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Global health in the network of international research collaborations



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Preface

Dear colleagues, dear friends,

The years 2024 and 2025 are marked by profound global crises that are challenging healthcare systems worldwide. Political upheavals, wars, environmental disasters, and social inequalities directly impact global health. The re-election of Donald Trump as President of the United States has brought about drastic health policy decisions: the withdrawal of the U.S. from the WHO, the appointment of an anti-vaccination advocate as Health Secretary, and the shutdown of USAID – one of the largest organizations for international development cooperation – are just a few measures with far-reaching humanitarian and health consequences. At the same time, the ongoing conflicts in Ukraine and the Middle East continue to claim countless lives, while climate change and the rapid loss of biodiversity increasingly affect our environment and well-being.

In a world where complex challenges demand new approaches, it is more important than ever for science and research to engage actively with global health issues. However, we cannot rely solely on large international organizations like WHO, UN, or G7 that celebrates its 50th anniversary, G20 etc. While these institutions can develop crucial programs and strategies, real change often begins at the regional and local levels. This is where new ideas and innovative research approaches come into play – developed by dedicated young scientists who not only analyze problems but also create practical solutions that serve as role models for other regions and settings.

This was precisely the focus of the 6th International Young Researchers' Symposium on Global Health, held on October 12th and 13th, 2024, ahead of the World Health Summit in Berlin. The research presented covered a wide range of global health issues, from mental health and telemedicine to infectious diseases and environmental sustainability. The projects showcased were not only scientifically sound but also innovative and inspiring – so much so that we decided to compile the contributions into this volume.

We are proud to present the 7th edition of the Akkon Schriftenreihe with this book. The research findings gathered here provide not only valuable scientific insights but also critical perspectives and solutions for some of the most pressing health challenges of our time. May this volume serve as a catalyst for further research, interdisciplinary exchange, and new ideas – paving the way for a healthier and more sustainable world.

Our big thanks goes to all contributors, their supervisors, their respective institutions and also sponsors for their wonderful support and collaboration.

Enjoy reading!

*Prof. Dr. med. Dr. PH Timo Ulrichs & Gaby Feldmann (Dipl.-Geogr.)
Head of Institute for Research in International Assistance (IRIA) /
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Preface

Spurring and engaging future minds for global engagement and cooperation at the intersection and interdependence of the health-related UN Agenda 2030 Sustainable Development Goals

Dear friends, colleagues and partners of IRIA and the Akkon University,

The 7th volume of the Akkon University publication series which you have before you once again impressively emphasises the important work, and along with it, the outstanding commitment and cooperation of young, future minds in the field of global health.

In this volume, international researchers from 13 countries – Antigua, Armenia, Azerbaijan, Canada, Georgia, Germany, Indonesia, Jamaica, Kenya, Mexico, Pakistan, Ukraine and Yemen – address a number of utmost relevant and topical issues comprising the nexus of climate & health, migration & health, nutrition & health, armed conflicts / war & health, education & health, sports & health, as well as public health, AMR & One Health, women health, sexual & reproductive health, infectious diseases, mental health, workforce & capacity building, and determinants on health.

Health and well-being are the goods that intuitively are valued most highly and importantly by each individual and by society as a whole, across genders, cultures, religions as well as generational, national, geographical, political boundaries and socio-economic strata. At the same time, health is a prerequisite for education, a thriving culture, a prosperous socio-economic development, diversity, freedom, justice and peace. With their crucial research work and dense international cooperation, the international Young Researchers coming annually together at the IRIA Symposia on Global Health in this context underscore SDG3 "Health and Well-Being" as predestined entry point, effectiveness factor and, very importantly, also as crucially important proof of efficacy in terms of the outcomes in attaining the entirety of the 17 SDGs.

The Institute for Research in International Assistance (IRIA) at Akkon University thus plays a crucial role as a blueprint for spurring and engaging future minds at international scale. The support of key partners, especially the German Federal Ministry of Health and the World Health Summit, as well as others, continues to be of great importance for effective implementation and successful outcomes at IRIA.

