used this study when defending why solitary confinement should no longer be used.

Neurodevelopmental changes

Animals are social beings by nature and we need social interactions for our mental and physical health in addition to safety and security. Many animals live in packs, groups, or communities for this reason. Darwin coined the term "survival of the fittest", which explains the strongest survive to pass on their genes which shape the next generation.[44] When we are isolated, we are left alone to defend, feed, and fend for ourselves, which turns off higher functioning areas of the brain.[45] Psychology and neuroscience have actively studied the "neurology of loneliness" and the impacts on the brain, society, and body.[45] Experimentally studying the neurological impacts of social isolation on humans is inhumane, so animals, primarily rat models, have been used.

Stress has widespread impacts on the body and mind and several neurobiological changes occur in correlation with stress. In terms of social isolation, several studies have shown consistent neurological changes such as brain structure, neuroendocrine, neurological processing alongside behavioral adaptations.[12] There are several genetic markers and neurobiological changes that have been associated with long term isolation. These include changes in serum cortisol levels, brain derived neurotrophic factor (BDNF), adrenal gland mass, and metabotropic glutamate receptors.[46] Beginning with the analysis of BDNF, this is a neuroplasticity marker that has a strong correlation to the stress response, depression, and anxiety. Ieraci analyzed mRNA of

certain genes in the prefrontal cortex and hippocampus, areas of the brain that are said to be impacted by isolation resulting in decreased neuroplasticity after social isolation.[47] Results showed a decrease in the individually spliced neuroplasticity markers in both the hippocampus and the prefrontal cortex. There also was a positive correlation between serum cortisol and the total BDNF despite the total BDNF not being decreased. Serum cortisol levels were measured to see if there was a correlation between social isolation and the HPA-axis since it is a driving factor. Results of the study showed a significantly reduced cortisone level which was surprising. Cortisol is the stress hormone that is produced by the adrenal glands and released when the body experiences stress.[47,48] Studies also showed a decrease in adrenal gland size which suggests hypoactivity of the adrenal glands and, therefore, the HPA axis.[49,50] The hippocampus and prefrontal cortex also communicate with the HPA-axis by negative feedback loops, which explains the hypoactivity.[49,50] Significant social isolation is suggested to decrease the body's ability to produce and release the stress hormone, which decreases hormone and stress regulation/response.[49,50]

In addition to changes related to brain derived neurotrophic factor and cortisol levels, the role of glutamate receptors is thought to correlate to the development of depression, hence why many antidepressants act on these receptors.[51] Several studies have demonstrated the downregulation of these receptors upon social isolation in mice.[46,52,53] With downregulation of these receptors, depressive, anxious and/or hyperactivity have been demonstrated in adolescent and adult mice. This further illustrates that the impact of social isolation in adults, who have undergone most neurodevelopment, remain extensive and can result in psychological deficits.[52,53]

Loneliness has also been associated with cognitive decline throughout the literature. Several studies have attempted to isolate specific genetic markers associated with cognitive

impairment with poor results. An exception is the ADAR1 (adenosine deaminase acting on mRNA) enzyme which is associated with cognitive functioning and is widespread throughout the body, but concentrated in the hippocampus and prefrontal cortex(same areas examined in relation to BDNF earlier)[54] Studies have demonstrated that the longer a mouse is isolated, the greater the increase in enzyme expression. This leads to a temporary cognitive decline as long as the isolation is under 7 weeks. Once the isolation passes 7 weeks, mice who are resocialized, do not regain the same level of cognitive functioning.[54] Further supporting the impacts of solitary confinement being permanent.

