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## CONTENT

<b>Paul Illingworth</b>	COVID-19 the Trigger for SDG Solutions in a Revised WHO Mental Health Action Plan	4
<b>Antony Laban-Sharman, Anne Majumdar</b>	Self-Care practices for anxiety during the COVID-19 pandemic in the UK in adults	9
<b>Ana-Maria Vioreanu</b>	The psychological impact of infertility. Directions for the development of interventions	21
<b>Christos Tsagkaris, Dimitra Desse, Emmanouela Dionysia Laskaratou</b>	Mental health sequelae of bone cancer: A narrative review	35
<b>Komarovskyi M. S., Mykytenko R. V., Onofreichuk Kh. O., Hryshchenkova O. S., Podhorna A. D., Kosolapov O. P., Zolotarov P. V.</b>	Clinical case of catatonic stupor developed as a result of acute respiratory disease COVID-19	39
<b>Larysa Bakhmutova</b>	Main features of expeditioners' personality traits in Antarctic conditions	42
<b>Sayang Ajeng Mardhiyah</b>	Mental health literacy and psychological distress as predictors psychological well-being of collage students in Sriwijaya university	49
<b>Iryna B. Romash, Ivan R. Romash</b>	Dynamics of quality of life indicators in patients with gastroesophageal reflux disease comorbid with connective tissue dysplasia under the influence of complex treatment.	59

# COVID-19 the Trigger for SDG Solutions in a Revised WHO Mental Health Action Plan

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## Abstract

**Introduction.** This paper explores COVID-19 impact on Global attempts to achieve Sustainable Development Goal 3, specifically Target 3.4.

**Purpose.** Suggest a new WHO Mental Health Action Plan needs to be refocused to help achieve universal mental health.

**Approach.** The author discusses the context of COVID-19s impact on Governments inability to progress the UN Sustainable Development Goals, specifically Target 3.4, reviewing this against the WHO Mental Health Action Plan (MHAP) 2013-2020 (WHO 2013). Utilizing relevant publications, progress/lack of progress are discussed, suggestions made as to how, by refocusing the MHAP to one more culturally sensitive and localized, to progress towards universal mental health.

**Discussion.** Contextualizing the lack of specific Sustainable Development Goals mental health target. The continual use by the WHO of promoting western medical approaches to achieve universal global mental health is explored, while using COVID-19 pandemic as a means of triggering change in how localized, culturally specific non-medical approaches could be championed.

4 **Limitation/Strengths.** The paper does not involve an extensive literature search. However, subject matter is timely and relevant. It challenges traditional approaches of how Global Mental Health has been addressed by organizations led by the UN/WHO. It identifies positive ways of progressing global mental health, by utilizing localized and culturally sensitive approaches.

**Practical/Social value.** The suggestions made are cost effective, given the financial challenges COVID-19 has brought, that is a practical and social value in its own right. Additionally, the practical local and culturally sensitive solutions can be used globally. They could be undertaken on their own or in conjunction with traditional western/medical models. The potential social value could be considerable, should it be the focus of the latest WHO Mental Health Action Plan.

**Conclusion.** Any new WHO Mental Health Action Plan must ensure non-traditional interventions are central and increasingly used to achieve universal mental health for all

## Keywords

COVID-19, Mental Health, cultural sensitivity, cost effectiveness, resilience, SDGs.

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## Introduction

The COVID-19 pandemic has brought about great disturbance for the global health community. Governments and all the other different

organizations involved with the fight to control it, is having to do so on many fronts. These include identifying people who test positive through test and trace, directly fighting the disease by caring for those needing acute in-patient care, plus vaccination and where needed resultant end of life care. Increasingly care is undertaken, in many countries, by Primary Care staff and this can include helping people with the so called long COVID and also those having also recovered but who have been left with post COVID anxiety. Additionally, this 'fight' involves supporting health and social care workers, and any others involved directly or indirectly, as well as protecting children's learning and people's livelihoods. This is the focus of the world's attention. However, this work has often been hampered by challenges of access, safety, supplies, and financial stress and increasingly the isolation and mental anguish, the likes of which has never been seen before, at least as far as can be remembered or on record.

This global challenge has resulted in short-term consequences which are evident everywhere, but the long-term costs of the pandemic have only recently started to emerge and be considered. Just how COVID19 will reconfigure health and social care, organizations operating practices, (and not just health and social care organizations, but also schools plus further and higher education establishments, to name a few), livelihoods, professions and priorities is only beginning to emerge

There is now an opportunity to refocus and reform how we do things. This paper suggests that by using the COVID-19 pandemic impact on people's mental health globally, the WHO Sustainable Development Goals (SDGs), specifically Target 3.4, <https://sdgs.un.org/goals/goal3> could be better achieved and that a revised and reconfigured WHO Mental Health Action Plan needs updating and refocusing. By doing so, it will greatly assist to get the globe back on track, from a mental health perspective.

## Purpose

This paper explores the impact of COVID-19 on Global attempts to achieve Sustainable Development Goal 3, specifically Target 3.4 and suggest how a new WHO Mental Health Action Plan needs to be refocused to help achieve universal mental health.

## Approach

The author discusses the current context of COVID-19s impact on Governments ability to progress the UN Sustainable Development Goals, in particular Target 3.4 and reviews this against the WHO Mental Health Action Plan (MHAP) 2013-2020 (WHO 2013). Utilizing relevant

publications, progress and lack of progress are discussed and suggestions are made as to how, by refocusing the MHAP away from the traditional Western medical model to one more culturally sensitive and localized, could help to bring about great progress towards universal mental health.

### Sustainable Development Goals

The Sustainable Development Goals are the recovery framework developed by the United Nations/World Health Organization (UN/WHO) (UN 2021). Their aim is to make everyone globally have an improved and more maintainable life. The UN/WHO see this being accomplished by addressing major global challenges, which they see as; poverty, inequality, climate change, environmental degradation, peace and justice. These challenges are to be addressed globally by governments through the 17 SDGs included in Table 1. Each Goal is broken down into targets relating to specific areas.

Table 1. The Seventeen Sustainable Development Goals

The 17 Sustainable Development Goals		
1: No Poverty	2: Zero Hunger	3: Good Health and Well-being
4: Quality Education	5: Gender Equality	6: Clean Water and Sanitation
7: Affordable and Clean Energy	8: Decent Work and Economic Growth	9: Industry, Innovation and Infrastructure
10: Reduced Inequality	11: Sustainable Cities and Communities	12: Responsible Consumption and Production
13: Climate Action	14: Life Below Water	15: Life on Land
16: Peace and Justice Strong Institutions	17: Partnerships to achieve the Goal	

### COVID-19 Pandemic

Millions of lives have been and continue to be affected globally as a result of the COVID-19 pandemic, it is very likely many more will be before the acute phase has run its course. At the time of writing, it is just over 12 months since the COVID-19 virus had become more widely known. However, the Public Health community had been predicting a similar SARS type virus would strike again, much earlier. Devi Sridhar, Professor of Global Public Health at Edinburgh University, had predicted a coronavirus-like crisis in 2018. Speaking at the launch of her book, co-authored with Chelsea Clinton, at the Hay Book Festival in Hay-on-Wye in Wales, she not only predicted it,



but said it would most likely come from animal to human transfer in China and then be brought to the West by airline (Allen-Mills & Gregory 2020).

Estimates of how many will eventually be directly impacted vary, but there is no doubt, there will be few globally not impacted. Lives have been and will continue to be disrupted, people losing their jobs many forced into poverty, some into extreme poverty. While those with jobs and money and developed countries are and will continue to find this all a great challenge, the impact will be even greater in low-middle income countries (LMICs) and among vulnerable groups everywhere.

It is, and will be for the foreseeable future, challenging for any country to attain the SDGs, but they can and must be achieved. Prior to the COVID-19 pandemic, the majority of countries had begun to make advances towards the SDGs, the Sustainable Development Report 2020 (SDG 2020). The report exposed that there was no country on course to achieve all of the SDGs, but the majority were continuing to progress towards their goals. It is interesting to note that Sach et al. (2020) identified that East and South Asia have progressed more than any other area, with Latin America and the Caribbean progressing the least. However, Sach et al. (2020) cautioned that despite the progress made to date, any further progress has been negatively impacted by COVID-19.

In respect of mental health, there is growing evidence that the pandemic has, is and will continue to impact on the mental health of the world's population across the age range, (Girdhar et al 2020; Shuja et al 2020 and Tanaka & Okamoto 2021). The next pandemic is already with us and it is the mental health pandemic.

## Discussion

Had SDGs and especially Target 3.D, <https://sdgs.un.org/goals/goal3> which asks for “early warning, risk reduction and management of national and global health risks,” been fully operationalized by now, countries globally would have been in a better position and been able to react and thereby control the COVID-19 pandemic better than they have. As mentioned earlier, there was clearly early warnings. Had there been better forethought and greater decisiveness, by Governments globally, many more lives would likely have been saved. It is worth noting that several low-income countries, such as Cambodia and Vietnam, for example, have for the most part stifled it with very little financial cost.

At the time of writing COVID-19 continues to have a major impact globally, it has also seriously resulted in increased inequalities. One area that has especially being affected is the mental health of communities globally. A wealth of publications globally has emerged since the pandemic began,

relating to the negative impact COVID-19 has had on the mental health of people across different age ranges, for example; perinatal and offspring in Spain (Caparros-Gonzalez et al., 2020), children and adolescents in China (Duan et al., 2020) and adults in Indonesia (Siste et al., 2020). While Girdar et al. (2020) cautioned that the elderly in India was at risk from social isolation as a result of COVID-19, García-Fernández et al. (2020) found that elderly people in Spain had significantly less emotional distress than other age groups. No longer should countries be delaying their response to the SDGs in relation to this, and other areas. Given the ensuing mental ill-health pandemic, action needs to be enhanced to address SDG 3 which is all encompassing “Ensure healthy lives and promote well-being for all at all ages”.

The SDG declaration emphasizes that to achieve the overall health goal, ‘we must achieve universal health coverage (UHC) and access to quality health care’ (WHO 2019). However, this is not specific enough. SDG3 Target 3.4 mentions mental health but does not even give it its own target. Instead it states; “By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being. Within Target 3.4, suicide rate is an indicator (3.4.2). One has to question why such an important and growing global concern has not got its own target. Why does the WHO not build on work already being undertaken to strengthen mental health resilience, rather than focusing on traditional western medical intervention, as it does in the Mental Health Action Plan (MHAP) 2013-2020 (WHO, 2013)? Clearly it was not on track before the COVID-19 pandemic struck. There is growing evidence that non-medical, local and culturally aware interventions are successful (Doukani et al., 2021, Jakovljevic (2018) and Raghavan et al., 2020).

However, one has to be careful and a distinction made between non-medical and medical or professional interventions, for example, a very good review was undertaken by Rathod et al. (2018) into “culturally adapted interventions for mental health disorders”. They concluded, there was value in cultural adaptation but there was not strong evidence of what adaptation and for whom. In other words, traditional, westernized interventions that had been adapted to address cultural differences., can work but more research is needed to ascertain what exactly works and what does not.

What this paper calls for, is not a western medical or psychological model that has been culturally adapted for local needs. Instead it asks for non-medical interventions that emerge from cultures within which there are people with mental health problems, where the ‘medical model’ is not accepted for whatever reason or not working. This

could be that the cost is prohibitive, or more likely availability is scarce. In many LMICs the ratio of mental health professional to the population is high and that what care provided is in urban areas. A non-medical intervention could be something as simple as a bench (Chibamba and London, 2019) or religious involvement (Iheanacho et al., 2021), or theatre (Crossley et al., 2019).

To ensure this is prioritized, we require a robust framework for guiding governments to move away from the costly medical and pharmacological models, to one where immediate post-pandemic recovery and long-term strategies focus attention on low cost, localized, culturally sensitive and effective means of building mental health resilience. However, both the UN (2020) policy brief on the need for action on mental health in relation to COVID-19 and the WHO (2021) report into how preparedness and response to COVID-19 into mental health, emphasize a more traditional medical model response.

The WHO Mental Health Action Plan 2013-2020 (WHO 2013) recognized the importance of mental health in achieving health for all. The four objectives; 1) more effective leadership and governance for mental health; 2) the provision of comprehensive, integrated mental health and social care services in community-based settings; 3) implementation of strategies for promotion and prevention and 4) strengthened information systems, evidence and research, were well received. However, with the Covis-19 pandemic and it is now 2021, a new Action Plan going forward is needed and one that offers something different to those previously championed which has had limited success.

### Limitations of the study\Strengths of the study:

The paper does not involve an extensive literature search and has been undertaken by a sole author. However, the subject matter is timely and highly relevant. It challenges traditional approaches of how Global Mental Health has been addressed by organizations led by the UN/WHO and who have championed the western/medical model over other approaches. It identifies positive ways of progressing global mental health, by utilizing localized and culturally sensitive approaches.

### Conclusion

The COVID-19 pandemic and resulting growing mental health related problems must be the trigger to drive change in how mental health is achieved by all. There is a long history of attempting to fix it be traditional westernized approaches, medical interventions and the use of

medicines. Despite recommendations and guidance from the UN and WHO and countries responding to those, the mental health pandemic is growing. The concern is once the viral aspects of COVID-19 are beginning to be better controlled, the mental health pandemic will hit. There are increasing numbers of publications demonstrating that locally based, culturally sensitive and non-traditional interventions are having a significant impact on improving mental ill-health. Any new WHO Mental Health Action Plan should, indeed must, ensure these non-traditional interventions are central and increasingly used to achieve universal mental health for all.

### Conflict of interest

The author declares no conflict of interests

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# Self-Care practices for anxiety during the COVID-19 pandemic in the UK in adults

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## Abstract

**Introduction.** The National Health Service cannot chronically sustain the overwhelming demands being placed on it due to financial cuts, staff numbers and presence of Covid-19. As a result, anxiety levels are on the rise thus increasing the need for effective self-care behaviors.

**Purpose:** The purpose of this study was to comprehend and acknowledge the profound influence Covid-19 has had on anxiety levels and explore what behaviors people engage in to manage their perceived stress levels themselves.

**Methodology:** This study was an exploratory mixed-methods design consisting of 110 self-referred adults aged 18-65 with anxiety completed an online survey guided by the "Harvard Anxiety and Depression Scale". Data collected from the free-text questions were analyzed using the thematic analyses method to evoke the most relevant themes and generate an evidence-based narrative.

**Results and Discussion:** Self-care behaviors used for anxiety self-management pre and during lockdown were walks, virtual family/social peer support, cooking and aerobic exercise. Additionally, it was apparent that a lack of ongoing family/social support was a key predictor for the proclivity of anxiety-inducing thoughts to be experienced. Interestingly, individuals who continually engaged in activity experienced positive mood states irrespective of the current lockdown environment.

**Conclusion:** This study adds to novel literature on the current anxiety levels of adults living in the UK under the Covid-19 pandemic and what self-care behaviors people implement to self-manage their anxiety levels. This study stresses the significance of ongoing peer support as a self-care behavior that can act as a positive mediator for healthy cognitive processes to ensue. Therefore, future self-care programs advocating this strategy may, if not prevent, slow down the rising cases of anxiety and ill mental health due to the uncertain environment of Covid-19

## Keywords

Anxiety, Mental Health, Self-Care, Covid-19, Qualitative.

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## Introduction

Acknowledged in literature as a "feeling of unease, such as a worry or fear, that can be mild

or severe depended on the perceived threat/outcome" (National Health Service [NHS], 2018a), anxiety is ongoing problem for the NHS in England. Currently, 1 in 6 adults, aged 18 - 65, experience some form of anxiety with an additional 2.1 million individuals accessing the NHS Mental Health Service (MHS) in 2018/19 (Baker, 2020). Additionally, the NHS at present spends £13 billion yearly on MHS which equates to a total of 14% economic distribution from local NHS resources (Baker, 2020).

Moreover, these issues are now further amplified by the presence of the Coronavirus Disease 2019 (COVID-19). Despite its recent existence, Covid-19 has had a significant influence on all the domains of society, including physical and mental health in the United Kingdom (UK) (Holmes et al., 2020; Romash.2020). For instance, Kef (2021) and Sahu and Kumar (2020) suggest that social media platforms are spreading pseudo claims about the severity of Covid-19 and amplifying already high tended levels of anxiety. More importantly, literature suggests that ill psychological consequences from the pandemic are expected to be profound due to numerous social determinants of health being influenced by the pandemic such as education attainment (Public Health England, 2018), inequitable income distribution (Department of Work & Pensions [DWP], 2019) and unemployment issues (Foley, 2020). Moreover, the "stay home, protect the NHS, save lives" initiative (Freedman, 2020) may induce further consequences of ill mental health as even though the government initiative was created to reduce the prevalence of infectivity, the "by-products" of such an approach led towards increased levels of loneliness, social isolation, loss of work due to the economic crisis and the media generating distress around the virus that all contributes towards the probable development of depression, anxiety and even self-harm (Holmes et al., 2020; Mahase, 2020). Specifically, as revealed in Holmes et al. (2020) survey of the general population in the UK capturing the "mental health concerns due to the impact of Covid-19", social isolation, loneliness and personal economic difficulties seem to be the primary concerns for people that are also key predictors for anxiety, depression, stress and negative feelings (Elovainio et al., 2017; Frاسquilho et al., 2015; Matthews et al., 2019).

Additionally, the fear of relationship loss, thoughts of uncertainty about the future, bereavement and lack of contact with family members were all common themes amplifying the overall feeling of anxiety (Holmes et al., 2020; Mahase, 2020).

Thus, it is paramount to implement cost-effective practices that will inhibit the sustained feelings of loneliness/anxiety and support feelings of belonging and engagement to preserve the

mental health of individuals living in the UK post pandemic (Connor & Kirtley, 2018).

Additionally, access to ongoing support for MHS across the country have been significantly reduced due to the significant change in work environment and growing demand thus further increasing the levels of concern for health practitioners as it is reported that less than a third of individuals who commit suicide are usually in contact with a MHS within the last 12 months before death (Appleby, Shaw, & Amos, 1997). Hence, increased ongoing access to MHS is paramount post pandemic however, alternative/complementary health-promoting "self-care" (SC) behaviors may be an appropriate cost-effective approach to not only reduce the demand on the MHS but to also support and evoke individuals to develop a sustainable "toolkit" of behaviors that will enable adults to manage their anxiety themselves.

The need for SC in the UK. At present, SC is defined as "the ability of individuals, families and communities to promote health, prevent disease, maintain health, and to cope with illness and disability with or without the support of a healthcare provider" (World Health Organization [WHO], 2019). In a concise manner, SC represents an idea and philosophy for people to be more proactive about their own health (Bhuyan, 2004; Dean & Kickbursch, 1995).

In other words, SC can act as an embodying philosophy to help people prevent and management the onset of anxiety and comorbidities that not only improves their quality of life but simultaneously, would reduce cost, pressure and stress on the NHS.

There are numerous behaviors categorized as SC however, the most common SC approaches/activities presented in literature to manage anxiety in adults are yoga (NHS, 2018b; Stussman, Black, Barnes, Clarke, & Nahin, 2015), mindfulness (Aherne et al., 2016; Decker, Brown, Ashley, & Lipscomb, 2019), exercise (ACSM, 2016; Mikkelsen, Stojanovska, Polenakovic, Bosevski, & Apostolopoulos, 2017), cooking (Farmer, Leonard, & Ross, 2018; Utter, J., Denny, Lucassen, & Dyson, 2016) and peer support (Gillard, 2019; Puschner, 2018).

Thus far, it seems that peer support, through the phenomenon of "socialization", may be the most reliable and valid method of SC for anxiety management as positive outcomes can be seen in a variety of settings such as substance addiction and abuse (O'Connell, Flanagan, Delphin-Rittmon, & Davidson, 2017), clinical populations with mental health disorders (Bocking et al., 2018), ongoing mental health peer support for students (Byrom, 2018), war veterans (Weir, Cunningham, Abraham, & Allanson Oddy, 2019) and peer support within communities to reduce mental health hospital admissions (Lawn, Smith, & Hunter, 2008).

Peer support is a practice where individuals vicariously share lived experiences of discomfort and suffering, form an interpersonal connection, and collectively learn and support one another ongoing (Gillard, 2019; Puschner, 2018). It isn't clear what precise mechanism is responsible for such outcomes however, the phenomenon of "socialization" and "empathy" (Smith, 2006) in accordance with the social cognitive theory (SCT) (Bandura, 2004) may offer some explanation; as individuals who engage in socialization, spark a dialogue where individuals can "vicariously share emotions and thoughts" fostering interpersonal closeness (Smith, 2006) leading towards a positive mood state in conjunction with a positive behavioral feedback loop (Bandura, 2004) increasing the probability for these individuals to re-engage in socialization and further reducing the chance for negative thoughts and feelings to be experienced. Relating this to Covid-19, it is highly probable that people who did not experience ongoing social or familial support would be at risk of experiencing negative cognitive processes fueled by anxiety.