On behalf of GHA – German Health Alliance, multisectoral initiative comprising the competencies of 120 member organisations with strong focus on international health cooperation, and the Virchow Foundation I would like to highly commend Akkon University and IRIA for the outstanding work programme and research activities. Experiencing the highly engaged and extremely interested international Young Researchers mid of October 2024 after their symposium at IRIA also as invited guests of the Virchow Prize Lecture and the festive Virchow Prize Ceremony under the high patronage of the President of the German Bundestag in the Rotes Rathaus Berlin has been a special pleasure and true joy.

Wishing continued excellent success!

*Roland Göhde
Co-Founder & CEO | Virchow Foundation
Chair of the Board | GHA – German Health Alliance
Founding Member of the IRIA Advisory Board at Akkon University*

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#01 Antigua

Polluted Pathways: Unveiling the Role of Pharmaceutical Waste in Antibiotic Resistance – A One Health Perspective

Nathalie Camacho, Leslie Walwyn

ABSTRACT. In 2050, there will be an estimated 10 million deaths due to antibiotic-resistant illnesses (ARI). Theories regarding ARI include misuse or overuse of prescription antibiotics, overuse of antibiotics in livestock, non-prescribed consumption, and the emergence of antibiotic-resistant bacteria in clinical settings. However, there is a hidden culprit which is a primary factor in the world's growing antibiotic resistance: the antibiotic-ridden pollution from pharmaceutical manufacturing factories (APPF). APPF is associated with an estimated increase in the annual gross domestic product losses of up to USD \$100 trillion (Reuters, 2024). This study aims to review the production and impact of APPF from multiple pharmaceutical manufacturing plants in China, Europe, and the United States (USA).

The USA based study highlighted the Midwest, and Northeast regions, and emphasized how climate change worsens antibiotic resistance. Increasing global temperatures cause runoff and precipitation changes which further the progression of antibiotic resistance colonies in agricultural settings. In Europe, a study of the Danube River showed 7 high infectious and antibiotic resistance bacteria throughout the river sampled. A study in Italy revealed 258 active pharmaceutical ingredients in its rivers.

A study done in three pharmaceutical factories in China showed 1043 viral operational taxonomic units and 8 of which were considered high risk. Exploring these factories' role as a significant contributor to the spread of antibiotic resistance worldwide is a critical piece in combating antibiotic resistance. The water waste and factory by-products from these plants are mostly in low- and middle-income countries where strict regulations on managing these products are not enforced. The overwhelming environmental contamination contributes to the proliferation of antibiotics and resistant bacteria which eventually enter local ecosystems and food chains. Our research takes a One Health approach given that this issue affects humans, animals, and the environment. The findings will underscore the need for better environmental regulations in pharmaceutical productions, increased global collaboration and security to safeguard the environment and mitigate environmental antibiotic contamination.

INTRODUCTION. Among the leading causes of deaths worldwide antibiotic-resistant genes (ARGs) have surged to an alarming number of deaths and hospital admissions. ARGs are created due to the overuse or misuse of antibiotics, in humans, animals, and the environment. They allow bacteria to recognize familiar antibiotics used in the pharmaceutical industry and create defense mechanisms against them thus rendering these antibiotics ineffective. There has been a daunting rapid proliferation of these genes. Any prolonged environmental contamination or exposure to antibiotics can have this effect on water, soil, and air. Bacteria can become antibiotic resistant in various ways starting with genetic mutations. The bacterial gene can absorb and analyze the antibiotic altering its target site, rendering it ineffective. Another common mechanism is Horizontal Gene Transfer (HGT). In HGT, bacteria can, through three different ways, acquire the antibiotic genes and form resistance against them by encoding them in the bacteria's own genome. In some of the environments discussed in the study, many bacteria use a biofilm to protect themselves against antibiotics reducing antibiotic penetration and reducing their metabolic activity. It is also important to note these microscopic organisms are highly contagious and it is extremely easy for them to spread throughout an environment. The public is mostly aware of some instructions and precautions when taking antibiotics such as completing the full treatment cycle and not using unprescribed antibiotics. These precautions are used to avoid the proliferation of antibiotic-resistant genes within our own bodies. However, this is sometimes out