The impacts of social isolation do not only impact the individual who experienced the separation; Several studies have reported epigenetic changes in mice following long term isolation which can be passed down to their offspring.[37] Epigenetics is the alteration of gene expression without altering the gene code itself, usually due to environmental factors. This includes DNA methylation, histone density modifications, and posttranslational modifications.[37] Three-month-old male mice were socially isolated and the impacts were studied. Results showed that there were strong epigenetic changes in the midbrain by six months or three months of isolation. The epigenetic changes included global DNA methylation, enhanced histone methyltransferase and histone deacetylase activity. The most significant result related to mental health changes is the observed downregulation of the serotonin transporter, Slc6a4. Serotonin is one of the most studied neurotransmitters in relation to mental health alongside dopamine. Imbalances of serotonin have been correlated to depression, anxiety, low mood, flat affect, and irritability.[55] Hence why selective serotonin reuptake inhibitors (SSRIs) are used in the treatment of mood disorders as mentioned earlier.[19,20,23,24] This study was groundbreaking and points to the need of more epigenetic studies after social isolation.

Despite the importance of healthy and enriching social interaction being paramount for basic physiological brain development and function, the use of solitary confinement continues to exist in prison systems. After an extensive literature search, the justification presented appears to be focused on safety, with emphasis on community safety even if it is at the cost of individual safety and well-being. The small amount of data that mentions solitary confinement as beneficial to the inmate argues that some prisoners have vulnerabilities that make housing them in solitary confinement safer such as mental illness, gang affiliation, race, gender expression and prior law enforcement careers.[34] More often solitary confinement is used as a way to manage underfunding, overcrowding, and limited resources that leave prisons ill-equipped to deal with the large general prison population.[34] As a result, they utilize segregation as a holding place. Physical safety is more important than mental safety in our current system so that justification is used in the continuing of solitary confinement. In addition, prison officials embrace solitary confinement as a way to control and punish dangerous or violent prisoners. [8] Lastly, solitary confinement continues to exist in our prisons systems because courts have not deemed solitary confinement cruel and unusual punishment for people without preexisting mental health conditions since "for many inmates, it does not appear that the degree of mental injury suffered significantly exceeds the kind of generalized psychological pain that courts have found compatible with Eighth Amendment standards"[6] .This poses an ethical question of when do we justify causing harm to one person opposed to larger masses?

Increased Mortality and Morbidity post incarceration

If the devastating and potentially permanent impacts of solitary confinement presented earlier are not convincing enough to ban its use, discussing the increased mortality and morbidity

following solitary confinement should be. There is a consistent link between social isolation and mortality and morbidity across the literature.[3] Social isolation is not limited to incarceration; we are becoming more individualized as a society. We live farther apart from family, interact with people less due to social media access, and have different cultural values that have drifted from the collective. A recent meta-analysis of 148 studies, 308,849 participants, concluded that people with adequate social relationships were 50% more likely to survive compared to those without adequate relationships. An additional meta-analysis was conducted which analyzed 148 studies, including 308,849 participants from the US, Europe, Asia and Australia linking perceived and actual isolation to decline in health and early death. [3,11] Social isolation and loneliness should be used as predictors of death like other well-established risk factors such as smoking, alcohol use, physical inactivity, and obesity.[3,11,37] As mentioned above, there is concrete documentation of development of physical ailments associated with increased mortality such as high blood pressure and hyperlipidemia co-occuring with mental health conditions.[33] Using this philosophy, solitary confinement would be a marker for early death.

METHODS

A comprehensive systematic literature review was conducted by employing PubMed and Augsburg University Library databases, Google Scholar, and the UpToDate website for the purpose of extracting and compiling relative data, implications, and clinical recommendations. Databases reporting health statistics at the state (Minnesota Department of Health), national (Center for Disease Control and Prevention), and international (World Health Organization) levels were utilized to assess potential risk factors, the prevalence of disease in certain ethnicities, and population-based statistics. Key search operators included the following terms

separate and in combination: Social isolation (SI), solitary confinement, psychosis, schizophrenia, bipolar disorder, major depressive disorder, with and without the addition of key terms prison, institution, and deinstitutionalization. The search was further expanded to include any other descriptive words relating to the prevalence of mental illness and healthcare disparities, specifically due to solitary confinement or social isolation. The listed citations of each study were explored and traced to their original source. Various study designs including systematic reviews, meta-analyses, peer-reviewed articles, observational studies, and qualitative studies were deliberately chosen to optimize the quality of the literature review. With the importance of societal news sources and sociological perspectives, interviews and documentaries were also used when discussing the Kalief Browder case who this paper is written in honor of. The criteria for inclusion was set as the following: 1) Peer-reviewed articles that were published within the past 15 years(2005-2020), 2) Studies investigating the prevalence of mental illness, the signs and symptoms, treatment, & etiology, 3) Articles published in English examining human subjects.