Still, it is necessary to understand the influence Covid-19 has had on anxiety levels and explore what behaviors people engage in to manage their perceived stress levels themselves as it'll guide future interventions to focus on SC behaviors that individuals choose and perform consistently and competently. This is important as future interventions focused on SC behaviors that people enjoy reduces the threat of autonomy, in conjunction with perceived behavioral competence that has been associated with improved self-efficacy which is a strong predictor for behavior adoption and adherence (Bandura, 1997; Ryan & Deci, 2000). Furthermore, this approach should help with the sustained self-management of anxiety levels in the future

## Purpose

To explore the perceived effect of Covid-19 on anxiety levels and what SC behaviors adults use to manage it. The research question is as follows:

- To explore the anxiety experienced by adults during the covid-19 pandemic and approaches used to manage it?

Further objectives:

- To explore the experiences of people during lockdown and their impact on wellbeing.
- To identify peoples' self-care approaches during the lock-down period.
- To inform healthcare practitioners on areas of focus and potential self-care approaches that could be encouraged in the future management of patients who face similar circumstances.

## Methodology

### Study Design, Participant Characteristics & Recruitment

This study was an exploratory study with a mixed-methods design with the primary focus being on the qualitative findings. Following full ethical approval from the St Mary's University ethics committee, this study aimed towards a purposeful snowball sampling plan. Kotrlik and Higgins (2001) suggested that the minimum appropriate number of participants required for a survey analysis is 100 therefore this volume was aimed for and 110 was attained.

Furthermore, such a sample size ensured data saturation was achieved (Tracy, 2013).

Additionally, all participants were given the opportunity to read the generic information about the study, survey and give their consent to prior to participating.

Furthermore, participants were recruited through "word of mouth" (snowball sample) (Tracy, 2013).

Lastly, all participants were either male or female, based in the UK, aged 18-65 with self-referred levels of anxiety.

Consequently, participants who did not meet the previous criteria were excluded from the study.

### Instruments and Procedures

A specifically designed online survey was developed for this study guided by the Harvard Anxiety and Depression Scale with the purpose of achieving deep exploration of experiences as the study idea in its nature was novel and specific.

Additionally, prior to dissemination, a pilot test survey was carried out to ensure the questions were trustworthy and reliable.

Subsequently, the online survey was disseminated with elements of closed-ended, multiple-choice, scale-based and free-text questions in order to best answer the research question and capture people's feelings, emotions and thoughts.

### Data analysis.

The thematic analysis method (Braun & Clarke, 2006) was used to analyze the free-text questions, uncover the most relevant themes and generate an evidence-based narrative.

A 6-phase guide to performing the analyses was performed to ensure the research question was best answered. Themes were data driven (inductive) through the following phases: "Familiarizing yourself with the data" – to submerge the researcher into the themes situated in the text; "Generating initial codes" – articulating small titles to best capture what being articulated; "Searching for themes" – grouping relevant code; "Reviewing themes" – refinement developed; "Defining and naming themes" and "Producing the report".

Closed-ended questions were analyzed using the Statistical Package for Social Sciences (SPSS) software where descriptive statistics were conducted to best contextualize the findings.

## Results

Quantitative analyses revealed that 62% of the study's sample size were female, 79% from a white background in conjunction with 52% being between the ages of 18-29 (Table 1). Additionally, 51% of the study's sample size experienced heightened levels of anxiety due to Covid-19 alongside 59% of individuals who reported consistent worrying thoughts (Table 1).

Furthermore, feelings of isolation were not as high among the sample although still not trivial (32%) (Table 1).

**Table 1.** Illustrating important demographic characteristics, anxiety and isolation percentages of study participants.

Categorical data	Percentage (%)
Primary age range (18-29)	52
Male	38
Female	62
White	79
Mixed / Multiple ethnic groups	7
Asian / Asian British	5
Black / African / Caribbean / Black British	5
Other (e.g. Arab)	4
Feelings of anxiety	51
Experiencing worrying thoughts	59
Feeling isolated	32

In regards to the qualitative analyses, several connected themes and sub-themes emerged from the analyses with "family/social support" seemingly being the most significant factor for the management of anxiety and ill mental health alongside "positive feelings due to an activity" (e.g. exercise) (Table 2).

### Themes.

**High Points During the Lockdown.** In this theme, participants emphasized just how significant it was to be able to see family and friends during the lockdown and that the extra time available allowed individuals to engage in personal development. The sub-themes included the importance of Family/Social Support and Benefits of Personal Development:

**Importance of family/social support.** Seeing family and friends acted as a "coping mechanism" for stress and anxiety management during

lockdown with participants illustrating that *"the high point of the lockdown was certainly more time for myself and my family as well as a slowly paced life in general"* in addition to *"high points when spending time with people virtually and physically throughout lockdown"*. One individual who worked in a hospital provided an insightful reflection on just how important family/social support was:

*"Working for the NHS during the pandemic has been extremely stressful. We are doing more cases and people are more anxious than usual because of the risk of being infected. Due to the short staffing, we have been given more work. Night-time is even worse because we get more serious emergencies then, which makes me physically and mentally exhausted. Having said that, I am able to get through it because I have a good support system at home, being with my family and spending time with them. This allows me to calm my anxieties. Moreover, cooking and baking acts as a good stress reliever*

*before I go for my shifts at the hospital."* (Chloe)

Furthermore, another participant articulated that having a collaborative environment at work was the key determinant in providing psychological reassurance:

*"I was also able to appreciate teamwork and camaraderie at work, which I experienced working in the hospital. Knowing that somebody has my back and supports me through difficult shifts is a great reassurance during this uncertain time. I was able to focus on my physical wellbeing also, pushing myself to be healthier in the way I eat and exercise."* (Georgia)

Despite the differences in context, family/social support seems to be a key psychological variable for providing intrinsic reassurance and inhibiting the feelings of worry and unease associated with anxiety.

**Benefits of personal development.** Another high point for individuals during lockdown was the opportunity for personal development and self-reflection. Many people expressed that *"time for self-improvement"* and *"highs have been having time to work on yourself"* were of significance. Other high points for people have been to allocate their free time towards activity and movement to achieve their self-defined goals such as *"losing weight, cooking meals from scratch, daily walks have been good"* and *"highpoints have been increased exercise activities and total control of my diet"*.

One individual illustrated that having more time for themselves since recovering (from Covid-19) played an important role through the process of returning to full health and normality:



*"Since recovering, I felt more relaxed and being able to go for walks and be in the sunshine has helped, being in furlough has helped ease the worry, recovery from illness has enabled me to get life back on track, improvement in diet and reconnecting with people has helped find normality again." (Arthur)*

*"I was able to improve skills for home such as gardening and cooking. Through this, I was also able to spend more time with my family and better my communication with them. This lockdown has*

*also changed my mindset, appreciating simpler things in life, being content with what you have and finding happiness in whatever you have." (Venessa)*

Thus, perhaps acting as "blessing in disguise", some individuals found that having ample free time and self-reflection sparked up dormant elements of self-development that occupied people's minds enough to engage in a journey of self-discovery and meaning; also inhibiting feelings of discomfort associated with anxiety.

**Table 2.** A summary of relevant themes and sub-themes generated from the thematic analyses

Themes	Sub-themes	Selected quotation
1. High points during the lockdown	1.1 Importance of Family/Social support	<i>High points have been speaking to family and friends. (Sam)</i>
	1.2 Benefits of Personal Development	<i>A high point of lockdown was being able to focus more on myself. (Matthew)</i>
	2.1 Lack of Family/Social support & Feelings of isolation	<i>Feelings of isolation and loss of personal contact with others. (Zoe)</i>
	2.2 I mostly missed family	<i>Not being able to see friends and family from different places in the UK. (Jake)</i>
2. Low points during the lockdown		
3. Drivers towards more positive feelings	3.1 Positive feelings due to an activity	<i>Therapeutic! Done a small amount of gardening and cooking. (Mary)</i>
4. Feelings of anxiety	4.1 Loneliness & isolation	<i>Being cut off from family and friends and feeling alone. (Nancy)</i>
5. Exacerbating anxiety	5.1 Uncertainty about the future	<i>Have felt tearful at times due to the uncertainty of things and not being able to maintain a regular routine. (Katrina)</i>
	5.2 Fear of 2 <sup>nd</sup> wave	<i>Covid returning and being ill again as I don't feel I have the strength to face it again. (Natalie)</i>
6. Facilitating Self-Care	N/A	<i>Talking to my family for reassurance and support. (Michelle)</i>

### Low Points During the Lockdown

In this theme, individuals expressed their feelings of isolation, loneliness and lack of family/social support as the primary factors for increasing their anxiety levels during the Covid-19 period. The sub-theme of this was isolation, especially among those who lacked family/social support, missing family and friends and anxiety.

**Lack of family/social support and feelings of isolation.** In contrast to the significance of family/social support in the previous section, people who experienced a lack of such support and prolonged duration indoors underwent low mood states, feelings of depression, stress and generalized anxiety about the current environment and uncertainty about the future. Quotations such as *"feelings of isolation,*



*feeling low in general”, “a low point is being isolated from friends and family”, “intermittent anxiety and depression”, and “feeling stressed about the uncertainty of the future” provided insightful snapshots in respect to how people felt and why. One individual managed to portray all of these concerns in their response with the lack of family support being something that “let them down”:*

*“Worried not coping with sickness, fear of dying alone, trying to get correct medication because symptoms unclear whether COVID or just flu, lack of support while sick, isolation was difficult, depression not knowing how long this was going to last, feeling exhausted from simple tasks, having to wash, shop and cook during sickness was hard, difficult not being able to order groceries online while sick, feeling anxiety from listening to news and updates of people dying was frightening, unable to tell neighbors I was sick in case they panicked, feeling let down by family because they were too scared to help out, losing my job and worried about finances, also loss of 3 family and friends made it upsetting and real. Spent 2 months living in fear and anxiety.” (Leah)*

Another individual also revealed that sustained lack of contact led to feelings of anxiety and depression:

*“Video calls, with friends and family. When I never got any contact for a few days, then I would start getting feelings of terrible loneliness, and would start feeling a bit depressed.” (Emma)*

Thus, it is evident that sustained absence of family/social support increases the chance for anxiety, feelings of depression and negative cognitive processes (self-critical & self-deprecating thoughts).

**I mostly missed family.** The last key theme was the emphasis from participants that they most missed seeing and talking to their families and friends for psychological reassurance and emotional support during the Covid-19 pandemic. The quotations on this theme were short but plentiful in volume:

*“Company of people, being able to hug people I care about.” (Vicky)*

*“Being able to see my family and friends.” (Jeremy)*

*“Human contact, I love being around people, and socializing.” (Alex)*

Thus, it is clear from the themes that a lack of family/social support is a determinant for the increased risk of anxiety levels and ill mental health.

#### **Drivers Towards More Positive Feelings**

Certain aspects were reported by participants to generate positivity. Sub-themes within this included participating in an activity, seeking peer support and connecting with friends and family.

**Positive feelings due to an activity.** In this theme, individuals who engaged in multiple activities throughout the day such as exercise, cooking, walking and virtual social meetups reported positive mood states. In general, individuals who “kept themselves busy” did not feel unworthy or unproductive thus reducing the chance for self-critical thoughts to ensue. Quotes that best portray this are as follows:

*“Yesterday was a very busy day, I did tasks such as DIY around the house, shopping and exercising. I felt happy throughout the day and productive. By the end I was exhausted!” (Jessica)*

*“I’ve had an extremely fulfilled day with activities that occupied both my physical and mental needs. I’ve studied for an exam, went to a bar with my girlfriend and took a walk with my dog. I can easily say that I’ve felt relaxed and happy throughout the whole day.” (Adam)*

*“Yesterday I woke up early & went for a 3km run followed by a 30-minute strength workout. I ate healthy but nutritious good food & met with some of my friends who I haven’t seen in a while (socially distanced). I feel really positive & grateful that the world has slowed down & we can really enjoy spending time with each other & being in the moment rather than constantly rushing about.” (Taylor)*

*“Woke up, did gardening, exercised and felt very good relaxed in evening and watched a movie and did some reading. Kept myself busy and minimized sedentary activity. Ate three meals with fruit as snacks cooked myself so felt very good doing that as felt healthy too and was extremely calm and relaxed, no stress apart from during exercise pushing my limits but I enjoy that.” (Jake)*

Thus although this outcome is of no surprise, it does illustrate the importance of engaging in multiple activities though out the day as a strategy for SC programs to encourage individuals to preoccupy themselves and not allow self-deprecating thoughts and worries to “creep in”.

#### **Feelings of Anxiety**

In contrast to those who felt positive, numerous people during lockdown felt “sluggish” and unmotivated to partake in regular daily activities due to feelings of isolation, loneliness, uncertainty about the future and fear of a second Covid-19 wave all fueling a generalized feeling of unease and fear. Some people felt “near

*breakdown” whilst others described their feelings as “felt slightly down but hopefully things will get better soon”.*

**Loneliness and isolation.** Loneliness and isolation were feelings that people experienced during the lockdown period that contributed towards the generalized feeling of worry, unease and thus anxiety. Quotations such as *“feeling lonely sometimes”* and *“being alone, feeling restricted”* provided insight that people felt helpless and trapped. Further quotations were:

*“Excess free time, isolated from family.” (Ben)*

*“Day passed o.k. But then I would get feelings of loneliness, I get this more than I did, before lockdown.” (Alex)*

*“During the day I am able to cope, in evenings, feelings of depression, unable to talk to someone because people feel overburdened hearing about my health. Daytime been out walking and to get fresh air for change of environment, seeing people with friends and loved ones, feel isolation even more, having to socially distance. People don’t want me to visit because I have been ill and they are worried of me being asymptomatic and a carrier.” (Sonia)*

### Exacerbating Anxiety

Another key theme was that it was clear that participants were faced with troubled thoughts during the pandemic that exacerbated their anxiety. Sub-themes within this included Uncertainty about the future and Fear of 2nd wave.

**Uncertainty about the future.** In conjunction with the previous sub-theme, individuals reported a sense of *“future uncertainty”* and *“fear of the unknown”* as mechanisms driving ill thought and worry. Quotations such as *“the uncertainty of all our futures scares me”* and *“what will the future look like, fear of the unknown”* illustrate the gravity of how fearful people were about future events. Due to the environment being so volatile and negative, this could potentially explain why individuals felt so insecure about the future in conjunction with personal specific circumstances that further amplified this feeling increasing the risk of anxiety and health-debilitating behaviors.

**Fear of 2<sup>nd</sup> wave.** Due to the infectious nature of the virus and chaotic environment that transpired after, many people felt frightened of the possibility for a second wave unfolding with more Covid-19 deaths. Quotations such as *“dreading a second wave of covid”* and *“I fear the virus may return and kill more people”* briefly illustrates the severity of fear and negative cognitive processes

that were occurring in people’s minds. Further quotations include:

*“Fears that there may be a second wave and i or people I know may get ill and/or die.” (Marva)*

*“Fears - a second wave of the virus.” (Pam)*

*“That people have and are still not taking the Pandemic seriously and that a second one may occur. I worry that I could go out and bring Covid 19 back to my husband.” (Finola)*

*“Fear of a second wave of infections.” (Daniel)*

Thus, this sub-theme may have acted as an adjunct contributing towards the proclivity for generalized anxiety to be experienced. Despite this, it is clear that the reasons for increased anxiety during lockdown are multifactorial and situation specific in respect to how it is developed for each person. More importantly, irrespective of individual intention and activity, environmental influence plays a significant role in changing behavior and consequently, SC programs that reduce environmental variance should be facilitated.

### Facilitating Self-Care

Family/social support acted as a “coping mechanism” for the management of anxiety levels however, this theme illustrates that ongoing family/social support was not only a “coping mechanism” but also acted as a determinant for positive mental health outcomes and inhibition of anxiety and ill-related thoughts. Quotations such as *“support from family and friends”* and *“being able to have virtual contact with friends through face time”* are just a couple of insights vocalized by participants. One person explained how ongoing support provided intrinsic reassurance and due to such a phenomenon allowed her to stay calm through such an uncertain time:

*“Family and friends has been a great support network for me to move through this lockdown. Through the help of social media, I am able to communicate with friends and family even from my native home in Philippines. It reassured me that I am not alone during this time.” (Sarah)*

Others provided less depth and insight but emphasized the same principle from different perspectives:

*“Feeling supported but my family that allowed be to stay calm about life and accept that what was going on was out of my control.” (Debbie)*

*“Focusing on my faith and reuniting virtually with family and friends.” (Ally)*

*“Talking to family and friends about how I am feeling.” (Natalie)*

*“Support from friends and family.” (Ryan)*

*“Seeing a therapist, going for walks and speaking to friends and family most days and avoiding the news.” (Louise)*

*“Lots of family contact with phone and video calls.” (George)*

Despite the lack of depth, there was an overwhelming emphasis on just how significant ongoing family/social support played for individuals during the Covid-19 pandemic towards their mental wellbeing. It is clear that a SC program facilitating a therapeutic environment through dialogue where individuals can vicariously share emotion and experience is paramount

## Discussion

From the results presented, areas of interest can be identified. Firstly, it is apparent that both a lack of and a sustained reciprocation of ongoing family/social support is a key predictor for the proclivity of anxiety-inducing thoughts to be experienced; secondly, in this study the “by-products” of reduced family/social support led to negative thought processes and feelings such as isolation, loneliness and uncertainty about the future; and lastly, individuals who continually engaged in activity experienced positive mood states irrespective of the current lockdown environment.

As Covid-19 is a global pandemic and crisis, the findings from this study, particularly around the importance of peer support as a mediator for positive mental health outcomes, is supported by literature that has captured the psychological impact of global crisis events on individual, community and international levels such as the ill mental health experienced in warzones (Summerfield, 2000), coping mechanisms derived from individuals who had experienced the Ebola virus outbreak in Africa in 2014 (Bortel et al., 2016) and the previous Coronavirus disease (SARS) that occurred in China in 2003 (Tolomiczenko, 2005). Summerfield, (2000) emphasises that “personal recovery is grounded in social recovery” and that “rights and social justice shape collective healing”. Although the environment of warzones may compound the feelings of anxiety more due to its violent nature, ill-related thoughts and feelings of bereavement, guilt, mistrust of public services, generalised anxiety and fear about the uncertainty of future events (Summerfield, 2000) are all relatable findings to this dissertation. Additionally, even in this traumatic context, peer support groups, where people share insight, experiences, thoughts and emotion, seem to facilitate an environment of trust and rapport that helps nurture and develop health-promotion strategies (Coatsworth, Forchuk, & Griffin, 2006; Summerfield, 2000). In contrast to

this, individuals in warzones who lacked community acknowledgement and support felt rejected, abandoned and isolated that increased the inclination of antisocial behaviours and depressive thoughts (Puspoky et al., 2006; Summerfield, 2000) which can also be seen in the context of Covid-19 as individuals who received a lack of peer support and sense of belonging emphasised similar feelings. Comparable findings can also be found during the Ebola virus outbreak where survivors at an individual level, who felt rejected, stigmatised and abandoned by their community experienced feelings of anxiety, depression, isolation, self-harm, worthlessness, sadness and self-stigmatisation (Bortel et al., 2016; James, Wardle, Steel, & Adams, 2019). In conjunction with this, and similar to the environment of Covid-19, the economy of West Africa plummeted due to the Ebola virus outbreak which further influenced the social fabric and rapport between communities and consequently creating a “breeding ground” for anxiety and self-destructive behaviours to ensue (Huber, Finelli, & Stevens, 2018). However, despite the severity and death toll of the Ebola virus outbreak, behavioural coping strategies to tackle and recover from past traumatic experiences involved socialisation/peer support and a commitment to faith as a collective identity to foster a sense of belonging (Bortel et al., 2016; James et al., 2019) which again, is somewhat replicable to the coping strategies of people during the Covid-19 pandemic. Acting as an adjunct to the previous findings, data collected from the previous SARS outbreak, in a hospital environment, confirmed that nurses who lacked the peer support from their physicians/doctors, felt burned out, less informed about the development of SARS, less involved in decision making, rejected and consequently, experienced feelings of worry that affected moral, job satisfaction and fulfilment (Tolomiczenko, 2005). This finding is useful as the environment of the previous SARS outbreak in the hospital domain is likely to be replicable to the current hospital environment of Covid-19 and also confirms the need for peer support to ensure staff are nurtured for and that patient centred care isn't compromised. Thus, despite the differences in environment, there is a universal theme that ongoing peer support as a SC behaviour for anxiety management is beneficial in the context of social upheaval however, a tailored SC strategy for anxiety self-management in the context of Covid-19 is still warranted.