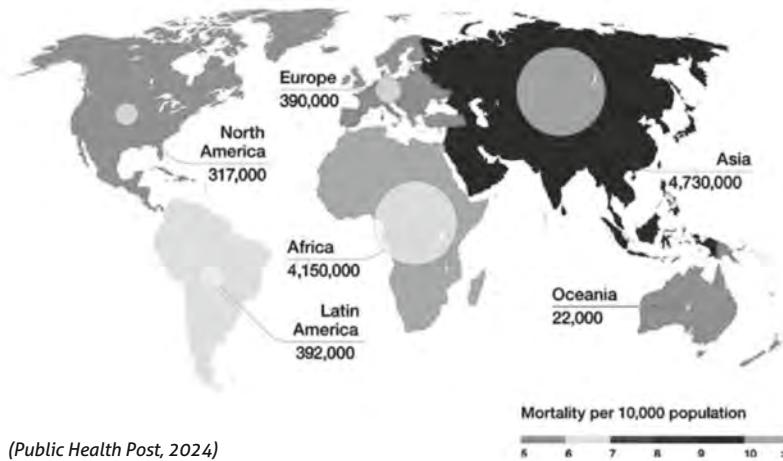
of our control since many of these ARG's are found in the soil where our food is grown, in the water that we consume and also use to grow our food. ARG's are also found within the air of common places. This study will investigate the degree of contamination. It exposes the role of the pharmaceutical industry and takes into question how their manufacturing processes may be aiding in the rapid proliferation of these ARGs in our ecosystems. Many pharmaceutical manufacturing plants around the world are mostly located in low socioeconomic areas where regulatory control for waste management of pharmaceutical manufacturing byproducts is lax. With little local and worldwide attention on this topic of monitoring pharmaceutical manufacturing plant waste disposal it is easier to draw attention to other causes of ARG's. However, the studies in this research paper will highlight the enormous impact manufacturing plants have on the environment, humans, and the proliferation of these highly infectious genes.

STUDY MATERIAL AND METHODS. In this research paper nine different scientific studies are reviewed and cited for their conclusions. They highlight the effects of ARGs and the connection between the proliferation of ARGs and the factory's pollution and waste impact. Three countries were selected due to their population concentration and their large pharmaceutical manufacturing production

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Deaths attributable to AMR every year by 2050



which in turn impact local and global ecosystems. The US, Europe, and China studies all aimed to collect data on the number of ARGs found within their environments. In the US study, researchers identified the nation's most vulnerable watershed areas which were most impacted by antibiotic pollution. They developed a multimeric index to track the concentrations of ARGs in these watershed areas. This data also showed the distribution and the impact of ARGs. More factors such as climate change and agricultural practices such as over-farming were shown to exacerbate the proliferation of ARGs (Kamanmalek & Rice-Boayue, 2023). In Europe the Danube River study aimed to poll and collect data from 2311 km area of the Danube River. There were

36 sampling sites from Germany to Romania. 500 ml samples were collected from a boat at 30 cm depth and cooled immediately as they were transferred to the lab. These standards were applied and maintained for all samples. In addition, this study conducted a longitudinal sample method where a temporal monitoring system was used throughout one year. In most countries the samples were in the capitals were, but also in some low-pollution sites. It is worth mentioning that these areas ranged from state-of-the-art water treatment facilities to areas that didn't have these systems set in place. All the samples were analyzed in laboratories led by trained partner scientists of the project (Frost, Gilchrist, & Roberts, 2024).

The study focused on Italy collected samples throughout two years in Milan, Varese, and Como. At each site 24-hour composite samples were collected every 20 minutes by an automatic sampling device. The water samples which were collected at 500 ml sizes were frozen until analysis. Of significance, these three Italian cities had standard water treatment protocols set in place including pre-treatment and primary and secondary treatment facilities along with UV light tertiary treatment. All of them also discharged the treated water directly into rivers or lakes (Kümmerer, 2010).

The China-based study analyzed three different factories throughout different provinces. All three factories produced primarily cephalosporin, kanamycin, valinomycin, and monensin. Each factory also had the same three functional areas, filter membranes, and similar disposal processes. The samples were collected from dust samples and water samples and placed in zip-lock bags and then were all transferred to the same laboratory. The same instruments were used to analyze the DNA samples. Due to some low DNA concentration in some of the air samples other parallel air samples were used. Most samples in this study, however, were water and soil samples. There were 56 soil and wastewater metagenomic data points (Tian, Zhang, & Liu, 2024). Statistical analysis was performed and recorded for all

studies presented. For the supplementary studies presented on the effects of antibiotic-resistant genes (ARGs) standard protocol for collecting soil, water, air, and bio samples were akin to those mentioned in the US and Italy based studies. Statistical analyses were also conducted, and the conclusions of these studies were used as the main points. Each study compared their collected samples with other standard samples for comparison purposes.