DISCUSSION

The purpose of this literary analysis is to provide support for the existing literature favoring the elimination of the use of solitary confinement in prison systems. In addition to the immense amount of interdisciplinary research supporting this effort, reducing prison overcrowding and reallocating finances to better support inmates are potential solutions that could finally put an end to solitary confinement.

The first proposed solution involves decreasing prison overcrowding by releasing persons who have been charged with petty or low-level crimes. As mentioned earlier, sometimes prisons justify using solitary confinement as a strategy to deal with overcrowding.[37] When prison space

is limited, prisoners overflow into solitary confinement cells since there is nowhere else to put them. It is estimated that over a third of the U.S. prison population are persons imprisoned for either low level offenses and non-violent crimes such as drug offenses, shop-lifting, and fraud or persons with sentences served.[30] An analysis of the United States spending and what crimes people are incarcerated for is essential to decrease overcrowding and overspending. "Approximately 39% of the prison population should not be imprisoned".[30] Of these people, it was found that 25% are detained for low-level, nonviolent crimes such as drug offenses, shoplifting, and fraud. The remaining 14% consisted of sentences served, but with profitization of prisons, we are seeing an increase in sentence length. This third doesn't account for the large number of people imprisoned who have not been convicted and are awaiting trial. If this cohort of prisoners were released, approximately 20 million dollars annually would be saved.[30] If the criminal justice system were to refocus on rehabilitation, releasing this large population of prisoners who do not pose a threat to society would free up a significant space in prisons, and, in turn, decrease unnecessary exposure to solitary confinement. In addition, there should be elimination of the cash bond system that unfairly amounts to poor persons being disproportionately jailed despite not even being convicted of a crime. This will eliminate the possibility of more stories like Kalief Browder.

The 20 million dollars that would be saved annually by releasing low level offenders, should be put towards individual mental and physical health access, extensive mental health training for guards, and providing holistic support to people once they are released. As mentioned earlier, the amount of money allocated to mental health is insufficient. Even without experiencing solitary confinement, prisoners struggle to adapt to prison life. Mental health resources are essential for all, but especially those who experienced solitary confinement. All too

often prisoners' mental illness is left unaddressed until they are severely decompensated with dangerous symptoms. We need to transition from a system of reactivity to one of proactivity. Imprisonment should not remove the right to access quality health care.

When prisoners are able to have their symptoms evaluated, the system exploits the poor. Several prisons use a system consisting of prisoners paying fifteen dollars initially to see a nurse and then overpriced amounts for each pill after that. If they do not have the money, they will not be able to see a nurse or they will go into debt with the jail. Once the prisoner gets money put on their phone card or commissioned by family members, the debt is deducted first. This often leads to people not seeking out care early on in their symptoms, leading to progression of their chronic physical and mental conditions leading to decreased health outcomes and quality of life.

Eliminating overcrowding and reallocating funds saved to mental and physical access is not enough. We also need to train our prison workers in mental health and compassion. Several solitary confinement admissions are due to the inability of guards to distinguish mental health behaviors from intentional violence. If guards are trained in mental health, that will allow them to support inmates and potentially decrease unnecessary solitary confinement. The result would be promoting an environment of rehabilitation as opposed to excessive punishment and minimizing the devastating mental health effects of isolation.