Wu, Connors and Everly, (2020) looked at the previous response to SARS in the context of hospitals and emphasised the need for leadership, cohesion and ongoing support for staff to ensure they felt resilient enough to bare the overwhelming responsibility of Covid-19; whilst new research looking into the mental health consequences of Covid19 advocate the need for



“population-level interventions targeted at the prevention and treatment of mental health symptoms (e.g. anxiety) and at boosting coping and resilience (e.g. exercise)” (Holmes et al., 2020). Perhaps the most promising strategy for successful adherence towards an anxiety self-management intervention post pandemic is online SC (self-help) programmes (Sahni, Singh, Sharma, & Garg, 2021), in particular “self-help guidance on demand” (Brog, Hegy, Berger, & Znoj, 2021). Firstly, integrating self-help programmes for anxiety online concur with current social distancing measures, do not require physical contact, facilitate peer support and are scalable (Brog et al., 2021; Rosen, Glassman, & Morland, 2020). Secondly, a “guidance on demand” approach implies that patients can request therapist assistance when needed whilst still being able to experience unguided (automated) self-help thus promoting cost effectiveness (Brog et al., 2021) and preserving autonomy, an important mechanism for establishing rapport (Bandura, 2004). Most importantly, randomised controlled trials assessing the effectiveness of “guidance on demand” on anxiety have been conducted with “guidance on demand” showing similar positive reductions to that of usual care (in person) or “guided self-help” (online with therapist). For instance, Krieger et al. (2019) carried out a 8-week, compassion focused intervention with usual care combined with “guidance on demand” and usual care alone on individuals who experienced overly self-critical cognitions and found significant medium-large effect sized reductions in self-deprecating thoughts in favour of the intervention group. Similarly, Kleiboer et al. (2015) conducted a 6-week online intervention based on problem solving therapy with the “guidance on demand” group showing identical reductions in anxiety symptoms as the unguided mode of the programme. Likewise, both Krieger et al. (2019) and Kleiboer et al. (2015) findings can be strengthened by additional evidence (Berger et al., 2011; Rheker, Andersson, & Weise, 2015). Thus, it would be safe to assume that best mode of SC for anxiety moving forwards could be online “guidance on demand”.

In the final analysis, amalgamating online, “guidance on demand”, with an activity such as walks (virtual walking groups) or cooking due to its popularity might be an appropriate strategy. Specifically, the “guidance on demand” aspect can promote peer support that acts as a “environmental mechanism” for rapport building through the phenomenon of socialisation and empathy (Smith, 2006) in conjunction with the positive behavioural feedback loop, explained through the SCT (Bandura, 2004), fostering an hedonistic experience and increasing the inclination for adherence towards this pattern of behaviour. Additionally, and to the best of the

authors knowledge, no studies have been carried out this way that would be of use to the area of anxiety self-management. Furthermore, in addition to the benefits from peer support, simply moving would already provide additive benefits both physically and psychologically (ACSM, 2016, 2017) as sedentary behaviour would be reduced. In summary, a SC programme that encompasses peer support with an activity such as walking, cooking or even aerobic exercise should be a cost-effective suitable strategy for helping individuals self-manage their anxiety more competently and reducing the proclivity to submit to negative cognitive processes and engagement in self-destructive behaviours.

### Impact of Findings

The findings of this study are influential, insightful and pragmatic in guiding future health care professionals, from both primary and secondary care services, in producing a program or self-help materials for anxiety. Consequently, in doing so should act as the first step towards reduced NHS pressure and costs. Secondary community health services (e.g. talking groups, weight management, exercise referral) in particular benefit from this study as it would be useful to facilitated SC programs fueled with social support and activity in an attempt to manifest socialization, rapport building, hedonism and thus adherence towards this mode of behavior.

### Limitations of the study\Strengths of the study:

This study adds to novel literature and is one of the first of its kind to obtain insight into people's perceptions, feelings, worries and thoughts about the current uncertain environment of Covid-19 and how people self-manage their anxiety however, this study isn't without its limitations. By its nature, surveys only provide limited insight as it is difficult to portray true feelings and emotions via this mode of data collection. Additionally, some questions were left unanswered in conjunction with individuals potentially providing dishonest answers or just answering the questions with what “the researcher wanted to hear”. Furthermore, some questions may have been comprehended and interpreted differently between each participant despite the researcher's best efforts. It is also important to acknowledge that the findings of this study are only applicable to adults and thus cannot apply to any population outside this age range. Still, despite this both quantitative and qualitative methods were used to facilitate a holistic approach and absorb as much of the relevant findings where possible to generate a useful valid evidence-base narrative. Additionally, as more than 100 individuals completed the survey some trustworthiness, reliability and

saturation can be established. In respect to future research suggestions, it would be useful to focus on the quantitative analyses for this research topic and compare different age groups towards anxiety levels in terms of severity; as this research focused on the qualitative aspect, this analyses was deemed outside the remit for this particular study. Furthermore, as peer support presented itself as being the most influential element of anxiety management, future SC interventions amalgamating peer support with an activity such as walking (walking groups) or cooking (virtual or in person) and using the HADS scale pre, during and post intervention alongside qualitative interviews may be one of many appropriate research strategies acting as a “stepping stone” towards a future SC program promoting anxiety self-management.

## Conclusion

In conclusion, the findings from this study adds to current novel literature on the current anxiety levels of adults living in the UK under the Covid-19 pandemic and what behaviors people adopt to self-manage their anxiety levels. Furthermore, this study highlights the significance of ongoing peer support as a SC behavior that can act as a positive mediator for healthy cognitive processes to ensure that inherently reduces the risk of anxiety levels and ill mental health. Thus, future health care initiatives that seek to facilitate SC and promoting this strategy may, if not prevent, at least slow down the rising cases of anxiety and ill mental health due to the uncertain environment Covid-19 plus other future pandemics might produce.

## Conflict of interest

The author declare no conflict of interests

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# The psychological impact of infertility. Directions for the development of interventions

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## Abstract

**Introduction:** Infertility represents a major health problem that oftentimes is experienced as a crisis situation. Because it interposes with achieving an important life goal, that of having children, its implications on the psycho-emotional level are robust.

**Purpose:** The present article aimed at exploring the multidimensional effects of infertility on mental health, as well as suitable psychological intervention strategies for patients both at an individual and couple level.

**Methodology:** An extensive literature review was conducted to select the most relevant information. Articles included were searched in PubMed, Google Scholar and other similar databases within a seven years interval (2014-2021) to assure the up-to-date quality of the paper. The main criteria of inclusion were: studies about the consequences of infertility on mental health, epidemiology, risk and protective factors, psychological models for infertility, psychological evaluation, established instruments, psycho-social and therapeutic interventions, intervention protocols used in public health for infertility patients.

**Results and Discussion:** Infertility is often experienced as a crisis situation, in which the most common consequences are visible at the level of mood disorders (e.g. anxiety, depression, marked distress) and at the social level (stigma, divorce, social isolation, financial difficulties). Psychological counseling is needed throughout medical treatment and therapeutic interventions (e.g. cognitive-behavioral therapy) have shown favorable results in managing the emotional balance of the individual/couple and reducing the risk of psychopathology.

**Conclusions:** Research highlights the beneficial effects of psychological interventions on reducing levels of stress related to infertility, anxiety and depressive symptoms and on improving the quality of life and couple dynamics.

## Keywords

infertility, risk factors, protective factors, psychological interventions, infertility-related stress

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## Introduction

According to the World Health Organization, infertility is the inability of a couple to obtain a pregnancy after twelve months of regular unprotected sex or after repeated attempts by the woman to become pregnant. Infertility is a major

public health problem worldwide, affecting around 48 million couples and 186 million individuals of reproductive age. A distinction is made between primary infertility - the inability to have a pregnancy - and secondary infertility - the inability to have another pregnancy after a previous successful one. The impact of infertility can have

major consequences both psychologically and socio-economically. The first to suffer from these are women, as they are prone to stigma, an increased risk of domestic violence, divorce, acute distress, anxiety, depression and social isolation (WHO, 2020).

One of the strongest predictors of infertility is the advanced age of the woman, but an equally important role is played by environmental factors and lifestyle. Factors influencing reproductive capacity may be gender specific, but this is not a condition (Hart, 2016).

There are several terminologies explaining this issue, so it is necessary to distinguish between them. First, infertility "is defined as a disease characterized by failure to establish a clinical pregnancy after 12 months of regular and unprotected sexual intercourse due to a person's impairment of reproductive capacity either individually or as a couple." (Borght & Wyns, 2018, p. 2). Infertility is a disease that causes disability as an impairment of the function.

Subfertility is also the effort of couples to achieve a pregnancy, associated with any low degree of fertility. According to the International Classification of Functioning, Disability and Health (ICF), it is coded b660, affecting procreation functions (functions associated with fertility, pregnancy, birth and lactation) - b6600 fertility-related functions with impairments such as subfertility and sterility (World Health Organization, 2001). The terms infertility/subfertility are used interchangeably.

Second, while infertility is a limited condition over a period of time, sterility indicates a permanent stage of infertility (Zegers-Hochschild, et al., 2017).

Regarding the prevalence of infertility, it is estimated to affect one in seven couples of reproductive age in Western countries and one in four couples in developing countries. There are regions around the world that are more prone to infertility such as South Asia, the Middle East, North Africa, Eastern and Central Europe, where the index can reach 30%. The contribution of female and male factors differs: men are involved in 50% of cases, with differences between certain regions of the world. Globally, infertility affects between 8 and 12% of couples, with secondary infertility being the most common. One explanation for this is the risky methods of abortion, the lack of adequate care in maternity wards, which can lead to dangerous infections after birth or abortion (Borght & Wyns, 2018).

Female factors that contribute to infertility may be related to other biological disorders. The International Statistical Classification of Diseases and Related Health Problems (ICD-10-AM) classifies infertility as follows: N97 female infertility (inability to complete a pregnancy) with the following etiologies:

- N97.0 Female infertility associated with anovulation;
- N97.1 Female infertility of tubal origin;
  - o Associated with congenital anomaly of the fallopian tube:
    - locked;
    - occlusion;
    - stenosis;
- N97.2 Female infertility of uterine origin;
  - o Associated with congenital uterine abnormality;
  - o Non-implantation of ovum;
- N97.3 Female infertility of cervical origin;
- N97.4 Female infertility associated with male factors;
- N97.8 Female infertility of other origin;
- N97.9 Female infertility, unspecified (World Health Organization, 2002).

Going further and analyzing demographics around the world, there are six important facts about demography:

- 1) Millions of people worldwide suffer from this condition;
- 2) The highest infertility rates are those of secondary infertility and are found mainly in contexts poor in resources;
- 3) Africa is the region with the most alarming infertility rates globally;
- 4) Africa suffers from a demographic paradox: high infertility rates coexist with high fertility rates;
- 5) Although this issue is a major global crisis, there is an acute lack of prevention programs and treatment services - the main justification being directly linked to a form of control of over-popularization, especially in regions with a very high birth rate (e.g. sub-Saharan Africa);
- 6) The regions that suffer the most from infertility are the same that offer the fewest options of diagnosis and access to treatment (Inhorn & Patrizio, 2015).

## Purpose

The main objective of this paper was to explore and analyze the psychological impact of the infertility condition, with all its multidimensional effects. More and more recent research draws attention to the risk factors for infertility and to the widespread effects of this condition at the bio-psycho-social level. That is why psychological intervention in managing this issue is urgently needed, and the literature suggests scientifically validated methods that can restore psychological balance. Starting from psycho-education and understanding the medical condition, to evaluation and psychological intervention, each step must be followed in order to bring the patient back to the psychological safety zone, to help him face the challenges that follow and to support him in taking those better informed decisions. Therefore, psychological support is essential from the



moment of diagnosis until the end of treatment, regardless of its results.

## Methodology

The present study is a literature review intended to serve as a practical guide for mental health specialists for the development of individualised interventions for infertility patients. Articles included were searched in PubMed, Google Scholar and other similar databases within a seven years interval (2014-2021) to assure the up-to-date quality of the paper using keywords such as: „Infertility-related stress“, „Risk factors“, „Psychological impact“, „Counseling“, „Interventions“. The main criteria of inclusion were: studies about the consequences of infertility on mental health, epidemiology, risk and protective factors, psychological models for infertility, psychological evaluation, established instruments, psycho-social and therapeutic interventions, intervention protocols used in public health for infertility patients. The exclusion criteria were the year of publication (older than 2014) and the source of publication (low impact factor).

## Results

### **Risk factors and consequences of infertility**

According to the literature, there are many factors that can influence the spontaneous fertility of the couple. These include:

- *Reproductive system disorders*: congenital disorders, muscle tissue gland, endometriosis, polyps and anatomical problems;
- *Genital infections or sexually transmitted diseases*;
- *Old age*: the quality of fertility begins to deteriorate at the age of 25-30 years in women and studies show that most of them are not aware that postponing a pregnancy increases the risk of infertility. Moreover, it is erroneously considered that medical treatments used to have and maintain a pregnancy can solve the problem of declining fertility caused by old age. The prognosis is all the more unfavorable as the woman's age is over 35 years, and the duration of infertility exceeds 3 years (Eijkemans, 2014);
- *Hormonal dysfunctions* (e.g. hypothyroidism, hyperprolactinemia);
- *Smoking and alcohol consumption*: studies show that 40% of men suffering from infertility are smokers. The impact of smoking is also great in women, as nicotine works by destroying eggs faster. A lost egg cannot be recovered, which is why women who smoke reach menopause up to 4 years earlier than normal age. Alcohol consumption in men indicates a reduction in sperm count (Sabarre, Khan, Whitten, Remes, & Phillips, 2013);
- *Obesity and nutrition*: because the most common complication of obesity in women is

polycystic ovary syndrome (between 30-70% of women with this syndrome are obese) the risk of infertility is exacerbated (Tsai, et al., 2013).

- *Sexual violence*: research indicates that women who have a history of psychological trauma caused by sexual abuse have a three times higher risk of infertility (Deyhoul, Mohamaddoost, & Hosseini, 2017).

- *Testicular dysfunction and sperm quality*;

- *Negative life experiences and stress*: studies in mice show how systematic stress affects reproductive function by inhibiting a key hormone in the reproductive system. Moreover, life history theory provides a frame of reference that explains the impact of adverse early life experiences on fertility from an evolutionary perspective. Specifically, people who experience unfavorable childhood conditions (e.g. lack of resources, family imbalances) are more likely to approach a fast life history strategy characterized by impulsive behaviors, early reproduction, prolonged physiological activation, and poor mental health management. All this translates into a major risk of infertility in adulthood (Schweiger, Schweiger, & Schweiger, 2018).

Infertility itself does not show a certain somatic symptomatology, except when it is associated with other clinical conditions. Instead, perhaps the most common symptomatology of infertility is at a psychological level, as mental health can be affected in a proportion of 30 to 80% depending on the cause and duration of infertility (Luk & Loke, 2015). The main symptoms can range from stress and an inferiority complex, to anxiety and major depression (Yusuf, 2016). Stress levels are much higher among women, for various reasons. Perhaps one of the most important reasons is the status of being a mother, a fundamental role in the life of a woman, which for many of them is considered defining and therefore an essential purpose in life. The inability to achieve this goal comes with many emotional imbalances, and can be a crisis situation that threatens the psychological well-being of women. In addition, some studies have suggested that among women suffering from infertility, the initial level of stress caused by the condition is compounded by additional stress, at least as strong, caused by medical treatments. The level of stress caused by infertility treatment is the second highest intensity of a stressor, after the death of a family member or divorce (Wiweko, Anggraheni, Elvira, & Lubis, 2017).

The consequences of infertility extend to the family, social and economic level, the damage given by this condition being multi-dimensional. Next, some of the dimensions of this issue will be analyzed.

- a) *The psychological dimension*: as mentioned above, perhaps the most affected area of life is the psychological one. The most common reactions



observed among individuals and couples when they hear the news are the shock reaction, denial (which if prolonged can prevent access to early intervention), anger (perception of an injustice), the feeling of losing control (weakening coping mechanisms), social isolation, guilt (which can lead to depression), anxiety (Kirca & Pasinlioğlu 2013; Sezgin & Hocaoglu 2014).

b) *The socio-cultural dimension:* culture, traditions and beliefs play a very important role in certain societies, putting their mark on issues related to the subjectivity of each person's health. For example, in developing societies, infertility can be a real social problem, with couples facing stigma and experiences that lead to shame and marginalization. These things happen because of the emphasis on various values, especially those related to family life, namely: social pressure to have children as soon as possible after marriage, portrayal of the child in the form of a supreme achievement that brings pride and prestige, the attribution of the parent to transfer certain norms and social

roles further. For such cultures, the inability to fulfill their "mission" and social and family expectations can be categorized as a defect, a major disadvantage or can be understood as a bad will to have a child. Therefore, if they are unable to achieve their social roles defined by their own culture (women, the role of mother and men, the role of male example), people suffering from infertility are at risk of developing feelings of lack of self-worth, decreased self-esteem and the perception that there is something wrong with them as a family unit (Patel et al., 2018; Pinar & Yildirim, 2016).

*The economical dimension:* infertility treatments are expensive and long-lasting, which is why couples who are part of resource-poor areas may be unable to gain access to treatment. Moreover, in some cultures (mainly in developing countries) the inability to give birth to a child comes with a breakdown of a woman's economic security, caused by various consequences: divorce, alienation from family members, withholding of any financial resources provided by the family until then and even confiscation of the inheritance (Rouchou, 2013).

Medical treatment	
Assisted Reproduction Technology (ART)	<ul style="list-style-type: none"> <li>• involves all fertility treatments aimed at manipulating either the egg or the embryo</li> <li>• in vitro fertilization (IVF) being the most widely used procedure worldwide</li> </ul>
Perfusion of sperm from the fallopian tube	
Agents that induce ovulation	
Intra-fallopian gamete transfer	

**Fig 1. Treatment options for infertility**

Primary prophylaxis is the most useful method of reducing the frequency of infertility, but most of the time it is not applied. In order for the prevention to be effective, access to information about the disease and risk factors is needed. Research has indicated that, including among women with a high level of education, the significant impact of advanced age on infertility or the risks associated with reproductive assistance technology remain unknown (Hammerberg, et al., 2017). Since a crucial step in preventing infertility is to implement change into lifestyle and certain deleterious habits, being informed about what to do in order to achieve a healthy pregnancy is the basis for active strategies of help seeking and preventing the secondary effects of a possible diagnosis (e.g. distress, anxiety).

Unfortunately, most people only start to inform about this when they are directly confronted with the problem, and worries and feelings of fear have already set in, putting pressure on the effectiveness of treatments. Therefore, the role of prevention is to meet the educational needs of people who want children, to protect them from the psychological shock of a potential diagnosis of infertility, but also to promote good health practices overall. The promotion of psycho-educational programs on this topic, but also free access to scientific information, are two key points of primary prophylaxis (Öztürk, Siyez, Esen, & Kağnici, 2020).

#### ***Psychological aspects involved in infertility issues***

The psychology of infertility began to take shape in 1930, with the introduction of the psychogenic model of infertility by Berg and Wilson, in which it was postulated that a major cause of infertility unexplained medically is represented by psychopathology. More precisely, the etiological factor of unexplained infertility would be a psychic conflict of different nature: conflicting sexual identity, conflicting relationship between mother and child (Berg & Wilson, 1991).

Over time and with the advancement of research and technology in gynecology, the psychogenic model has lost its validity, proving that the probability that unexplained infertility is caused exclusively by psychological problems is extremely low and that, in most cases, it is basically a biomedical problem (e.g. pelvic pathology). However, the contribution of the psychogenic model has been considerable, setting the starting point for psychological research in the field of obstetrics and gynecology (Boivin & Gameiro, 2015).

A major influence in the psychological study of infertility was launched by the advancement of multifactorial models, one of the best known being the bio-psycho-social model. It attests to the contribution of various factors (biological, psychological, social, environmental) in the etiology of somatic diseases. Thus, there may be several determining factors and consequences of diseases, which manifest themselves differently from person to person, depending on the personal history, individual differences, various developmental environments, etc. (Lipowski, 1984).

One current direction of research that continues to receive much attention is the link between stress and infertility. This field is developed through a solid body of studies that focuses on many aspects starting from individual characteristics (such as gender, type of stressor, life events), explanatory mechanisms (lifestyle, hormones, compliance with treatment) and reaching up to protection factors and intervention models (such as counseling, psycho-education, help-seeking behavior). Another aspect that deserves a glimpse of change it is the excessive focus on female infertility, losing sight of the male factors that can contribute to this issue. Especially in the psychiatric debate of infertility, men tend to be included much less often in research and therefore neglected during treatment. That is why recent studies recommend shifting attention to the area of dyadic models of conceptualization and intervention (Boivin & Gameiro, 2015).

Continuing along the lines of psychological models of infertility, we review a theoretical framework that discusses several variables that can lead to the development of specific intervention models. The Interaction Model of Client Health Behavior (IMCHB) argues that the interaction between intrapersonal and contextual

factors is what contributes to the client's healthy behavior. Shortly, clients present two important sets of variables, namely, background variables - demographics, social influences, medical history, environmental resources - and dynamic variables - intrinsic motivation, affective response, cognitive appraisal - where the firsts are relatively stable over time, and the dynamic ones are influenced by environmental factors. Therefore, dynamic variables are intrapersonal, and due to their modifiable nature, are targeted in behavioral interventions designed to support health-oriented behavior (Cox, 1982). This model has a major impact in promoting behavioral tactics designed to reduce the risk of poor health (for example, by changing lifestyle and trying to eliminate vicious behaviors).