RESULTS. The results of the study done in the USA showed elevated concentrations of azithromycin, ciprofloxacin, sulfamethoxazole, and trimethoprim with azithromycin. The highest concentrations are found in Iowa and Indiana and with aggressive agricultural practices they showed how this would exacerbate the current issue (Kamanmalek & Rice-Boayue, 2023). The European study of the Danube River found 7 different antibiotics and these results were presented in the Global African Forum (2019) and more results from other countries were also presented (Frost, Gilchrist, & Roberts, 2024). One result that was presented in this forum found India having higher concentrations in the treated wastewater than what can be found in a patient's blood levels while on an antibiotics cycle. It was also estimated that there will be a 65% increase in the world's waterways by 2050. The forum also polled and found only 8 large

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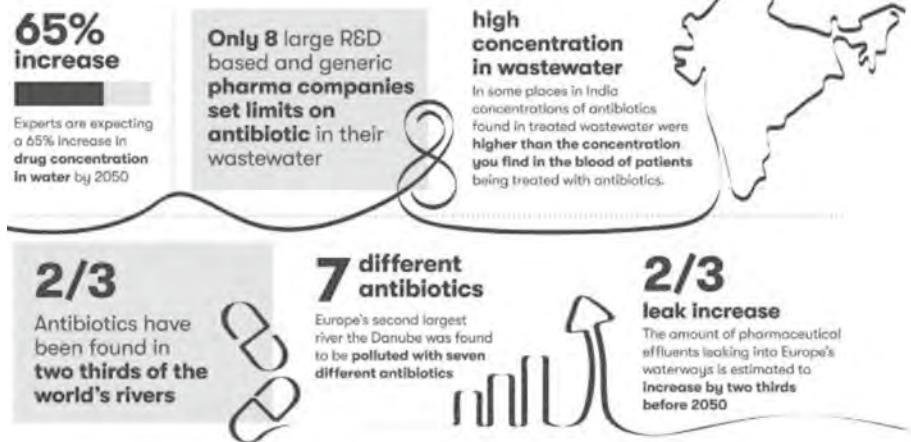
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research and development-based and pharmaceutical companies set limits on antibiotics found in the wastewater out of the hundreds of factories found in the Europe (IQVIA Institute, 2019). For the study done in Italy it was concluded that Italy had 7–14 tons of active principles filled with ARGs that were being discharged annually into the aqueous environment (Kümmerer, 2010). In pharmaceutical factories in China the soil and wastewater were identified as the main contributors of airborne resistance. A range of 14–67.24% of ARGs were found in the soil and anywhere 2.43–75.06% found in the groundwater. The data was analyzed and out of 27 resistant genes 9 were correlated with 16 clinical illnesses that are highly infectious and are responsible for common mortality diagnoses in clinical settings (Tian, Zhaang, & Liu, 2024). As for the many supplementary studies in this paper, one which focused on finding ARGs in birds found 48 multi drug-resistant genes on 24 parrots that were screened (Smith, 2023). Another article tackled the link between antibiotic use in agriculture and how it affects the soil and the proliferation of ARGs. It was concluded that the subtherapeutic use of antibiotics increased the proliferation of antibiotic resistance (Jones, 2023). This highlighted the common error of underdosing along with overuse or misuse of antibiotics, all of which lead to ARG proliferation. A study done in Poland

also showed that prevalence of ARGs in open spaces with higher amounts of ARGs collected in air samples when compared to other countries such as China and Warsaw. This data was collected in Colony Forming Units (CFU) with Poland reporting 600 CFU compared to China at 580 CFU and Warsaw with 84 CFU (Brown & Green, 2018). A different study on this topic showed the effects of ARGs on wildlife. In Chile, which is known for their fishing industry, found as many as 8–10 ARGs compounds in their fish which they concluded posed "a serious threat to the public" (Miranda & Zemelman, 2001). Lastly, to discuss the impact of ARGs on the environment a study was done of ARGs found in beaches worldwide. These results showed that microplastics found in the sand harbor "a bacterial community" more abundant and distinct from the natural environment, regardless of the quality of water at the beach (Magalhaes et al., 2024). These results reveal with clarity just how much the proliferation of ARGs are universally ingrained in our environment, humans and animals alike. It also showed there are higher rates of ARGs than would have previously not been aware of.