Lastly, the remaining funds saved from releasing low level offenders should be invested toward developing high quality transition programs between prison and society. Our prison system is said to be about rehabilitation and reintegration into society, but the resources available contradict that. There is not a safety net for prisoners and the barriers post release such as poverty, homelessness, untreated chronic health conditions, and lack of access to health

insurance are often not addressed. This sets prisoners up for a cycle of oppression and reoffending.

Poverty and homeless is an issue that impacts Americans of all identities, particularly ex-inmates. After release, it can be especially challenging obtaining employment with a conviction on record. Additionally, finding stable housing post incarceration is hard due to the stigma associated with imprisonment. Landlords have the right to do background checks and refuse tenants who have convictions on their records. This leaves homeless shelters as the main housing resource for post incarcerated persons. With the unmatched supply and demand of homeless shelters, this is not an adequate resource for people, especially those with as high of needs as the post incarceration population. Furthermore, homeless shelters are not equipped to support the mental health conditions people have developed or exacerbated due to their incarceration, which can lead to ex-inmates being kicked out of shelters. Sometimes this cycle leads to the ex-inmate reoffending just to be imprisoned again for a consistent place to sleep. Through this cycle, one can see how the prison industrial complex sustains itself once someone is incarcerated for the first time since the barriers post release are so immense and driven by profitization and disparities.

In addition to poverty and homelessness, there are large disparities in the access to quality health care while incarcerated and after release. According to Up to Date, 80% of people released from prison have chronic psychiatric, medical, and/or substance use disorders".[56] Of that, only 15% saw a primary care provider, outside of emergency room visits, the first year post release.[56] Since several people have mental health exacerbation or development with physical decline while in prison, it should be the is the responsibility of the institution(government) that caused it to provide support once time is served. The government doesn't provide additonal

support and instructs inmates to enroll in state-based health coverage. Prior to the Affordable Care Act, most individuals were unable to qualify for insurance which left them without the ability to access services due to inability to pay (poverty) as mentioned above. Once the Affordable Care Act was passed, people were enrolled in Medicaid, but that didn't solve the issue. Even persons who had a primary care provider, did not return due to feeling judged or ashamed of their health conditions or criminal record. There is an ingrained stigma amongst society about the value of incarcerated people which perpetuates disparities. I suggest incorporating bias training into all medical education, lobbying to increase health care access for all, and using funding to revamp and appropriately fund transitional programs.

CONCLUSION

Solitary confinement has well-documented and consistent long term, and potentially permanent impacts on people. These effects include mental illness development and/or exacerbation, neurodevelopmental changes, and increased mortality. The use of solitary confinement has been outlawed in both juveniles and persons with pre-existing mental health conditions. With the stigma towards mental health many people do not have their mental illnesses diagnosed by a practitioner, nor receive treatment. According to the National Alliance on Mental Health (NAMI), 1 in 5 adults have at least one mental health condition, yet 45% are undiagnosed and/or untreated.[57] Untreated mental health limits a persons access to living a healthy life and being a productive member of society. As mentioned earlier, there are more people in prisons with mental illness than in hospitals seeking treatment. This data itself should be grounds to ban solitary confinement in its entirety because the chance of isolating someone with mental illness is likely. This then is a violation of their eight amendment right, infliction of

cruel and unusual punishment as discussed earlier. Several politicians and public figures such as President Obama, Supreme Court Justice Anthony Kennedy, and Pope Franics have called for solitary confinement to be banned and literature agrees with them. . I believe that a complete restructuring of our criminal justice system, policy, lobbying, and deprivatizing prisons is the most effective way to accomplish the abolishment of solitary confinement. Since safety is the common justification for solitary confinement use, making society safer through inclusive communities with enough resources would prevent violence and elevated crime. Once our society humanizes inmates and focuses on holistic rehabilitation, we will have a smaller prison population, decreased mental health exacerbations, fewer repeat offenders, and a safer society. A safe society eliminates the justification for solitary confinement use. Ultimately solitary confinement kills the mind, soul, and body slowly leaving invisible scars that last a lifetime and prisons are supposed to act as rehabilitation centers not execution facilities.

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