Most often, infertility takes the form of a crisis situation, putting in danger the psychological well-being of the individual/couple, life satisfaction and other aspects of mental health. It is useful to conceptualize the crisis so that we understand how to deal with the problem in the most effective way (Fig.2).

Summing up the above, we can make a general observation on the areas of research in infertility. Two main directions are those of medicine and clinical psychology and those of social models. From this point of view, infertility research is a vast, eclectic field, focusing on the essential aspects of each field. For example, the clinical perspective turns its attention to psychological distress as a direct result of infertility, coping mechanisms and effective methods to identify those who need prompt intervention. On the other hand, the social perspective draws attention to several concepts such as health-oriented behavior, seeking help, the social role of being a parent, stigma, marital dynamics, gender differences, culture, and individual/dyadic differences (Johnson, Greil, Shreffler, & McQuillan, 2018).

Anxiety and depression are the most common psychopathologies in infertile couples for several reasons: uncertainty about the cause of infertility and the success rate of treatment, uncertain duration of treatment, financial difficulties and social pressure. Of all these, the strongest predictor of depression is the duration of treatment. On the one hand, because a long duration of treatment can lead to trial failures and a possible chronicity of the disease. On the other hand, the longer the duration of treatment, the greater the risk that the identity of the disease will be known to more friends and family members, which can lead to social pressure, stigma or feelings of shame (Maroufizadeh, et al., 2018). A current review of the literature indicates that the symptoms of clinical intensity manifested occur in 25 to 60% of people affected by infertility (De Berardis, et al., 2014). Moreover, research draws attention to the fact that high levels of depression

in women are associated with avoiding medical treatment and increasing dropout rates after the first cycle of treatment. Consequently, the reasons for giving up treatment or refusing specialized help are explained by psychological factors (Rich & Domar, 2016).

Unfortunately, the complications of depressive symptoms and acute stress have effects on the success rate of treatment, forming a kind of

vicious circle. In short, stress produces harmful effects on the hormonal system, with implications on sexual functions and the body's response to treatment (Ergin, et al., 2018). Therefore, psychological interventions concomitant with medical treatment specific to infertility are a necessary condition in restoring the equilibrium of the individual/couple and in removing obstacles to the success of treatment.

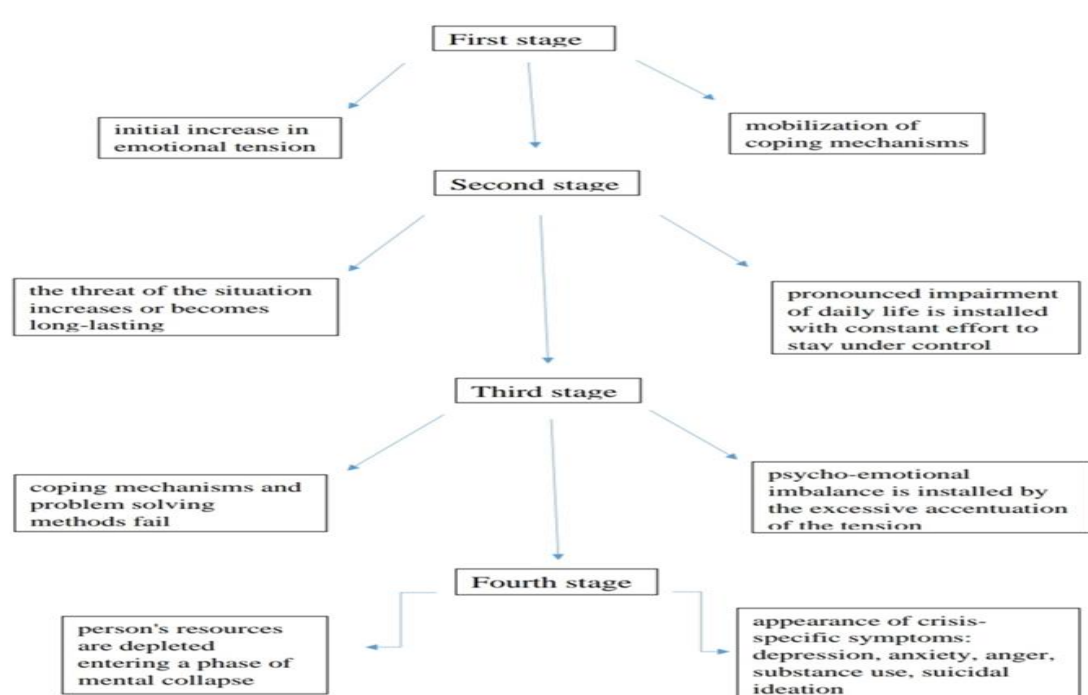


Fig.2 The four-step model of crisis response (Caplan, 1964).

### Psychological evaluation in infertility

When it comes to estimating the impact of a diagnosis of infertility on the functionality and psycho-emotional balance, it is important to analyze the aspect of psychological evaluation. Psychological evaluation should be done both in the initial stage, immediately after the diagnosis and before the start of medical treatment, and after the implementation of the treatment plan and throughout it.

When the patient is in the initial stage, that of learning about the diagnosis, one of the therapeutic goals should focus on exploring his concerns and fears about what is to come and on psychological preparation, strengthening internal resources for treatment requirements. An important first step in this process is the correct information of the patient about the condition he suffers from, the treatment possibilities and the expected results. Thus, the patient will know the details necessary to form realistic expectations and will lay the foundations for informed decision making.

The literature emphasizes a person-centered approach to counseling, and the U.S. Institute of Medicine has even provided a definition of what it means to provide patient-centered health care: "Providing care that respects and responds to the patient's individual preferences, needs and values and ensuring that patient values guide all clinical decisions" (Institute of Medicine, 2001). Taking into account the specific needs of the patient, the risk factors for high distress can be analyzed, depending on his history and individual differences: pre-existing psychological disorders, attitudes towards parental status, coping mechanisms, quality of couple relationship, social support network and treatment-related factors such as side effects, success rate and others (Doyle & Carballado, 2014).

The main objective of the psychological evaluation of the patient with infertility will capture the emotional status and reactions/attitudes towards infertility before starting treatment. For the evaluation to be as valid as possible, it needs to be structured on several levels:

a) Gathering information

- from the personal, medical, professional, psychiatric history, both of the individual and of couple;
- Establishing the current level of functionality;
- Checking the impact of infertility on mental health, marital stability, reproductive and sexual history;
- Administration of psychological tests.

#### b) Clinical interview

- Necessary for completing the clinical picture, favoring the evaluation and construction of an intervention plan;
- Combining psychological testing with the clinical interview provides an appropriate assessment and identification of the patient's psychopathology and immediate needs.

Therefore, a correct psychological assessment will include theoretical, clinical and therapeutic principles, so as to ensure the quality of services provided, the implementation of effective treatment and / or the application of counseling sessions to support the patient / couple in the medical process (Covington & Burns, 2006).

When it comes to psychometric assessment, the main indicators to consider are stress / distress, coping strategies, social support, quality of life, adaptation to treatment, helplessness, acceptance, anxiety and depression. An important aspect here refers to the use of instruments to measure the specific valences of infertility, as general psychological scales cannot provide sensitivity and specificity for infertility. Thus, more than ten instruments have been developed to measure the impact of infertility at the psychological level and to capture vulnerable areas or protective factors (Pedro, et al., 2016). These include: Fertility Problem Inventory (FPI; Newton et al., 1999), Fertility Quality of Life Tool (FertiQoL; Boivin et al., 2011), COMPI - Fertility Problem Stress Scales (COMPI-FPSS; Schmidt, 2006), SCREENIVF (Verhaak et al., 2010), FertiSTAT (Bunting et al., 2010).

Fertility Problem Inventory (FPI) is one of the first multidimensional questionnaires built to capture the most relevant aspects to consider in the therapeutic process in patients with infertility. It is a self-report questionnaire and can be completed by both members of the couple. The tool shows considerable gender differences in the effect of stress on perceived anxiety and depression symptoms, self-reported resilience levels, and marital satisfaction, both from a female and male perspective (Zurlo, Cattaneo Della Volta, & Vallone, 2017).

Fertility Quality of Life Instrument (FertiQoL) is a tool that focuses primarily on measuring the quality of life of patients with infertility and is a standard in the psychological assessment of

infertility. It consists of two parts, namely: FertiQoL Central and an optional treatment module that measures quality of life levels throughout medical treatment.

FertiQoL Central consists of 4 scales totaling 24 items that measure the emotional, mind-body, relational and social dimensions. The treatment module contains 10 items plus 2 more general items that measure the well-being of physical health and of life in total. FertiQoL also presents the necessary psychometric qualities, being validated in several countries (see [www.fertiqol.org](http://www.fertiqol.org)) (Aarts et al., 2011; Donarelli et al., 2016).

COMPI (Copenhagen Multi-Center Psychosocial Infertility) - Fertility Problem Stress Scales (FPSS) is a key tool used in assessing infertility related stress on a global level. It was built on the basis of the Fertility Problem Stress Inventory (Abbey et al., 1991) and patient interviews (Schmidt, 2010) in order to determine risk factors for infertility distress that may interfere with treatment, but also protective factors and gender differences (Sobral, Costa, Schmidt, & Martins, 2017).

The other two mentioned instruments, SCREENIVF and FertiSTAT, are two very useful screening tools in the rapid evaluation of the patient immediately after diagnosis. SCREENIVF (Ockhuijsen et al., 2017) indicates the patient's risk of developing a psychopathology at the end of infertility treatment, and FertiSTAT (Blanchet et al., 2019) provides support in assessing knowledge about the pathology and helps increase awareness of associated risk factors for infertility. The latter consists of a list of indicators representing the main risk factors for low fertility in women and men, where each indicator is coded by a color signifying the severity of the factor (blue, yellow, orange and red - for more details see <http://www.fertistat.com/>).

## Discussion

### ***Psychological intervention strategies for patients with infertility – Opportunities and Challenges***

The role of psychological counseling in infertility highlights essential issues both individually and as a couple or group. Counseling should be a step that every patient with infertility goes through, as the implications at the psychological level, but also at the level of the treatment plan, are essential.

In the initial stage of psychological counseling, the patient benefits from a framework based on unconditional acceptance, empathy and active listening, so as to be motivated to seek and find the most appropriate solutions for him. The European Society of Human Reproduction and Embryology (ESHRE, 2002) explains how the process of psychological counseling gives the



patient the opportunity of making informed decisions when it comes to medical treatment for infertility. Basically, the counselor prepares the person to start treatment, provides support throughout the treatment and helps them adapt to the different outcomes that treatment procedures may have. Moreover, the counselor facilitates the consideration and adoption of alternatives in case of treatment failure (e.g., adopting a child or accepting a happy child-free life) (Joy & McCrystal, 2015).

There is a growing trend in research to identify the most effective types or strategies of psychosocial intervention. This imposes a challenge for the mental health practitioner as research in recent years has failed to establish a clear methodology due to mixed results. For example, some meta-analyses (Ying et al., 2016; Chu et al., 2017) have suggested that psychological interventions lead to a significant reduction in negative affect caused by infertility, help increase the likelihood of becoming pregnant, and improve marital function (Frederiksen et al., 2015). On the other hand, there have been meta-analyses that have indicated the lack of significant effects of psychological interventions on the chance of becoming pregnant and on the decrease in stress levels (Boivin, 2003). Therefore, it is imperative to investigate the effectiveness of psychological interventions in managing the stress caused by infertility and their possible effects on the pregnancy rate and satisfaction in the couple. Next, it is important to describe the psychological interventions that the literature indicates to be the most useful to apply to patients with infertility.

One of the interventions that has enjoyed significant positive results in reducing distress caused by infertility is cognitive-behavioral therapy (CBT). Numerous studies have suggested that CBT techniques are useful in managing perceived stress and infertility-related mood disorders (such as anxiety) (Zhou, Cao, Liu, & Xiao, 2021). Such techniques include relaxation methods (autogenic training, progressive relaxation), stress inoculation training (SIT), cognitive restructuring (techniques for identifying and modifying distorted cognitions induced by automatic thoughts about infertility; e.g. catastrophization, global evaluation), problem-solving and decision-making techniques, and lifestyle-related education (nutrition, exercise, sleep and work schedule) (David, 2017). Some studies included in this meta-analysis (Greil et al., 2014) and which used CBT as a psychological intervention, showed that patients report significant improvements in mood, stress management and marital satisfaction at 6 months post-intervention. Moreover, progress tends to be sustained over time, with participants indicating lower scores for depression 1 year after treatment.

In order to create a clearer picture of how CBT sessions are conducted, we can take as an example the randomized control study of Karaca et al. (2019), in which a classic CBT intervention protocol was followed. In this study, the experimental group benefited from a group cognitive-behavioral therapy program over 11 weeks. The sessions lasted on average, two hours, only the first and last one having 20 extra minutes to complete the pre and post intervention questionnaires. The first session focused on the patient's psycho-education both on the disease (with the help of an obstetrician) and on drug and psychological treatment options. The next two sessions focused on clinical assessment (assessment of the patient's condition and needs) and conceptualization of the case (a comprehensive explanation of the patient's clinical picture). The next six sessions were key to therapy, implementing cognitive-behavioral stress management methods and techniques such as progressive muscle relaxation, breathing control techniques, planning and goal setting, methods for identifying and disputing negative thoughts and ways to replace them with adaptive ones that contribute to psychological well-being. Furthermore, the participants were supported in exploring the maladaptive coping mechanisms they used until then to cope with the symptoms of anxiety and depression, in order to improve them and to become more effectively. Participants were given homework after each session, as they help to strengthen the skills learned in therapy. Session ten aimed to address other issues specific to infertility, namely the couple's sexual problems. In the last session, a general conclusion was made based on the summary of the key points of each meeting and indications were given for strategies that can be adopted to prevent relapses.

The results of this study suggest that group cognitive-behavioral therapy has significant positive effects on the control group, on infertility related stress, symptoms of anxiety and depression and on general health. These results are conclusive with other studies, which point to the high efficacy of CBT (individual) in reducing global stress caused by infertility, with post-test results indicating a considerable decrease in stress and anxiety / depressive symptoms compared to the initial results (Faramarzi et al., 2013; Springer et al., 2018).

Another therapeutic intervention very often used in the areas of health psychology is based on the principles of mindfulness meditation. The fundamental principle of mindfulness meditation is the awareness of the present moment, sustained attention, giving up judging what is happening here and now (negative thoughts / emotions) and practicing gratitude (Bai, et al., 2019). Evidence from the literature shows the effectiveness of mindfulness-based interventions in reducing



anxiety and depressive symptoms (Eisendrath, et al., 2016) reducing chronic pain (Morone, et al., 2016) and increasing quality of life (Montgomery et al., 2016). The ability to be flexible and shift your attention to what you are experiencing right now helps to integrate and accept thoughts and emotions, ultimately leading to detachment from their negative valences (e.g., in case of depression, feelings lack of self-worth and lack of hope) (Creswel, 2017).

Therefore, interventions such as those based on mindfulness are useful and should be applied in reproductive medicine, as in addition to the long-term benefits specific to the patient, they may have other benefits such as limited costs and conservation of limited resources for infertility treatment.

A new therapeutic technique derived from the CBT area, belonging to the third wave of cognitive-behavioral therapies, is Acceptance and Commitment Therapy (ACT), which shows promising results in recent studies. This technique is based on certain essential processes such as acceptance, mindfulness (contact with the present moment), cognitive diffusion and actions accompanied by commitment, which aim to achieve and develop psychological flexibility (Hosseiniapanahi, et al., 2020). Through this therapy, the patient learns to accept subjective experiences with all his thoughts, feelings, and perceptions, to limit excessive attention to himself as a victim, and, perhaps most importantly, the person learns how to identify his own qualities and internal resources and how to translate them into behavioral goals, to use them for easy adaptation to life experiences (Samadi & Doustkam, 2014). ACT has been shown to be effective in interventions targeting mental disorders, but also chronic medical conditions (e.g. chronic pain). The main effects act on reducing psychological pain (suffering) and improving psychological well-being (Gloster, Walder, Levin, Twohig, & Karekla, 2020).

To sum up, the literature captures three of the most useful therapeutic strategies that can be used in patients with infertility: cognitive-behavioral therapy, therapy based on mindfulness and therapy through acceptance and commitment. It comes as a challenge for the therapist to find and use the therapeutic strategy that best fits the client, as every person has its individual differences.

Furthermore, it is important to follow the instructions in the established practice guidelines to ensure the quality and efficiency of psycho-social services provided to patients with infertility. Such an example of guidelines is the guide by Boivin and collaborators (2001), which is divided into six sections that describe the objectives, purpose, communication skills required and potential problems that may arise in the psychosocial counseling of patients with infertility.

Briefly, the first section contains the necessary information on the medical consultations to be performed and how they differ from other types of consultations in the field of obstetrics and gynecology. The second section introduces the role of counseling the patient with infertility and highlights the most common challenges, who is more likely to need counseling, who can do more counseling and what it entails. Section three, recalls patient-centered good practices and indicates ways to incorporate counseling into the medical treatment scheme. Section four focuses on factors that may determine the urgent need for counseling such as treatment failure, worsening psychological distress, or sexual dysfunction. Section five considers different ways of reproduction and discusses the ethical and moral issues they may impose (e.g. donating gametes, choosing a surrogate mother, or adoption for both heterosexual and homosexual couples). Section six mentions additional ways of psycho-social help that can be integrated with counseling in fertility clinics such as the delivery of psycho-educational materials, online / telephone counseling, help groups, self-help strategies. To illustrate as clearly as possible the content of this practice guide, the following examples can be provided:

- For example, in the case of psycho-educational materials, they must be written in a comprehensive way and in such a way that the patient does not feel excluded if he cannot identify with the situations described as an example. At the same time, it is important that the information provided is empirically supported, to capture the essential aspects of the issue (risk / protective factors, coping / resilience mechanisms) and to normalize the psychological consequences.

- In the case of support groups, social support is facilitated, options are offered to strengthen a meaningful life (child-free or by resorting to alternative methods of forming a family), strengthening coping strategies so that patients face the inter and intra-personal problems they may encounter.

- In the case of patients with high levels of psychological distress, clinical evaluation is performed and methods of therapeutic intervention are established in order to reduce the level of risk to psychopathology.

- In the case of patients who are at the end of medical treatment, the perceived effects of losing an important goal in the couple's life are addressed in therapy or counseling and the present condition of the partners is analyzed to observe the level of preparation before the end of treatment.

These are some of the essential examples for counseling the infertility patient exposed in this guide (Boivin, et al., 2001).

National Institute for Health and Care Excellence (NICE) in the United Kingdom is an international benchmark for good practice based

on scientific evidence. The recommendations regarding the care of the patient with fertility problems emphasize the central role of the effects at the psychological level and how the information should be provided so as to be helpful to the patient. It mentions the need to inform both partners about the effects of stress caused by fertility problems, how it can affect sexual function, leading to reduced sexual contact and, therefore, to the spread of fertility problems. Furthermore, people suffering from fertility problems are encouraged to consult a mental health specialist, as addressing problems, investigations and medical treatments can exacerbate psychological stress, making the person vulnerable. Psychological counseling should be provided to the patient both at the time of diagnosis (pre-treatment), during and at the end of treatment (post-treatment), regardless of the results obtained. A final important principle for infertility counseling is that the person providing counseling should not be directly involved in the process of treating the clinical condition (NICE, 2017).

### Limitations of the study

One of the limitations in the counseling of infertility patients is the lack of extensive prevention programs at a public level. Such programs are mainly based on primary prevention (prevention of the onset of the disease) and secondary (therapeutic actions taken for early detection and for slowing down the progression of the disease). An effective prevention strategy should consider eliminating, giving up, and reducing exposure to risk factors (e.g. smoking, unhealthy diet, sedentary lifestyle). Some of the clinical practices that have proven to be effective in prevention are medical checks to ensure the proper functioning of the reproductive system, screening for sexually transmitted diseases, prevention of addictive behaviors (smoking, substance use) in adolescents, smoking cessation in adults, promoting a healthy lifestyle through a balanced diet and constant sport (Borghet & Wyns, 2018).

Another limitation would be that this paper considers three widely-used and proven methods of therapeutic interventions for infertility patients. Nevertheless, there are other types of interventions that can help in the therapeutic process but were not mentioned here.

### Conclusions (and Future Work)

The role of the mental health specialist is undeniable in the treatment process of infertility and research is increasingly pointing out its importance. For example, as mentioned in this paper, the patient-centered approach is the

medical care that should be implemented in any clinic. If up until now, the role of the counselor was more in crisis management and providing information needed to make decisions, now his contribution is focused on the area of psychotherapy. Taking into account the most important responsibilities of the mental health specialist in the field of reproductive medicine, the following can be summarized:

- The mental health specialist has the task of creating and effectively implementing prevention / intervention programs specific to the patient's emotional needs, respecting the patient-centered approach, in order to increase awareness of the need for psychological support in such cases;
- Helps patients in decision making;
- Supports the development of adaptive coping mechanisms and helps to identify maladaptive patterns;
- Helps the patient prepare for the start and maintenance of treatment cycles (by developing psychological flexibility, resilience and other internal resources);
- Develops and implements psycho-social self-help tools based on empirical evidence for the patient to benefit from outside the clinic;
- Provides training to medical staff in order to develop communication skills with the patient and knowledge of the psychological implications of such a diagnosis;
- Develops programs and support groups for patients in the high risk area of psychopathology (Patel, Sharma, & Kumar, 2018).

In conclusion, research clearly highlights the beneficial effects of psychological interventions on reducing levels of stress related to infertility, anxiety and depressive symptoms and on improving the quality of life and couple dynamics. It is important to have access to and promote such types of interventions, as many patients are reluctant to resort to them, although their implications have been proven and continue to be. Therefore, the practical objective of this paper is to provide an overview of the psychological impact of infertility and possible directions for designing of psychological prevention and intervention programs in infertility.

### Conflict of interest

The author declares that she has no conflict of interests.

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# Mental health sequelae of bone cancer: A narrative review

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## Abstract

**Introduction:** Bone cancer causes a significant mental health burden. Although the mental health implications of cancer as a whole have been widely discussed, there is limited evidence regarding the psychiatric and psychological sequelae of malignant and benign bone neoplasms in particular.

**Purpose:** To summarize the scientific literature, present relevant knowledge gaps and discuss a number of recommendations. **Methodology:** The authors searched Pubmed/Medline and Google Scholar with keywords (mental health, bone cancer, musculoskeletal neoplasms, psychiatric comorbidities). When appropriate, MeSH terms and Boolean operators were used. Relevant peer reviewed studies published in English, French or German until 05 May 2021 were included.

**Results and Discussion:** Loss of mobility, decrease of physical activity, chronic pain and amputations in combination with patient's previous psychiatric history, socioeconomic conditions, cancer biology and treatment-related side effects undermine the mental wellbeing of patients and carers. Since March 2020, the COVID-19 pandemic has posed an additional burden, which is yet to be comprehensively evaluated.

**Conclusion:** More research and solid action towards the integration of mental health care into the management of bone cancer is crucial.

## Keywords

cancer, bone cancer, osteosarcoma, mental health, depression, anxiety

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## Introduction

Bone malignancies are among the least common types of cancer. In terms of incidence, they have accounted for approximately 0.2% of all new cancer cases in 2021. 0.3% of all cancer mortality is associated with bone and joint tumors according to the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute of the United States of America (NCI, 2021). Malignant bone cancers are either primary or secondary. Primary bone tumors, namely chondrosarcoma, osteosarcoma, Ewing's sarcoma, chondrofibrosarcoma, malignant giant

cell bone tumor and malignant fibrous histiocytoma, are rarer (Franchi, 2012). Secondary bone tumors usually derive from breast, lung and prostate primary tumors. Bones constitute the third most common metastatic sites (Jayarangaiah, Kemp, Theetha Kariyanna, 2021).

Mental health conditions are quite prevalent among patients with cancer affecting at least 30% of them. Cancer associated emotional distress, loss of functionality, change of body image, uncertainty, treatment side effects, chronic pain and disease progression contribute to the development of mental health conditions such as anxiety disorder, depression, dementia and

substance use among patients with cancer (Niedzwiedz, Knifton, Robb, Katikireddi, Smith, 2019). On top of these, cancer-induced alterations in neurotransmission, hormone secretion and hepatic function can affect patients' conscious and unconscious mental activity (Dai et al., 2020). Although, several aspects of mental health have been investigated in the context of particular types of cancer or neoplastic disease as a whole, to date little is known about mental health and bone cancer.

## Purpose

The purpose of this review is to provide an overview of the available research in the fields, present the knowledge gaps, discuss their implications in contemporary research and clinical practice and outline relevant recommendations.

## Results and Discussion

### *Aspects of mental health in bone cancer*

During the last years, a limited number of clinical, observational and cross-sectional studies have evaluated the impact of bone cancer on mental wellbeing of patients and patients' cohabitants, the biological underpinnings and certain clinical aspects of bone cancer.

Sachsenmaier and colleagues (2015) assessed the mental health implications of bone sarcoma by means of a structured questionnaire. In a total of 66 eligible participants, 53% of patients reported an optimistic attitude and 37.5% reported emotional steadiness. Female patients and patients with less than two offsprings were more prone to pessimistic ideas. Well-educated and married patients were more likely to seek psychological consultation. Elderly patients had a higher likelihood to experience feelings of isolation, while relationship trouble within families was common (Sachsenmaier, Ipach, Kluba, 2015; Storey et al, 2019). In a critical review of evidence published until 2017, Storey and colleagues investigated the effect of bone sarcoma in mental health and quality of life of 8,823 patients reported in a sum of 12 studies. Their analysis indicated that relapse rates was the most common cause of anxiety and depression. Painful tumors were strongly associated with psychiatric comorbidity leading to worse quality of life, higher levels of perceived stress and even marginalization. Amputations were identified as a key factor in mental health deterioration, although a limited number of patients reported self-esteem improvement following amputation procedures (Storey et al., 2019). The latter was consistent with the findings of Gil et al. (2018), who assessed the mental health implications of amputations by means of a retrospective study involving 46 patients with metastatic osteosarcoma and

reported pain remission and improved self-confidence following amputation (Gil et al, 2019).

The psychobiological aspects of bone cancer have been addressed by He and colleagues (2019) in an 84-months long clinicolaboratory study investigating the expression of mental health-related proteins in chondrosarcoma tissue samples. Their study showed that death-domain-associated (DAXX) protein, dopamine D3 receptor (DRD3) and disrupted-in-schizophrenia-1 (DISC1) protein were highly expressed in moderately, poorly differentiated and metastatic osteosarcoma tumors. On the contrary, their expression was significantly lower in tissue samples of osteochondroma, a benign tumor. Further analysis associated the presence of these proteins with worse survival rates and outcomes and suggested them as potential chondrosarcoma biomarkers (He et al, 2019).

A recent study by Groot et al. (2021) analyzed the responses of 47 patients – patient cohabitants' pairs to a series of questionnaires with an eye on quality of life, pain, depression, and anxiety. Patients and their cohabitants – who presumably acted as informal carers – scored similarly for quality of life. Nevertheless, higher levels of depression and anxiety linked with an overestimation of the patients' burden were detected among the patients' cohabitants (Groot et al, 2021). Finally, Bartels et al. (2021) attempted to map the impact of the COVID-19 pandemic on the emotional status of patients with bone metastases in a sub-study of the PRESENT cohort. Statistical analysis of the responses of 169 patients to a structured questionnaire indicated that 28% of patients experienced significant levels stress and anxiety associated with the course of the pandemic and the related restrictive measures. 39% of the patients had similar feelings regardless of the lockdown situation, while 29% did not mention such feelings. On these grounds the researchers concluded that the pandemic has affected the psychosocial wellbeing of the majority of patients with bone metastases (Bartels, 2021).

### *Knowledge gaps and the way forward*

It appears that the interest in the mental health implications of bone cancer has increased in the last 5 years. Nevertheless, the available evidence is still scarce and heterogeneous. Most studies agree that bone cancer leads to a quality of life deterioration and undermines patients' and carers' mental wellbeing (Sachsenmaier, Ipach, Kluba, 2015; Storey, 2019; Gil, 2019). Interestingly, it seems that amputations can affect patients' mental wellbeing positively, to the extent that they relieve them of chronic pain and discomfort (Sachsenmaier, Ipach, Kluba, 2015; Storey, 2019). On top of these, biomolecules implicated in mental health disorders have been associated



with bone cancer and are further assessed as biomarkers.

Evidently, there is a lack of clinical studies assessing the effectiveness of psychosocial interventions (individual or group oriented psychotherapy and counseling, psychiatric medication, ergotherapy sessions etc) in supporting bone cancer patients' and carers' mental wellbeing (Lingens, Schulz, Bleich, 2021). During the COVID-19 pandemic digital psychosocial interventions can be implemented and assessed. Telehealth has already been used to perform neuropsychological tests and monitor patients with dementia, who did not have access to physical healthcare facilities due to COVID-19 restrictions (Carotenuto, Traini, Fasanaro, Battineni, Amenta, 2021). Moreover, the impact of amputations and other forms of treatment, such as radiotherapy and chemotherapy, should be assessed in the mental wellbeing of specific vulnerable patients' groups such as children and refugees. Taking into account the cultural factors contributing to pain and disease perception, it is also important to compare patients and carers' attitudes in different continents, countries and social contexts. The aforementioned should also be investigated among healthcare workers. Simultaneously, there is a clear need for more research about the biological interconnection of bone cancer and mental health disorders. Such research can yield biomarkers and potential therapeutic targets with multiple applications in oncology and psychiatry.

Currently, the way forward appears twofold encompassing research and clinical interventions. Research needs to address the knowledge gaps, preferably by means of large-scale studies. Retrospective research appears as the optimal means to assess the potential effects of particular mental health indicators and interventions. Intention – to – treat analysis can be used to evaluate the potential effects of mental health oriented treatment strategies across different study groups. Systematic reviews and metaanalysis of the generated evidence can be performed in regular intervals, in order to inform researchers in the field, administrators and policymakers. Clinical interventions can be based on the existing knowledge and psychosocial care practices in cancer. In this context, the concept of a multidisciplinary cancer team including mental health specialists and practitioners should be enhanced (Silbermann, 2013). Healthcare providers and insurance agencies should also take action to provide patients with bone cancer with access to mental health services. Finally, yet importantly, patients' organizations, civil society and health bodies should advocate for the integration of mental health into bone cancer management.

## Conclusions (and Future Work)

Mental health increases the burden of bone cancer. Recent studies have illustrated the psychosocial implications of bone cancer towards patients and carers and its potential biological underpinnings. More research and solid action towards the integration of mental health care into the management of bone cancer is crucial.

## Conflict of interest

The authors declares that they has no conflict of interests.

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# Clinical case of catatonic stupor developed as a result of acute respiratory disease COVID-19

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## Abstract

*The aim of this work is to demonstrate and analyze a clinical case of catatonic stupor as a consequence of the complex effect of the infectious process, namely systemic inflammation and direct neurotoxicity of the SARS-CoV-2 virus on the nervous system. A retrospective analysis of outpatient and inpatient medical records was performed. . Analysis of clinical case proves the possibility of catatonic syndrome due to acute respiratory disease COVID-19. 2. Given that catatonia is an urgent condition, it is necessary to be vigilant about its occurrence.*

## Keywords

COVID-19, post-infectious catatonia, mental disorders, clinical case.

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## Introduction

Despite the fact that COVID-19 primarily damages the respiratory system, as the pandemic continues, the number of patients in whom the infection affected the nervous system and neuropsychiatric disorders such as hyposmia, stroke, insomnia, neurotic disorders or delirium increases. One of the potential post-infectious disorders may be catatonia. Only sporadic cases of it are described, and reliable data on observations about it are absent. At the same time, careful attention is paid to post-infectious catatonia caused by COVID-19, because in the absence of timely recognition and treatment of this urgent condition there are serious complications that can be fatal.

## The aim of the work

The aim of the work is to demonstrate and analyze a clinical case of catatonic stupor of post-

infectious origin due to the acute coronavirus disease COVID-19 in patient P., 40 years old, who from 25.03.2021 to 30.04.2021 underwent examination, treatment and rehabilitation in Starokostiantyniv military hospital.

## Materials and methods.

A retrospective analysis of outpatient and inpatient medical records was performed.

## Results and discussion

Catatonic stupor is a psychopathological syndrome characterized by immobility combined with lack of verbal contact and increase of muscle tone. Catatonia has traditionally been regarded as a sign of endogenous psychosis, especially schizophrenia. However, this syndrome is not nosologically specific and can occur in many diseases: up to 20-25% of its cases are somatogenously caused (Dunaievskiy. Kuznetsov, 2019). Constantine von Economo was the first

who described catatonic syndrome after acute respiratory disease in detail in the structure of lethargic encephalitis, which affected some patients after the Spanish flu during the pandemic of 1918-1920. In May 2020, during the COVID-19 pandemic, Italian doctors were among the first to report an atypical curative case of "akinetism". In retrospect, it was regarded as a catatonic stupor (Cooper, Ross, 2020). In the same month, British doctors reported a case of catatonia, manifested by stupor and accompanied by disorders of perception, in a man with COVID-19 (Caan, Lim, Howard, 2020). In the systematic review of the literature as of 20.04.2021, in addition to the above, there are 7 more relevant cases of catatonia due to COVID-19 (Schneider, Smith, Wohlleber, Malone, Schwartz, 2021). The authors consider its appearance as a consequence of the complex impact of the infectious process, namely systemic inflammation and direct neurotoxicity of SARS-CoV-2 virus on the nervous system, as well as psychosocial factors leading to post-traumatic stress, anxiety and depression. Differential diagnosis with hypokinetic delirium is proposed, which in particular consists in a rapid positive response to benzodiazepines: patients quickly, significantly improved after their prescription, which is not typical for delirium.

Below is our own clinical case of catatonic stupor, which developed in a patient as a result of COVID-19.

In the life history, the burden of heredity on mental illnesses is remarkable: the father is "commissioned" from armed forces after the transferred TBI on a line of psychiatry, the aunt on a line of the father suffers from depression. The patient underwent regular medical examinations during military service and was considered healthy. At work, family and friends are characterized positively. Patient does not smoke, denies the abuse of psychoactive substances.

Case history: from 08.03.2021 there was a general weakness, increased body T to 38.0 ° C. 10.03.2021 performed PCR with real-time detection, during study of nasopharyngeal lavage revealed RNA of SARS-CoV-2 virus. Outpatient treatment was started: heparin, moxifloxacin, xarelto, pulmobriz, serrata, vitamin therapy, tonic therapy, physiotherapy. D-dimer from 12.03.2021 103.0 ng FEU / ml. CT of the chest from 16.03.2021: "CT signs of viral pneumonia. High probability of COVID-19. CT-I (area of the affected parenchyma up to 15%)". Antibiotic therapy was continued. Feelings began to improve, the body's T decreased, staying in the range of 35.9-36.5 ° C. From 21.03.2021 due to the fact that the condition was regarded as recovery, treatment was canceled.

During the illness there was a pronounced somatopsychic asthenia, in particular, weight loss of 7 kg, complained of fatigue, patient was weak,

lethargic, anxious, suspicious, for example, many times a day measured the saturation of oxygen in the blood. Despite the improvement in somatic condition, general weakness, fatigue and anxiety aggravated. Obvious changes in mental status from 22.03.2021: he spoke in a quiet, hoarse voice, became retarded, tense, reacted sluggishly to others, decreased appetite, and almost stopped sleeping at night. On March 23, 2021, due to the expiration of the term of outpatient treatment, he tried to start military service, due to severe asthenia; his release from duty was extended. On March 24, 2021, stereotypical movements appeared the patient stared straight ahead, could not pay attention to anything. 25.03.2021 consulted a psychiatrist, recommended MRI of the brain. In the process of preparation for MRI in the X-ray room finally stopped moving, did not respond to painful stimuli, and did not respond to the spoken language. MRI of the brain from 25.03.2021: "MR data for the presence of changes in the volume of the substance in the brain at the time of the examination was not detected. MR signs of focal process of the brain, most likely against the background of neuroinfection. Hospitalization with a diagnosis of catatonic syndrome is recommended. On admission to the hospital, examined while lying on a couch, his face tense, with his eyes tightly closed, he resisted the attempt to open them. On the language, painful stimuli did not respond; muddy. He showed waxy flexibility in the muscles of the upper extremities, there were elements of passive submission: he allowed himself to sit on the couch, stuck in this position with his arms outstretched. Body T = 37.4 ° C, blood pressure = 130/100 mm PC, Ps = 120 / min., Sp O2 = 97%. Laboratory tests within normal limits (leukocyte count 7.9 x 10<sup>9</sup> cells / l). Delivered to the department on a stretcher. Introduced solution of Diazepam 5 mg / ml 4.0 ml v.m. About 30 minutes after the injection of Diazepam, opened his eyes, followed the interlocutor's gaze, responded to the spoken language, and made verbal contact. The patient answered in terms of the respondent, but in one word, in a quiet, low-modulated voice. Attention is unstable, exhausting. Oriented comprehensively enough, productive psychotic symptoms, gross cognitive impairment did not show. Patients followed the instructions as much as possible. According to the Bush-Francis catatonia scale, the patient scored 20 points, which convincingly indicates the presence of catatonia. Subsequently, on the background of treatment and rehabilitation, the patient's condition continued to improve, followed by discharge in a state of stable compensation.

## Conclusions and suggestions

1. Analysis of the above clinical case proves the possibility of catatonic syndrome due to acute



respiratory disease COVID-19. 2. Given that catatonia is an urgent condition, it is necessary to be vigilant about its occurrence. Based on this case, it is necessary to consider the possibility of its occurrence not only at the height of the infectious process, but also as it resolves, i.e. to show increased vigilance to convalescents and not leave them unaccompanied in outpatient and family medicine. If catatonic stupor is suspected, it should be diagnosed with other similar conditions, including hypokinetic delirium, taking into account the difference in subsequent treatment tactics. Patients with pre-existing psychiatric pathology are likely to be at risk, especially if catatonic syndrome is present. It is possible that the development of catatonia in the patient described by us contributed to the burden of heredity in psychiatry, which was realized after the transferred somatopsychic extreme factor. 3. Prevention of anxiety among the population should be carried out, as the neurotization of society on the background of a pandemic comes up with to the emergence of mental disorders. Obviously, that the characterological anxious thinking of the patient, considered in the clinical

case, in stressful conditions was one of the factors that led to the deterioration of the mental state.

### Conflict of interest

The authors declares that they have no conflict of interests.

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# Main features of expeditioners' personality traits in Antarctic conditions

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## Abstract

**Introduction.** Determining the benefits of basic human personality traits is one of the main components of the selection and staffing of small groups of peoples that are working in extreme environmental conditions and socio-spatial isolation. These groups include teams of polar explorers, scientists from outlying research bases, ship and submarine crews, and aircraft and space shuttles teams.

**Purpose.** To identify the prevailing type of temperament of and personal changes in people working on the Antarctic station during a one-year period of isolation to develop measures to maintain their mental and physical health.

**Methodology.** A total of 48 people (46 men and 2 women aged from 23 to 63 years) from four wintering teams of the Ukrainian Antarctic station (UAS) "Akademik Vernadsky" were voluntarily interviewed according to the Eysenck Personality Questionnaire (EPQ). The poll was conducted twice – before the departure to the Antarctic station and after their return after a year. Participants were studied in two groups (24 peoples) once again after a 6-month stay on the Antarctic station, to determine the level of psychoticism. The research was based on the analysis of preferences and changes in personality traits: Extraversion/Introversion, Neuroticism/Stability, and Psychoticism/Socialization.

42 **Results.** Based on the analysis of indicators such as Extraversion/Introversion, Neuroticism/Stability, and Psychoticism/Socialization, we determined the general structure of the personal characteristics of the expeditioners. Indicators of these characteristics showed that more than a third of the expeditioners (36.1%) were pronounced extroverts. A majority (61.1%) of the respondents were characterized by an intermediate between extraversion and introversion, and only 2.8% were pronounced introverts. 58.4% of the respondents were characterized by a low level of neuroticism, while 33.3% were characterized by medium level of neuroticism. Only 8.3% were found to have a high level of neuroticism. Low levels of psychoticism were predominant in 56.3% of the respondents while the remaining 43.7% had medium levels of psychoticism. A high level of psychoticism was absent in the respondents which indicates a psychologically correct selection of the team. Analysis of the dynamics of psychoticism revealed that there were higher growth rates (+0.97) of average indexes of psychoticism during the first 6 months of the expeditioners' stay at the Antarctic station than at the end of the activity. This was due to the "acute adaptation" period when the respondent fit in the natural conditions of Antarctica. Furthermore, there was a development of psychoticism in the expeditioners during the "polar night"; the growth rates of psychoticism decreased after adaptation.

**Conclusions.** To maintain people's mental health at the Antarctic station, it is optimal to select candidates for a one-year expedition with average rates of extraversion-introversion, and mostly low rates of neuroticism and psychoticism. These personal characteristics must be taken into account when forming an expedition team. The level of psychoticism during the expedition increases under the influence of the adverse environmental conditions of Antarctica and the socio-spatial isolation.

## Keywords

adaptation, Antarctic expeditioners, extraversion, introversion, mental health, neuroticism, psychological changes, psychoticism, personality traits, socio-spatial isolation, winter-over syndrome, wintering teams.

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## Introduction

On extreme conditions of the Antarctic environment, Palinkas (2002) wrote that «Antarctica is the highest, driest, coldest, and windiest of the earth's continents». The vast majority of this continent is an ice desert, where people are exposed to prolonged low temperatures, high solar radiation (due to opening in the ozone hole), strong geomagnetic disturbances, and the effects of polar day and polar night. Thus, the Antarctic continent is not suitable for human life and activity. These natural factors significantly affect the functional and psychological state of people who work at polar stations under extreme conditions for a long time. As a result, this leads to negative consequences in their physical and psychological state such as deterioration in health, well-being, mood, and performance; and weakening of cognitive functions. The signs of psycho-physiological and psycho-emotional disorders such as chronic stress, anxiety, grumpiness, depression, fatigue, low activity, reduced performance, and violations in the social sphere appear (Romash, 2019; 2020). These disorders are called «winter-over syndrome». Studying the impact of the «winter-over syndrome» on human health has been repeatedly investigated by many authors: Alfano et al. (2021); Chen, Wu, Li, Zhang, and Xu (2016); Cravalho (1996); Miroshnychenko et al. (2020); Palinkas (2002; 2017); Palinkas, Reed, and Do (1997); Sandal, van de Vijver, and Smith (2018); Steinach and Gunga (2021); Suedfeld (1998); Chengli et al. (2003) etc.

Some of them, for example, Chen et al. (2016) and Kuwabara et al. (2021), study the processes of human adaptation to polar conditions. It was universally defined that sleep disorders in members of winter teams increase. The study of the regime, quality, and duration of sleep at the Antarctic station are described in Collet et al. (2015); Folgueira et al. (2019); Sandal, van de Vijver, and Smith (2018); Shylo, Lutsenko, D., Lutsenko, O., Babiychuk, and Moiseyenko (2020).

Polar expeditioners often note the unwarranted occurrence of headaches and vegetative-vascular reactions, and the deterioration of mood and well-being, mostly during the Antarctic winter (Temp,

Lee, & Bak, 2017). The influence of seasonality (polar day and polar night) and long-term isolation was studied among the winterers of the Indian expedition to Antarctica (Bhagava, Mukerji, & Sachdeva, 2000).

The team's psychological climate is negatively affected by the limited number of people who are in a small space of the base during the entire year. At the same time, the processes of chronic stress and fatigue progress while the processes of adaptation of psychophysiological functions slow down (Bakhmutova (2020); Mohapatra, Anand, and Raju (2020); Nirvan et al. (2020); Palinkas (1992). This increases the risk of psycho-emotional disorders and contravention of interpersonal interaction. The psychological consequences of isolation and prolonged stays in small expeditionary groups have been studied in Oliver (1979); Mullin (1960); Suedfeld and Steel (2000); Tortello et al. (2020).

The relationship between individual psychological characteristics of people and the emergence of psychosocial issues in small group during isolation on the Antarctic station are presented by Kokun and Bakhmutova (2020; 2021 and Palinkas and Suedfeld (2021).

One of the main components of the psychological selection of a candidate to the UAS «Akademik Vernadsky» is to determine the benefits of individual psychological characteristics of the expeditioners.

Here, the main criteria are the indicators Extraversion/Introversion, Neuroticism/Stability, Psychoticism/Socialization. The concept of Extraversion/Introversion was developed by Eysenck H. J. (Eysenck, S. B. G., Eysenck, H. J. & Barrett, 1985; Eysenck, H. J. & Eysenck, S. B. G., 1993), where the physiological interpretation of the benefits of Extraversion or Introversion was defined. It is a feature of the central nervous system, which depends on the balance between the processes of excitation and inhibition.

Extraversion/Introversion balance together with more pronounce factor Neuroticism/Stability (emotional-volitional stability or instability) is considered as the main characteristic of the personality. Jung (1995) defined introversion as an «attitude-type characterized by orientation in life through subjective psychic contents», and

extraversion as “an attitude-type characterized by concentration of interest on the external object.”

Neuroticism is one of the more than well-established and empirically validated personality traits. Widiger and Oltmanns (2017) noted that “Persons with elevated levels of neuroticism respond poorly to environmental stress, interpret ordinary situations as threatening, and can experience minor frustrations as hopelessly overwhelming”. Numerous studies are currently being conducted to establish the links between these personal qualities and the peculiarities of mental processes (including cognitive processes).

Psychoticism is the third personality trait in the Eysenck personality model and is defined as a personality type that is prone to risk-taking, possibly engaging in anti-social behaviors, impulsiveness, or non-conformist behaviour (Eysenck, S. B. G., Eysenck, H. J., & Barrett, 1985).

Taking such characteristics into account in the recruitment processes to work at the Antarctic station allows to make an optimal selection of team members and the rational use of individual characteristics to effectively perform tasks by each of the expeditioners. Moreover, the presence of high levels of neuroticism and psychoticism can adversely affect the mental health of people. Therefore, we recommend the Eysenck Personality Questionnaire (EPQ) as a necessary tool to maintain the mental and physical health in extreme environmental conditions.

In addition, considered such psychological preliminaries in Antarctica could be demand in the preservation of the mental and psychological health of people in long term cosmic missions (Tortello et al., 2018). Antarctica is seen as a natural laboratory analogue of a space for psychological research. Suedfeld (2018); Suedfeld and Weiss (2000) (as cited in Mohapatra, Anand, and Raju, 2020) stated that “Understanding of human behavior and performance in isolated and confined environment (ICE) has been the area of interest for all those involved in human space program”. All of the above confirm the importance of defining and studying the structure of individual psychological personality traits in polar expeditions as a factor of human mental health.

## Purpose

The exploration of the predominant type of fundamental personality traits (Extraversion/Introversion, Neuroticism/Stability, Psychoticism/Socialization) is aimed at maintaining mental health, and understanding and predicting changes in the psychological and physiological state of expeditioners.

The aim of study was the assessment of the predominant type of the temperament of people working in Antarctic expeditions and identification

of personal changes under the influence of extreme environmental conditions of Antarctica and socio-spatial isolation. Usually, these indicators are recorded using various scales and questionnaires.

## Design/Methodology/Approach

An Eysenck Personality Questionnaire (EPQ) was used for the expeditioners of the Ukrainian Antarctic expeditions at the “Akademik Vernadsky” station. The scales measured by the EPQ are: Extraversion/Introversion, Neuroticism/Stability, Psychoticism/Socialization in addition to the Lie Scale (Timo Lajunen & Hanna R. Scherler (March 1999). Extraversion and introversion are typically viewed as a single continuum; therefore, being high in one necessitates being low in the other. This version has 100 Yes/No questions.

### Participants and Procedure

This study involved 48 expeditioners (46 men and 2 women; aged 23 to 63 years) from the the Ukrainian Antarctic “Akademik Vernadsky” station who participated in four annual expeditions (12 people in each group) between 2016 and 2020. This Antarctic station is located in West Antarctica on Galindez Island.

The research was conducted on the basis of the State Institution National Antarctic Scientific Center of the Ministry of Education and Science of Ukraine (<http://uac.gov.ua/en/>) that organizes the annual scientific expeditions to the Ukrainian Antarctic station “Akademik Vernadsky”. According to State Special-Purpose Research Program in Antarctica for 2011-2023 (<http://uac.gov.ua/en/research-program-en/>), this is main operator in Ukraine for coordination of logistic operation and scientific research in Antarctica.

### Statistical Analysis

The Statistical Package for the Social Sciences version 22.0.0.0 was used for statistical analysis. Descriptive statistics (frequencies, mean, standard deviation) and a paired sample t-test were used. We used paired samples because data distributions for all indicators were close to normal (modulo sum of skewness and kurtosis < 1).

## Results

According to the EPQ, we diagnosed the severity of individual psychological personality traits after the type of temperament. Based on the analysis of the frequencies of the dichotomous indicators Extraversion/Introversion, Neuroticism/Stability, Psychoticism/Socialization, we determined the general structure and severity of personal characteristics in the sample (Table



1). More than a third of the expeditioners (36.1%) were pronounced extroverts. The majority of respondents (61.1%) were characterized by an intermediate position between extraversion and introversion, and only 2.8% were pronounced introverts (Table 1).

Table 1  
**The structure of personal characteristics in expeditioners at the UAS “Akademik Vernadsky”**

The structure of personal characteristics	Levels of personal characteristics (%)		
	Low	Middle	High
Extraversion/Introversion	2,8	61,1	36,1
Neuroticism/Stability	58,4	33,3	8,3
Psychoticism/Socialization	56,3	43,7	0

It is well known that neuroticism is a fundamental domain of personalities with huge public health implications. It was proved that the people with high levels of neuroticism respond poorly to environmental stress, interpret ordinary situations as threatening, and can experience minor frustrations as hopelessly overwhelming (Widiger & Oltmanns, 2017). That is, the benefits of Neuroticism/Stability (a characteristic of emotional instability or resilience) as a personality trait feature that maintains purposeful behavior in normal and stressful (extreme) conditions, which is especially important to consider when selecting expeditioners for long Antarctic expeditions. According to our results, 58.4% of the Ukrainian expeditioners had a low level of neuroticism, 33.3% were characterized by a medium level of neuroticism, and only 8.3% had a high level of neuroticism (Table 1).

Psychoticism determines the presence of personality traits that are manifested in interpersonal relationships: aggression, impulsivity, aloofness, and antisocial behaviour, indicating a susceptibility to psychosis and psychopathic disorders (<https://dictionary.apa.org/psychoticism>).

Psychoticism is associated not only with antisocial behaviour, but also with aggression. Human psychotic behaviour is characterized by severity, conflict, inattention, carelessness, hostility, anger, egocentrism, and impulsiveness in interpersonal interaction. The psychoticism scale study was conducted only for two groups of UAE winterers with a total of 24 people. This indicator may show the respondent's antisocial behavior, inadequate emotional reactions, high levels of conflict, non-contact, which is unacceptable for work in

extreme conditions of group isolation. We found that most of the UAE winterers—56.3%—had a low level of psychosis, and 43.7% possessed a medium level of psychosis (Table 1). High levels of psychoticism were completely absent in the expeditioners. This indicates a psychologically correct selection of the team.

An analysis of the dynamics of psychoticism in two groups (24 people) found that during the first 6 months of the period of “acute adaptation”, which coincides with the “polar night” (study D1-D2; Table 2), a higher growth rate (+0.97) of the average indicators (M1-M2) of psychoticism was observed than in the previous 6 months (study D2-D3). This indicates the significant influence of the Antarctic environment and the effect of the body's adaptation processes on the mental health of expeditioners.

In the second half of the year, psychoticism increased at a slow rate (+0.45) (Table 2) because the period of psychophysiological adaptation to Antarctic conditions had passed. It should be noted that at the end of the year, the growth of psychoticism remained within the average, which indicates a quality selection of the expeditioners to the team and effective psychological support throughout their period of stay at the UAS “Akademik Vernadsky”. Psychological support is provided to prevent the significant progress of psychoticism among team members, as it is one of the methods of maintaining the mental, physical, and psychological health of people living in extreme environmental conditions and long-term socio-spatial isolation.

Table 2  
**Dynamics of psychoticism in the group of expeditioners at the UAS “Akademik Vernadsky”**

Dynamics		Indicators of psychoticism in the group				
		Mean (M)		Standard Deviation (σ)		(+; -)
Before the expedition	D 1	M 1	4,58	σ1	2,67	–
Middle of the expedition	D 2	M 2	5,55	σ2	2,42	+0,97
At the end of the expedition	D 3	M 3	6,00	σ3	2,45	+0,45

## Conclusions (and Future Work)

One of the components of successful preservation of the mental and psychophysiological health of people at the Antarctic station is the knowledge of the structure of personal characteristics of the selected personnel. The predominant group characteristic of the Antarctic expeditioners is extraversion and most of the people in the year-long residence in socio-spatial isolation are extroverts. The last ones contribute to the effective establishment of interpersonal relationships within the group, communication both within the group and with the outside world, demonstrate enthusiasm in professional activities and interaction with the extreme environment of Antarctica.

In well-formed groups of Antarctic expeditioners, a high level of neuroticism is quite rare (8.3% of people). Psychoticism does not reach a high level in spite of growing by the end of a year of wintering. To maintain the expeditioners' mental health, selecting candidates with average rates of extraversion-introversion and low rates of neuroticism and psychoticism is optimal. These personal characteristics must be taken into account at the phase of group formation. The level of psychoticism during wintering is a variable characteristic. Its growth is associated with changes in the individual's psycho-emotional state during the adaptation and influence of the extreme environmental conditions and socio-spatial isolation. The current research has practical and social value, as it is aimed at preventing the development of negative mental states of participants in long-term Antarctic expeditions and the formation of positive social relations in a small isolated group.

Future research may reveal relationships between personality traits and changes in other influences on the freight forwarders' mental health. These are indicators of the emotional state, social relationships, professional vitality, etc. We believe that is advisable to continue to study the peculiarities in psychophysiological changes in the dynamics between those people whose professional activities take place in extreme environmental conditions and expand the methodological basis of research.

## Conflict of interest

The author declares that she has no conflict of interests.

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# Mental health literacy and psychological distress as predictors psychological well-being of collage students in Sriwijaya university

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## Abstract

**Introduction.** This research focused on answering questions: how mental health literacy and psychological distress act as predictors of psychological well-being in Sriwijaya university students.

**Methodology.** This research used quantitative method, by conducting instrument preparation, data collection, and analysis of data results to see the role of the independent variables on the dependent variable. Psychological well-being was measured using an instrument in a form of psychological scale referred to Psychological Scale by Ryff & Keyes (1995). Meanwhile, psychological distress was measured using WHO Self-Reporting Questionnaire 20 (SRQ-20) Indonesian version, and Mental Health Literacy measurement was adapted from O'Connor and Casey (2015). The participants of this research were consisted of 418 college students.

**Results.** The analysis results show that there is a role of mental health literacy and psychological distress together on psychological well-being, thus the hypothesis is accepted. Major hypothesis test was done using multiple linear regression which shows a correlation value (R) of 0.586 and a significance of 0.001 ( $p < 0.05$ ). For the results of minor hypothesis test, it is known that the beta value is 0.143 and the P value is 0.022 ( $p > 0.05$ ), this indicates that there is a role for mental health literacy on psychological well-being, thus the hypothesis is accepted. In addition, it is known that psychological well-being and psychological distress show a beta value of -1.945 and a P value of 0.001 ( $p > 0.05$ ), this indicates that there is a role for psychological distress on psychological well-being thus the hypothesis is accepted.

**Conclusions.** The percentage of mental health literacy and psychological pressure influences on psychological well-being (R adjusted) is 0.343, this also shows that the contribution of mental health literacy and psychological distress together on psychological well-being is 34.3%, while the rest is the contribution of other variables not examined in this study.

## Keywords

mental health literacy, psychological distress, psychological well being

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## Introduction

The World Health Organization (WHO), describes mental health as a state in which a

person realizes their abilities, able to deal with normal stressors, able to work productively and pleasantly, and able to contribute to the community (WHO, 2005). It can be said that, if

there are obstacles in carrying out these functions, the individual may have problems with their mental health.

The increase in mental disorders obtained from Basic Health Research Indonesian Ministry of Health (riskesdas) in 2018, shows a significant increase compared to Riskesdas in 2013, which increase from 1.3% to 7% (Indonesian Ministry of Health, 2018). This increase was revealed from the increase in the prevalence of households with people with mental disorders (ODGJ) in Indonesia.

Johanna Jarcho, Ph.D., a postdoctoral at National Institute of Mental Health, said that most mental health disorders appear in their teens or early 20s. The symptoms usually begin in childhood or adolescence and will continue into adulthood. Most people don't realize that they had an anxiety disorder when they were teenagers, and realize it as an adult. Teenagers have the potential to experience mental health problems such as school problems, college, lack of sleep, and romance, so it is not uncommon for them to choose drugs and alcohol to forget about those problems (Women's Brain Health Initiative, 2015).

It is estimated that mental disorders in children and adolescents will become one of the five problems that cause disability, morbidity, or even mortality in the next 20 years (WHO, 2013). Mental health problems in children and adolescents can affect their functioning in important domains in their lives now and the future, such as functioning at school, at home, with friends, and in the community (Jaycox et al., 2009).

Likewise, when teenagers enter university, students' mental health issues become a very common discussion (Blanco C. et al., 2008). In general, it is known that every individual has the potential to experience mental health disorders, from children to adults. In children, it is too early for them to understand mental health, so research has focused more on adolescents. This is because in adolescence, the cognitive development has finally able to receive information abstractly and rationally, it also can process this information in everyday life. Furthermore, for early prevention before mental disorders occur in adulthood, adolescents also need to understand about mental health itself. In this context, many students experience the onset of mental health problems or even worsen initial conditions that students have experienced before entering university (Burns & Rapee, 2006; Pedrelli et al., 2014;).

Screening results on 147 Unsri students conducted by researcher at the time of community service in 2019, found 56.5% of the students experienced mild symptoms of psychological distress, 40.1% experienced symptoms of high psychological distress (needs to be wary of), and only 3.4% did not show symptoms of

psychological distress, such as depression, anxiety and somatic complaints (Mardiyah, 2019).

Low mental health literacy and psychological distress are considered predictors of low psychological well-being (Farrer, Leach, Griffiths, Christensen, & Jorm, 2008; Burns & Rapee, 2006) and even dropping out of college (NAMI, 2012). Mental health literacy is knowledge and beliefs about mental disorders related to recognition, management, or prevention (Jorm, 2000). This means that individuals with mental health literacy have knowledge about mental disorders, their causes, symptoms, and treatments. Mental health literacy (Jorm, 2000) consists of several components including: 1) the ability to recognize specific disorders or differences in types of psychological distress, 2) knowledge and beliefs about risk factors and causes, 3) knowledge and understanding of self-help interventions, 4) knowledge and beliefs about mental health disorders.

Based on the background of the study, the researcher was interested to analyze mental health literacy and psychological distress as predictors for psychological well-being of collage students in Sriwijaya University.

## Purpose

This research focused on answering questions as below:

1. Is there a role of mental health literacy and psychological distress on the psychological well-being of collage students in Sriwijaya University?
2. Is there a role of mental health literacy on the psychological well-being of collage students in Sriwijaya University?
3. Is there a role of psychological stress on the psychological well-being of collage students in Sriwijaya University?

## Design/Methodology/Approach

This research used quantitative method, by conducting instrument preparation, data collection, and analysis of data results to see the role of the independent variables on the dependent variable.

### *Research Population and Sample*

The population in this study are active students in Sriwijaya University. The sampling technique used is the incidental sampling which is a sampling technique based on respondents who are met and meet the criteria. In this study, samples were taken based on individual's willingness to fill out the research scale.

The selection of the number of samples in this study refers to Roscoe's theory (Sugiyono, 2016). Roscoe suggested a suitable sample size for research ranging from 30 to 500 (Sugiyono,

2016). In this study, the participants were 418 college students.

#### *Data collecting methods*

Psychological well-being was measured using an instrument in a form of psychological scale referred to the psychological concept proposed by Ryff and Keyes (1995), which describes individual functioning to be independent, realize their potential, able to master their environment, able to accept themselves, have a purpose in life, and able to have a positive relationship with others. The Indonesian version of the Ryff and Keyes (1995) psychological well-being scale developed by Rachmayani and Rachmadani (2014) was modified and a try out was carried out to 50 respondents before being distributed. This was done to measure the validity and reliability of the measuring instrument. The reliability before try-out with 86 items was 0.871 and after try-out with 43 items was 0.923 (data attached).

Furthermore, the concept of psychological distress is used as an indicator of mental health which is defined as a multifactorial and unpleasant emotional experience of psychological (cognitive, behavioral, emotional), social, and spiritual traits that may interfere with the ability to effectively cope with illness, physical symptoms, and treatments (Reis et al., 2014). In this case, the researcher measured psychological distress using the Indonesian version of the WHO Self-Reporting Questionnaire 20 (SRQ-20), with a scoring scale of Yes (1) and No (0). This instrument has been used in Basic Health Research (Riskesda) of

Indonesian population, which aims to determine mental health status. One of the reasons is because this questionnaire has good validity in terms of sensitivity of 88%, and specificity of 81% (Hartono, 1995).

Meanwhile, mental health literacy concept is defined as knowledge and beliefs about mental disorders that aid in the recognition, management, or prevention. Mental health literacy includes the ability to recognize specific disorders; knowing how to seek mental health information; knowledge of risk factors and causes; knowledge of self-treatments; knowledge of professional help available; and attitudes that promote recognition and appropriate help-seeking (O'Connor & Casey, 2014). To measure mental health literacy, a standardized scale was adapted from O'Connor and Casey (2015) which was translated into Bahasa, with permission and guidance from O'Connor.

## Results

### *Description of Participants*

The number of participants in this study were 418 college students.

Based on the gender data, it is known that there are 129 male participants (30.9%) and 289 female participants (69.1%). Meanwhile for the age data, there are 150 adolescent participants (35.9%) and 268 young adult participants (64.1%)

Individual Characteristics		Frequency	Percentage
Gender	Male	129	30,9%
	Female	289	69,1%
Age	Adolescence	150	35,9%
	Early adulthood	268	64,1%
Participate in Non-Academic Activities	Yes	264	63,4%
	No	154	36,6%
Semester	2	153	36,6%
	4	85	20,3%
	6	108	25,8%
	8	52	12,5%
	10	16	3,8%
	12	2	0,5%

### *Description of Research Data*

This study was analyzed descriptively on each variable. The following is a description of each variable

Variable	Hypothetical Data				Empirical Data			
	Max	Min	Mean	SD	Max	Min	Mean	SD
Mental Health Literacy	175	35	105	23,3	137	77	109,775	9,478
Psychological Distress	20	6	13	2,3	20	0	7,175	4,401
Psychological Well-Being	172	43	107,5	21,5	163	82	123,077	14,867

Description: Min: Minimum Total Score; Max: Maximum Total Score; Mean: Mean Score; SD: Standard Deviation.

Besides that, researcher also classified the participants into certain categories for variable of mental health literacy and psychological well-being. This categorization serves a purpose to place individuals into groups in which positions are tiered according to a continuum based on the measured attributes. Classification of participants

was done through three kinds of categories, namely: low, average, and high.

Meanwhile, for psychological distress, the Indonesian version of WHO Self-Reporting Questionnaire 20 (SRQ-20) was used. Specifically, the interpretation of SRQ-20 total score is (Medhin, Hanlon, Dewey, Alem, Tesfaye, Lakew, et al, 2010):

**Table of SRQ-20 Total Score Categorization**

SRQ-20 Total Score	Categorization
0	No symptoms of psychological distress, such as depression, anxiety and somatic complaints
1 – 5	There are mild symptoms of psychological distress
6 or above	Experiencing symptoms of high psychological distress (needs to be wary of)

Based on the formula above, the categorization for each variable is as follows:

**Table of Categorization of Participants': Mental Health Literacy, Psychological Distress and Psychological Well-Being**

		Categorization	Frequency	Percentage
Mental Health Literacy	$X < 81,7$	Low	2	0,5%
	$81,7 \leq X < 128,3$	Average	402	96,2%
	$X \geq 128,3$	High	14	3,3%
Psychological Distress	$X < 1$	No symptoms of psychological distress	21	5,0%
	$1 \leq X < 6$	Showing mild symptoms of psychological distress	140	33,5%
	$X \geq 6$	Showing symptoms of high psychological distress	257	61,5%
Psychological Well-Being	$X < 86$	Low	4	1%
	$86 \leq X < 129$	Average	263	62,9%
	$X \geq 129$	High	151	36,1%



## Results

### Data analysis results

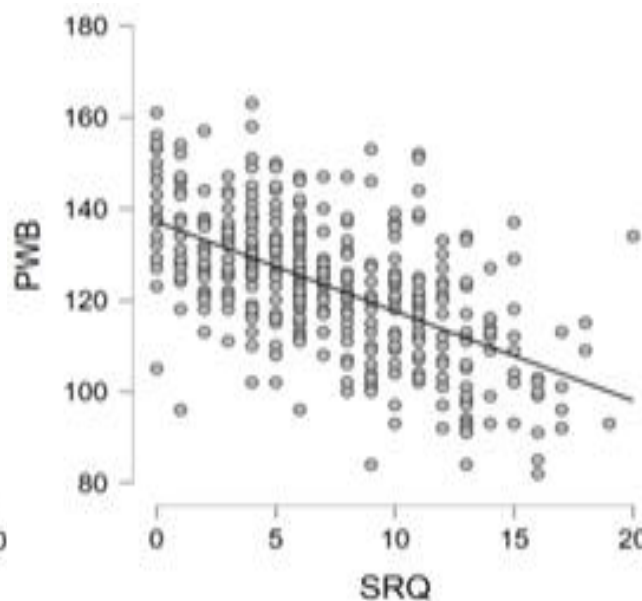
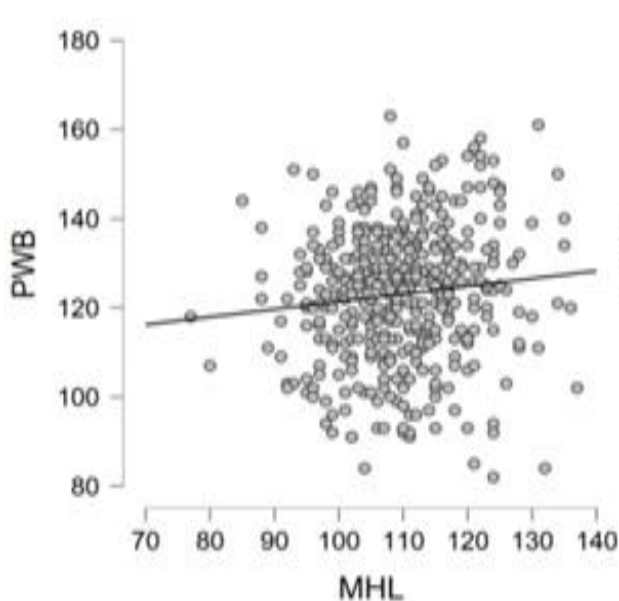
#### Assumption test

##### 1) Normality test

Before testing the hypothesis, the researcher conducted a normality test first, because to test the hypothesis, the data are required to be normally distributed. Normality of a data can be

recognized or detected by looking at the distribution of data (dots) on the diagonal axis of the plot graph and its residuals. Data can be said to be normally distributed if the dots spread around the diagonal line and follow the direction of the diagonal line.

Based on the plot graph output, the dots follow and approach the diagonal line thus it can be concluded that the data are normally distributed.



##### 2) Linearity test

One of the other requirements before testing the hypothesis is that there is a linear relationship

between variables. To find out whether there is a linear relationship or not between each variables, a linearity test was carried out. The results of the linearity test are as follows:

**Table of Linearity Test Results**

Variables	Linearity		Description
	Pearson's <i>r</i>	p-value.	
Psychological Well-Being -- Mental Health Literacy	0,110	0,025	Linear
Psychological Well-Being -- Psychological Distress	-0,578	< 0,001	Linear

Based on the linearity test, the significance value of psychological well-being and mental health literacy variables is 0.025; while psychological distress is 0.001 ( $p < 0.05$ ), thus it can be concluded that the variables have a linear relationship.

### 3) Multicollinearity test

Multicollinearity test is used to see whether the independent variables have a perfect or near perfect linear relationship, because a good

regression model should not have a perfect correlation between the independent variables. Multicollinearity test was carried out by looking at the Variance Inflation Factor (VIF).

According to Ghazali (in Purnomo, 2016), if the VIF value is  $< 10$  then there is no symptom of multicollinearity among the independent variables, and if the VIF value is  $> 10$  then multicollinearity occur among the independent variables. The results of the multicollinearity test can be seen in the following table:

**Table of Multicollinearity Test Results Summary**

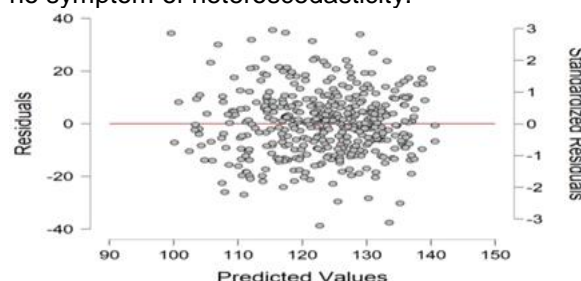
Variables	Collinearity Statistics		Description
	Tolerance	VIF	
Psychological Well-Being -- Mental Health Literacy	0,999	1,001	No multicollinearity
Psychological Well-Being -- Psychological Distress	0,999	1,001	No multicollinearity

From these results, it can be seen that the variable of mental health literacy and psychological well-being has a VIF of 1.001, meaning that the VIF value is smaller than 10 ( $1.001 < 10$ ), thus it can be concluded that there is no symptom of multicollinearity among the independent variables.

### 4) Heteroscedasticity test

This test is carried out to see whether the variance of the variables is not the same for all observation, because heteroscedasticity should not occur in a good regression. In this study, to see whether there is heteroscedasticity, the researcher used scatterplots; namely by looking at the pattern of dots on the regression scatterplots. The method is to create a plot or scatter graph between Standardized Predicted Value (ZPRED) and Studentized Residual (SRESID). Whether or not there is a certain pattern on the scatterplot graph between SRESID and ZPRED can be seen from the Y axis which has been predicted and the X axis which is the residual (predicted Y – true Y).

From the results of heteroscedasticity test, it can be seen that the dots spread above and below the number 0 on the Y axis, which means that there is no symptom of heteroscedasticity.



### Hypothesis testing

To test the hypothesis, the researcher used regression analysis. In this study, multiple regression analysis is used to determine the role of mental health literacy and psychological distress on psychological well-being. The result of the regression analysis is as follows:

**Table of Major Hypothesis Testing Results**

Variables	R	R Square	F	Sig	Description
Mental Health Literacy - Psychological Distress - Psychological Well-Being	0,586	0,343	108,416	$< 0,001$	Significant

Based on the table, it is known that the significance value of psychological well-being, mental health literacy, and psychological distress is 0.001 ( $p < 0.05$ ) with a correlation coefficient ( $R$ ) of 0.586. These results show that there is a role of mental health literacy and psychological distress together on psychological well-being, thus the hypothesis is accepted.

The percentage of mental health literacy and psychological distress influences on psychological well-being ( $R$  adjusted) is 0.343, this also shows that the role of mental health literacy and psychological distress together on psychological well-being is 34.3%, while the rest is the contribution of other variables not examined in this study.

**Table of Minor Hypothesis Testing Results**

Variables	Beta	p	Significance
Mental Health Literacy - Psychological Well-Being	0,143	0,022	Significant
Psychological Distress - Psychological Well-Being	-1,945	< 0,001	Significant

Based on the table above, it can be seen that psychological well-being and mental health literacy show a beta value of 0.143 and a P value of 0.022 ( $p < 0.05$ ), this indicates that there is a role for mental health literacy on psychological well-being, thus the hypothesis is accepted.

It can also be seen that psychological well-being and psychological distress show a beta value of -1.945 and a P value of 0.001 ( $p < 0.05$ ), this indicates that there is a role for psychological distress on psychological well-being, thus the hypothesis is accepted.

To determine how big the role of mental health literacy and psychological distress on

psychological well-being, the researcher conducted an analysis to find the effective contribution of the variables. By using the following formula:

$$SE(X)\% = \text{Beta}_x \cdot \text{Zero Order} \cdot 100\%$$

Thus it is known that the effective contribution of mental health literacy is 1.001% and psychological distress is 33.35% on mental health.

**Table of Effective Contribution Data of Mental Health Literacy and Psychological Distress on Psychological Well-Being**

Variable	Beta	Zero Order
Mental Health Literacy	0,091	0,110
Psychological Distress	-0,576	-0,579

**Table of Effective Contribution Summary**

Variables		Effective Contribution
Mental Health Literacy - Psychological Well-Being	$(0,091) \times (0,110) \times 100\%$	1,001%
Psychological Distress - Psychological Well-Being	$(-0,576) \times (-0,579) \times 100\%$	33,35%

## Discussion

In this study, the major hypothesis testing was carried out using multiple linear regression which showed correlation value ( $R$ ) of 0.586 and a significance of 0.001 ( $p < 0.05$ ). These results show that there is a role of mental health literacy and psychological distress together on psychological well-being, thus the hypothesis is accepted.

Meanwhile, the percentage of mental health literacy and psychological distress influences on psychological well-being ( $R$  adjusted) is 0.343, this also shows that the role of mental health literacy and psychological distress together on psychological well-being is 34.3%, while the rest is the contribution of other variables not examined in this study. According to Ryff (1995), several factors that may affect psychological well-being are age, gender, and culture. Then Ryff et al. (2002) also added several more factors including educational status and personality.

For the results of the minor hypothesis testing, it is known that the beta value is 0.143 and the  $P$  value is 0.022 ( $p > 0.05$ ), this indicates that there is a role for mental health literacy on psychological well-being, thus the hypothesis is accepted.

In addition, psychological well-being and psychological distress show a beta value of -1.945 and a  $P$  value of 0.001 ( $p < 0.05$ ), this indicates that there is a role for psychological distress on psychological well-being, thus the hypothesis is accepted. Specifically, the effective contribution of mental health literacy is 1.001% and psychological distress is 33.35% on mental health.

Several previous researches indicate that university should planning intervention and promotion of psychological well-being, to increase awareness and ability to conceptualize mental and emotional health for collage students (Vazquez, 2016). Learning and adopting knowledge related to health promotion and behavior during adolescence can improve healthy decision making and health literacy in collage, including mental health literacy, which in particular also has a component of knowledge around mental health itself (Bjørnsen et al., 2019). Therefore, mental health literacy interventions are suggested in promoting psychological well-being as the result itself rather than focusing solely on curative mental disorders (Vazquesz, 2016).

Adolescence is also a period when individuals are vulnerable to psychological distress, and so this period is an important time to promote psychological well-being and early intervention for mental health, as an effort to avoid the occurrence of mental health problems (Pengpid, & Peltzer, 2020). One of the interventions that can be done is mental health literacy intervention as described above. Research on mental health literacy will lead to planning for mental health promotion in order to reduce the occurrence and severity of

mental disorders, so the promotion of mental health literacy becoming important to promote psychological well-being and prevent mental health problems (Inchaithep, Punsawat, & Nuntana, 2018).

Ashfield and Smith (Male Suicide Prevention Australia, 2018) through their discussion of suicide prevention, also explained that it is not only important to reach an approach on how to respond to psychological distress and mental health disorders, but also to be involved in preventive promotion (in this case suicide prevention), improvement on psychological well-being, and mental health literacy. Moreover, one of the components of mental health literacy mentioned by Jorm (2000) is the ability to recognize specific disorders or differences in various psychological distresses. Thus, both mental health literacy and psychological distress are considered having a role in improving psychological well-being.

The results and discussion above indicate that the hypothesis which states there is a role of mental health literacy and psychological distress on psychological well-being can be accepted. Given that there are still 65.7% of other factors unidentified in this study, for further research, other variables can be added as predictors of psychological well-being, including adjustment, emotion, personality type, stress management, social support, and others.

The results also show that 61.5% students have high psychological distress, 33.5% on average level, and another 5% on low level of psychological distress. This is in line with what Jarcho (Womens Brain Health Initiative (2015) said that most adolescents in university experience psychological distress.

Psychological distress is a state of emotional distress that affects psychological well-being, this condition is characterized by symptoms of depression (e.g. loss of interest, sadness, hopelessness) and anxiety (e.g. restlessness, feeling tense) (Mirowsky & Ross, 2003). The level of psychological distress can be caused by two influences, namely: intrapersonal, such as personality traits; and situational influences, such as life events (Matthews, 2000). Situational factors from the environment that encourage psychological distress include traumatic events, physical factors, social factors, and poor health (Matthews, 2000). Therefore, there should be preventative efforts that universities can come up with in this regard.

In this study, the researcher also conducted additional analysis by conducting difference tests on variables of psychological well-being, mental health literacy, and psychological distress based on gender, age, participation in non-academic activities and semester of lectures. From those tests, differences are found in age for all variables and both in gender and semester for the variables



of mental health literacy and psychological distress. The difference in gender and mental health literacy variables is in line with several previous studies (Dias et al., 2018; Cotton et al., 2006), where women have higher mental health literacy scores than men. Gender differences found in psychological distress variable are also in line with several previous studies (Campbell, Bann, & Patalay, 2021; Tian et al., 2021), where women have higher mental health problems than men, and the biggest difference is in life satisfaction and psychological distress (Campbell, Bann, & Patalay, 2021).

### Limitations of the study

In this study, the researcher limits the scope of the research so that the research objectives can be achieved properly:

- 1) This research was conducted on active Sriwijaya University students
- 2) Individual characteristics data was obtained from personal data of students involved as participants in this research

### Conclusions (and Future Work)

The percentage of mental health literacy and psychological pressure influences on psychological well-being (R adjusted) is 0.343, this also shows that the contribution of mental health literacy and psychological distress together on psychological well-being is 34.3%, while the rest is the contribution of other variables not examined in this study.

Future work, it is important that university planning an intervention and promotion of psychological well-being, to increase awareness and ability to conceptualize mental and emotional health for collage students. Learning and adopting knowledge related to health promotion and behavior during in collage; can improve healthy decision making and health literacy in adolescents, including mental health literacy, which in particular also has a component of knowledge around mental health itself. Research on mental health literacy will lead to planning for mental health promotion in order to reduce the occurrence and severity of mental disorders.

### Acknowledgments

This research is expected to be able to contribute to the development of knowledge in the field of mental health regarding mental health literacy, psychological distress, and psychological well-being of collage students in Sriwijaya University.

### Conflict of interest

Author declares that she has no conflict of interests

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# Dynamics of quality of life indicators in patients with gastroesophageal reflux disease comorbid with connective tissue dysplasia under the influence of complex treatment

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## Abstract

**Introduction.** In the case of gastroesophageal reflux disease (GERD) on the background of undifferentiated connective tissue dysplasia (UCTD) causes an even more significant deterioration in the QOL, including sleep disturbances and the onset of excessive daytime sleepiness (EDS). Thus, the study of the peculiarities of GERD on the background of connective tissue dysplasia and determining the impact of comorbid pathology on the QOL of patients with GERD is a topical issue in internal medicine. It has significant socio-economic significance. We believe that monitoring the most important variables that affect the quality of life of patients with GERD can help raise public awareness in this regard. In addition, it can guide the health care system to address these issues.

**Purpose.** The purpose of the work is to increase the awareness of medical workers about the scale of the problem and ways to solve it. to study the features of the dynamics of quality of life in patients with gastroesophageal reflux disease comorbid with connective tissue dysplasia under the influence of the proposed complex therapy.

59 **Methodology.** 120 patients were included: 65 men and 55 women. In 75 of them (Study Group) GERD was in the background of UCTD, in 45 (Comparison Group) - developed as an independent disease. The Study Group was divided into three groups. Comparison Group - 45 patients with GERD without UCTD, received basic standard therapy, which included PPI "Panocid" 40 mg once a day and alginate-antacid formulation (Gaviscon Double Action Liquid) 20 ml, 3 times per day after meals and before bedtime. I Group - 25 patients with GERD +UCTD, which to the standard basic therapy was added "Magne-B6" for 2 tablets 3 times per day. II Group - 25 patients with GERD +UCTD, which to the standard basic therapy was added "Calcium-D3 Nicomed" 1 tablet 3 times per day. III Group - 25 patients with GERD +UCTD, who used the drug "Magne-B6" 2 tablets 3 times per day and "Calcium-D3 Nicomed" 1 tablet 3 times per day on the background of standard basic therapy. The Medical Outcomes Study 36-Item Short-Form Health Status (SF-36), the Gastrointestinal Symptom Rating Scale (GSRS), and the scale of "Personal and social performance" (PSP) - were used to study patients in detail. A comprehensive examination of patients was performed twice: before and after 30 days of comprehensive treatment.

**Results and Discussion.** Under the influence of the basic therapy in Comparison Group the General Health (GH) improved by 33.03%. While in the groups on the background of complex treatment is increased by 42.52% in patients of the I Group, by 13.10% in patients of the II Group, and 46.28% in patients of the III Group ( $p_1, p_2, p_3 < 0.05$ ). Physical Functioning Scale (PF) improved by 17.9% in patients of the Comparison Group ( $p < 0.05$ ) and by 30.38%; 27.47%, 29.17%, respectively ( $p_1, p_2, p_3 < 0.05$ ). Role Physical Scale (RP) scores improved by 25.14% in Comparison Group ( $p < 0.05$ ) and by 33.6%, 22.58% and 40.20% respectively ( $p_1, p_2, p_3 < 0.05$ ). Dynamics of data in Body Pain (BP) scale improved by 21.84% in patients of the Comparison Group ( $p < 0.05$ ) and by 37.28%, 25.46%, 35.92% ( $p_1, p_2, p_3 < 0.05$ ). As can be seen from it, under the influence of complex therapy, the values of the Vitality (VT) increased by 17.18% in patients of Group I, by 21.93% – in Group II, by 37.87% – in Group III ( $p_1, p_2, p_3 < 0.05$ ). Among patients of the Comparison Group, the influx of strength and energy felt 9.50% ( $p < 0.05$ ). Data of Social Functioning Scale (SF) improved by 8.8% in patients of the Comparison Group ( $p < 0.05$ ).

and by 22.7%, 29.6%, 29.31%, respectively ( $p_1, p_2, p_3 < 0.05$ ). Mental Health Scale (MH) improved by 17.23% in patients of Group I, by 22.41% – in Group II, by 21.96% – in Group III ( $p_1, p_2, p_3 < 0.05$ ) and 14.22% – in the Comparison Group ( $p < 0.05$ ). Also in patients were positive dynamics of the Role Emotional functioning scale (RE): by 27.37% in patients of Group I, by 12.36% – in Group II, by 15.7% – in the Group III ( $p_1, p_2, p_3 < 0.05$ ) and 9.05% – in patients of the Comparison Group ( $p < 0.05$ ).

**Conclusions.** Thus, the inclusion in the standard therapy of gastroesophageal reflux disease in patients with its development on the background of undifferentiated connective tissue dysplasia of magnesium lactate dihydrate in combination with pyridoxine hydrochloride ("Magne -B6 ") and calcium carbonate in combination with cholecalciferol ("Calcium-D3 Nicomed") contributed to a significant improvement in their quality of life.

## Keywords

quality of life, gastroesophageal reflux disease, comorbidity, connective tissue dysplasia, complex treatment.

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## Introduction

The problem of comorbid pathology in the patient XXI century becomes the rule rather than the exception. It causes significant costs for the diagnosis and treatment of such patients, and ultimately high disability and mortality.

Epidemiological studies in recent years have shown that gastroesophageal reflux disease (GERD) occupies a leading position among other acid-dependent gastrointestinal diseases and is a significant factor in health care costs. Depending on the study population, its prevalence is in the range of 10-30% and tends to increase (Charles Hill et al. 2020). Over the past 40 years, the incidence of GERD has increased significantly and has become one of the main clinical problems in gastroenterology. In North America, it is noted in 18.1-27.8%, in Europe – in 2.5-7.8%, in the Middle East – in 8.7-33.2% of cases. GERD is also increasingly found in Asians, where its prevalence averages about 8%.

According to research by Gorczyca R et al. (2019) and Iudici M et al. (2017) already in patients with GERD without concomitant pathology, the quality of life deteriorates due to functional limitations, emotional disorders, increased frequency of reflux. Patients with GERD usually suffer from a variety of symptoms,

including acid regurgitation, epigastralgia, non-cardiac chest pain, chronic cough, asthma. Symptoms of nocturnal acid regurgitation may interfere with sleep. Therefore, patients with GERD may experience a loss of quality of life (QOL) much more often than the general population. (Salome Satya Vani P et al., 2018). And this in turn affects the ability of people to perform daily activities, which closely affects the state of their well-being.

The urgency of the problem of GERD in addition to a serious impact on QOL and social functioning is the development of dangerous to the health and life of patients complications: esophageal stricture, peptic ulcer, Barrett's esophagus, adenocarcinoma. Therefore, early diagnosis of the underlying disease and comorbid conditions is important to prevent the above complications. By the way, digestive disorders are increasingly recognized as one of the leading causes of disability worldwide. In 2019, these diseases took third place after cardiovascular and cancer diseases

In the case of GERD on the background of undifferentiated connective tissue dysplasia (UCTD) causes an even more significant deterioration in the QOL, including sleep disturbances and the onset of excessive daytime sleepiness (EDS). This dependence is indicated



by our previous correlation analysis and the establishment of a direct close relationship between the indicator of pathological acidification of the esophagus (acid exposure time - AET) and EDS in both groups. In our previous study, we found a significant decrease in QOL and social functioning (Romash, 2019, 2020). In particular, patients with a combination of GERD and UCTD significantly more often worried about heartburn, impaired quality of sleep, and life on 1.4 times ( $p < 0.05$ ). They increased the frequency of gastroesophageal reflux with  $\text{pH} < 4$ , increased the number of acid reflux in the supine and standing positions.

Thus, the study of the peculiarities of GERD on the background of connective tissue dysplasia and determining the impact of comorbid pathology on the QOL of patients with GERD is a topical issue in internal medicine. It has significant socio-economic significance

We believe that monitoring the most important variables that affect the quality of life of patients with GERD can help raise public awareness in this regard. In addition, it can guide the health care system to address these issues

## Purpose

The purpose of the work is to increase the awareness of medical workers about the scale of the problem and ways to solve it. to study the features of the dynamics of quality of life in patients with gastroesophageal reflux disease comorbid with connective tissue dysplasia under the influence of the proposed complex therapy.

## Design/Methodology/Approach

120 patients have included 65 men and 55 women. In 75 of them (Study Group) GERD was in the background of UCTD, in 45 (Comparison Group) - developed as an independent disease. Depending on the treatment regimen, the experimental group was divided into three.

Comparison Group consisted of 45 patients with GERD without connective tissue disorders, who received basic standard therapy, which included PPI "Panocid" and alginate-antacid formulation (Gaviscon Double Action Liquid) 20 ml 3 times per day after meals and before bedtime.

I Group consisted of 25 patients with GERD in combination with UCTD, which was added to the basic therapy "Magne-B6" for 2 tablets 3 times per day.

II Group consisted of 25 patients with GERD on the background of UCTD, which was added to the basic therapy "Calcium-D3 Nicomed" 1 tablet 3 times per day.

III Group consisted of 25 patients with GERD in combination with UCTD, which was added to the basic therapy "Magne-B6" in 2 tablets. 3 times per day and "Calcium-D3 Nicomed" 1 tablet 3 times per day.

The Medical Outcomes Study 36-Item Short-Form Health Status (SF-36), the Gastrointestinal Symptom Rating Scale (GSRS), and the scale of "Personal and social performance" (PSP) - were used to study patients in detail.

A comprehensive examination of patients was performed twice: before and after 30 days of comprehensive treatment

The sample of patients was representative by age and gender (Table 1).

Table 1.

Distribution patients by age and sex

Indexes		Comparison Group (n=45)		I (n=25)		II (n=25)		III (n=25)	
Age		46.2±3.03		36.2±3.03		32.2±3.03		29.2±3.03	
Gender (abs. number,%)	Male	23	51.2	14	56.0	15	60.0	13	52.0
	Female	22	48.8	11	44.0	9	40.0	12	48.0

After reviewing the examination procedure and the principle of treatment, all patients voluntarily signed written agreements following the protocol of the clinical trial approved by the Bioethics Commission of Ivano-Frankivsk National Medical

University. To assess the dynamics of quality of life (QOL) of the examined patients under the influence of complex treatment, each patient was asked to fill out a short form of the questionnaire Medical Outcomes Study 36-Item Short-Form

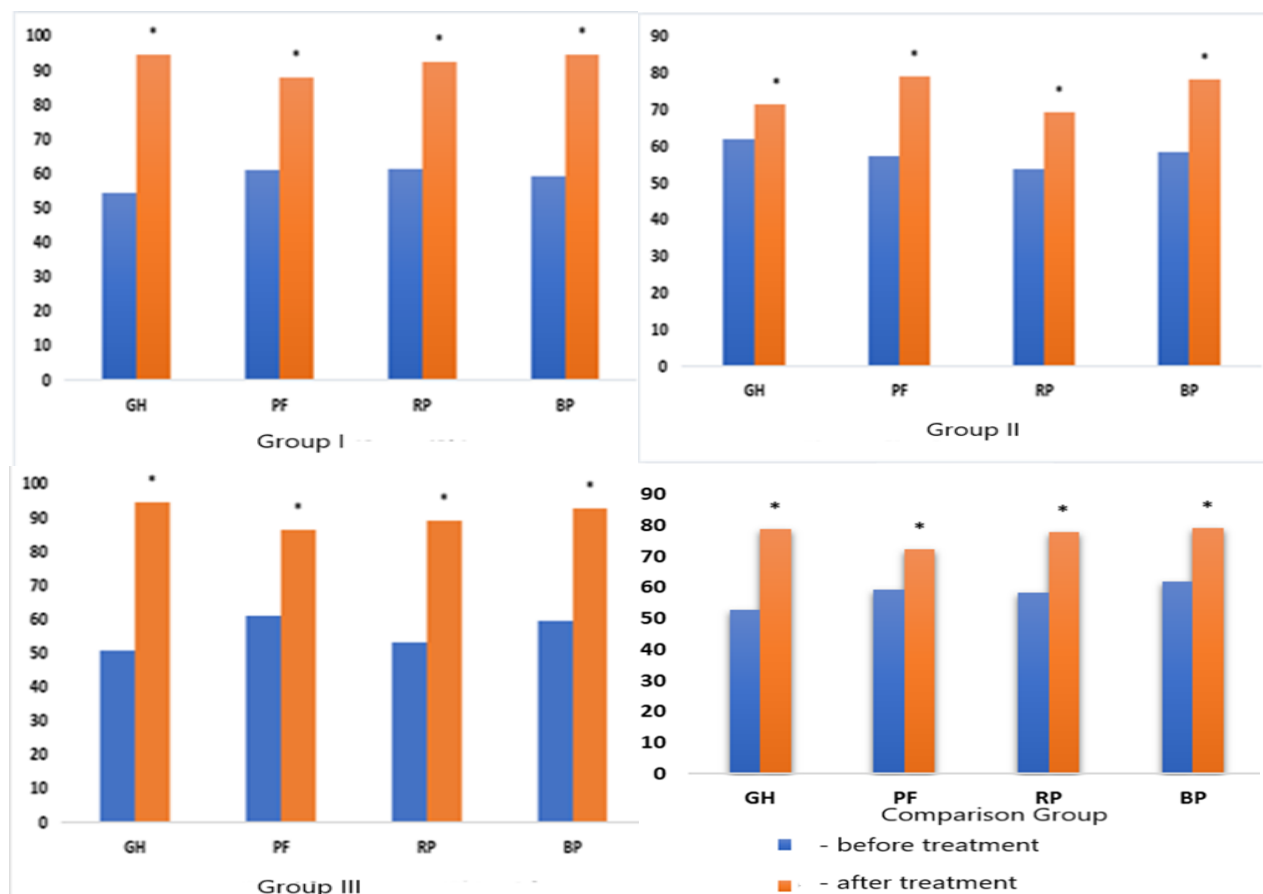
Health Status (SF-36) Ware et al. (1993) and the Gastrointestinal Symptom Rating Scale.

The SF-36 questionnaire consists of 36 questions grouped into eight domains: physical functioning (PF), social functioning (SF), role limitation related to physical problems (RP), role limitation, gender associated with emotional problems (RE), mental health (MH), vitality (VT), body pain (VP) and perception of general health (GH). The indicators of each scale are compiled as follows: the higher the value of the indicator (from 0 to 100), the better the score on the selected scale. They form two parameters that evaluate the eight concepts of health: psychological and physical components. The physical components are: GH - general perception of health, PF - limitations in physical activity due to health problems, RP - limitations in normal role-playing activities due to physical health problems, BP - physical pain. Mental components include: SF - limitations in social activity due to physical or emotional problems, MH - general mental health (psychological distress and well-being, RE - limitations in normal role activity due to emotional problems, VT - viability (energy and fatigue) The

scores of each scale vary between 0 and 100, where 100 is a completely healthy, and the results are in the form of scores compiled in such a way that a higher score indicates a higher QOL level. The general questionnaire is a general questionnaire that can be used for patients with various pathologies as well as for population-based studies. of 15 questions grouped into five clusters for a detailed study of symptoms reflecting reflux, abdominal pain, indigestion, diarrhea, and constipation. GSRS has a seven-point Likert-type scale, where "1" means no problem symptoms and "7" means no very problematic symptoms. The reliability and validity of this questionnaire are well documented, the values of the norms for the general population are available (Kulich et.al., 2008).

## Results and Discussion

The dynamics of the physical components of quality of life under the influence of the proposed comprehensive treatment in our examined patients is presented in Figure 1.



**Fig. 1. Dynamics of quality of life indicators (physical component) in the examined patients**

Note: \* - ( $p < 0,05$ ) data are reliable for indicators before and after treatment.

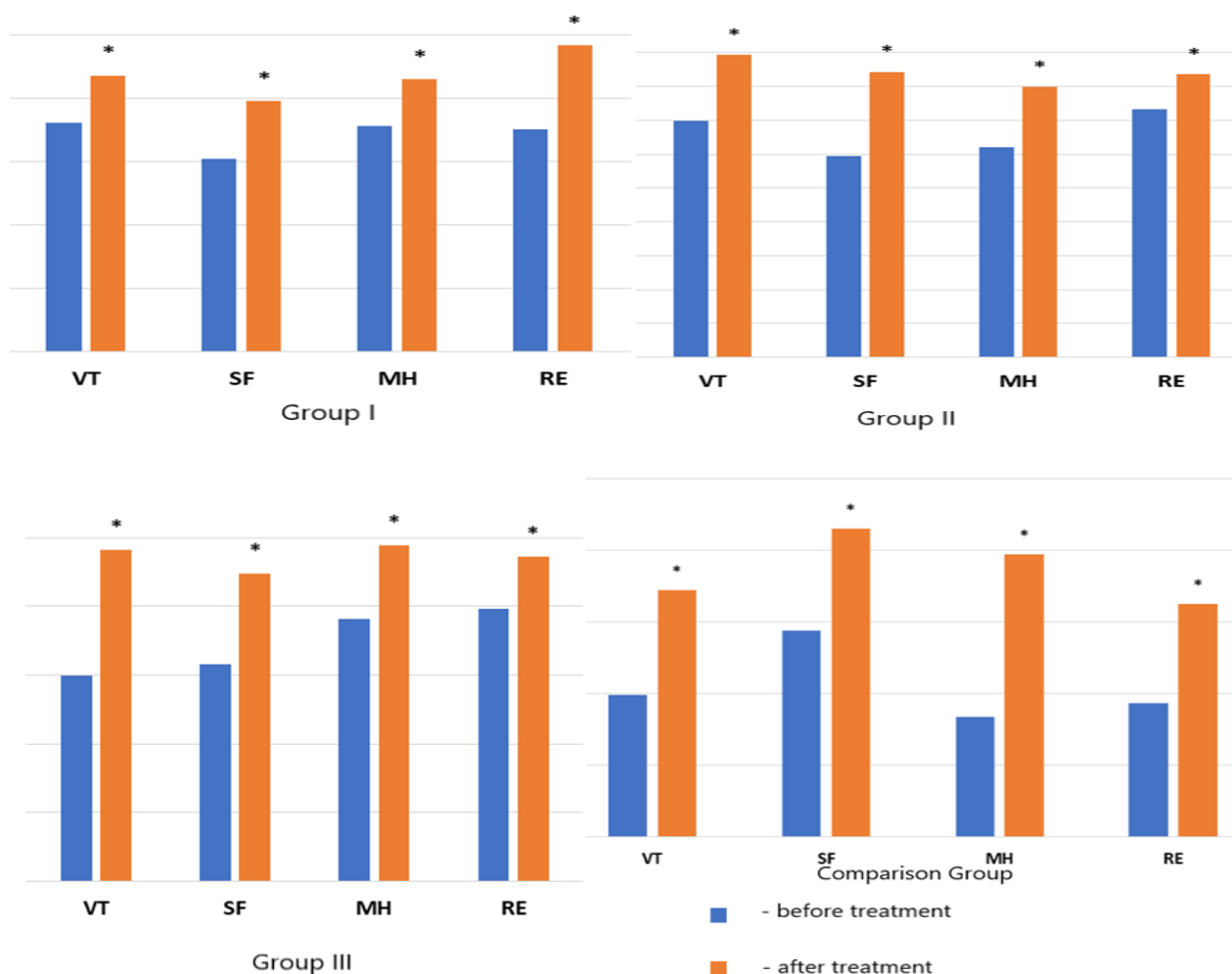
Under the influence of the basic therapy among the patients of the Comparison Group the General Health (GH) improved by 33.03%, changing from  $52.81 \pm 0.98$  to  $78.86 \pm 1.03$  ( $p < 0.05$ ). While in the groups on the background of complex treatment it increased by 42.52% (from  $54.3 \pm 0.97$  to  $94.5 \pm 1.97$ ) in patients of the first group, by 13.10% (from  $62.01 \pm 1.87$  to  $71.36 \pm 0.61$ ) – in II and 46.28% (from  $50.81 \pm 1.07$  to  $94.6 \pm 2.01$ ) – in the III, respectively ( $p_1, p_2, p_3 < 0.05$ ).

Physical Functioning Scale (PF) improved by 17.9% under the influence of the prescribed treatment (from  $59.32 \pm 0.97$  to  $72.3 \pm 0.61$ ) in patients of the Comparison Group ( $p < 0.05$ ) and by 30.38% (from  $61.12 \pm 1.38$  to  $87.8 \pm 2.09$ ) – in the I Group; 27.47% (from  $57.01 \pm 2.63$  to  $79.03 \pm 0.97$ ) – in the II Group; 29.17% (from  $61.12 \pm 0.68$  to  $86.3 \pm 1.16$ ) – in the III Group, respectively ( $p_1, p_2, p_3 < 0.05$ ).

Role Physical Scale (RP) scores improved by 25.14% (from  $58.31 \pm 0.91$  to  $77.9 \pm 1.12$ ) in Comparison Group ( $p < 0.05$ ) and by 33.6 % (from  $61.24 \pm 1.12$  to  $92.3 \pm 2.07$ ) in patients of the I Group, by 22.58% (from  $53.71 \pm 0.76$  to  $69.38 \pm 1.56$ ) – in the II Group, by 40.20% (from  $53.20 \pm 0.13$  to  $89.12 \pm 0.97$ ) – in the III ( $p_1, p_2, p_3 < 0.05$ ).

Dynamics of data in Body Pain (BP) scale under the influence of the proposed therapy improved by 21.84% (from  $61.9 \pm 0.89$  to  $79.2 \pm 1.33$ ) in patients of the Comparison Group ( $p < 0.05$ ) and by 37.28% (from  $59.2 \pm 0.86$  to  $94.4 \pm 1.25$ ) – in the I Group, by 25.46% (from  $58.36 \pm 1.15$  to  $78.3 \pm 2.13$ ) – in the II Group, by 35.92% (from  $59.41 \pm 1.08$  to  $92.73 \pm 1.05$ ) – in the III Group ( $p_1, p_2, p_3 < 0.05$ ).

Dynamics of mental components of quality of life under the influence of the offered complex treatment at the examined patients presented in figure 2.



**Fig. 2. Dynamics of quality of life indicators (mental component) in the examined patients**

Notes: 1. \* - ( $p < 0.05$ ) data are reliable in relation to indicators before and after treatment

Under the influence of complex therapy, the values of the Vitality (VT) increased by 17.18% (from  $72.3 \pm 1.62$  to  $87.3 \pm 0.97$ ) in patients of Group I, by 21.93% (from  $69.76 \pm 1.32$  to  $89.36 \pm 1.36$ ) – in the Group II, in which the basic therapy was added to the calcium drug; by 37.87% (from  $59.86 \pm 0.96$  to  $96.36 \pm 2.31$ ) – in the Group III, to which both drugs were added to the basic therapy ( $p_1, p_2, p_3 < 0.05$ ). Among patients with GERD without UCTD, who received basic therapy with PPIs and alginate-antacid formulation, the influx of strength and energy felt 9.50% ( $69.86 \pm 0.32$  to  $77.2 \pm 1.08$ ),  $p < 0.05$ .

Data of Social Functioning Scale (SF) under the influence of the proposed therapy improved by 8.8% (from  $74.36 \pm 0.98$  to  $81.5 \pm 1.64$ ) in patients of the Comparison Group ( $p < 0, 05$ ) and by 22.7% (from  $61.12 \pm 0.81$  to  $79.1 \pm 0.62$ ) in patients in the Group I, by 29.6% (from  $59.36 \pm 1.65$  to  $84.3 \pm 1.31$ ) – in the Group II, by 29.31% (from  $63.16 \pm 0.38$  to  $89.36 \pm 1.13$ ) - in the Group III ( $p_1, p_2, p_3 < 0.05$ ).

Mental Health Scale (MH) improved by 17.23% (from  $71.26 \pm 0.36$  to  $86.1 \pm 1.95$ ) in patients of the Group I, by 22.41% (from  $61.96 \pm 0.68$  to  $79.86 \pm 1.07$ ) – in the Group II, 21.96% (from  $79.19 \pm 1.02$  to  $97.63 \pm 2.03$ ) – in the Group III ( $p_1, p_2, p_3 < 0.05$ ) and 14.22% (from  $68.36 \pm 0.35$  to  $79.7 \pm 1.04$ ) - in the Comparison Group ( $p < 0.05$ ).

Also in the patients we treated there was a positive dynamics of the scale Role Emotional functioning (RE): by 27.37% (from  $70.3 \pm 1.16$  to  $96.8 \pm 2.07$ ) in patients of the Group I, by 12.36% (from  $73.26 \pm 0.64$  to  $83.6 \pm 1.35$ ) – in the Group II, by 15.7% (from  $79.43 \pm 0.38$  to  $94.3 \pm 0.92$ ) – in the Group III ( $p_1, p_2, p_3 < 0.05$ ) and 9.05% (from  $69.3 \pm 0.31$  to  $76.2 \pm 0.82$ ) - in patients of the Comparison Group who received basic therapy ( $p < 0.05$ ).

## Conclusions

Thus, the inclusion in the standard therapy of gastroesophageal reflux disease in patients with its development on the background of undifferentiated connective tissue dysplasia of magnesium lactate dihydrate in combination with pyridoxine hydrochloride ("Magne -B6 ") and calcium carbonate in combination with cholecalciferol ("Calcium-D3 Nicomed") contributed to a significant improvement in their quality of life.

## Conflict of interest

The authors declare that they have no conflict of interest.

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