DISCUSSION AND OUTLOOK. These findings contribute to a growing understanding of how ARGs affect people, animals, and the environment. With air, water, and soil concentrations of ARGs

Environmental Impact of Antibiotics



(IQVIA Institute, 2019)

being far above safe levels, current agricultural, and manufacturing processes it will only become more problematic. In efforts to amend these issues more transparency and accountability between the pharmaceutical companies and their respective governing bodies would allow for more security and stricter regulations. These regulations should aim to refrain from current filtration and disposal processes in these pharmaceutical manufacturing facilities. A better filtration system can also be implemented. Upon reviewing several studies, one method was found to be very effective at remo-

ving common antibiotics such as amoxicillin, cefalexin, sulfadiazine, and tetracycline from water samples. The filter was made with a gravel, sand, soil, and a soil+biochar combination. Another proposed solution is to set global standards to limit types and levels of contaminants in the wastewater produced by pharmaceutical factories. An eco-friendlier solution is to reuse water in factories, to limit their water usage and the amount of contaminated water released into the environment. These are just some proposed solutions and areas of collaboration that can be implemented because currently factories are not

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disposing of their waste products ethically and efficaciously. Therefore, large amounts of antibiotics are polluting the factories' surrounding environments and spreading into waterways, habitats, and soil. Unfortunately, there is not enough research being done within pharmaceutical plants on their data points for levels of containments in their factories and disposal processes to address plans for mitigation. As of now the focus is on trying to create more antibiotics to combat ARGs. This needs

to change to include the current challenge of ARG proliferation caused by pharmaceutical factories. Governments must become involved to drive these changes. The resolution of these issues could not only save time and money on future production of pharmaceutical antibiotics but also reduce the amount of preventable and unnecessary deaths of humans and wildlife alike due to ARGs as well as the devastation of our environment and climate. —

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#02 Armenia

The Influence of War on Mental Health issues in Armenia*Gagach Derkhorenian*

KEYWORDS. War, Nagorno-Karabakh conflict, migration, mental health issues in Armenia, therapeutic interventions for war survivors

ABSTRACT. War, defined as an armed conflict between states or groups, has profound psychological effects on individuals and communities. The Nagorno-Karabakh wars, including the recent conflict in Artsakh, have deeply affected the nation's psyche, with significant repercussions on mental health, including post-traumatic stress disorder (PTSD), anxiety, and depression.

In Soviet Armenia, psychotherapy was not widespread until the 1988 earthquake that took place which resulted in a significant loss of life, the amount was approximated to be around 25,000, along with many more injured. The events of the earthquake left a lot of people homeless. The quake followed the events of the Sumgait pogrom, during which ethnic Armenians were the victims of ethnic violence. The tension between Armenia and Azerbaijan kept on regarding the independence of Nagorno-Karabakh. These events were the background upon which the first Nagorno-Karabakh war took place.¹ It lasted from 1988 to 1994. The Azerbaijan and Armenia conflict never subsided even though intermittent ceasefires occurred. The next outbreak of conflict was the

four-day war in April 2016. The third outbreak of conflict occurred in September 2020 and lasted until December. The result of this was the depopulation of ethnic Armenians in Nagorno-Karabakh. It is said that the amount of displaced ethnic Armenians during this time was 26,000. After the events of the third outbreak of conflict in Nagorno-Karabakh, there was the Azerbaijani blockade and the subsequent outbreak of conflict in September of 2023 after which the conflict came to an end because of the dissolution of the independent republic. This resulted in an additional 100,000 Ethnic Armenian people being displaced, out of which 36,000 were children.²

Statistics from the Armenian wars highlight a substantial loss of life and displacement, with thousands of individuals suffering from long-term psychological effects. Research shows that soldiers and civilians alike experience heightened levels of anxiety, depression, and trauma, which are often exacerbated by generational trauma stemming from historical events such as the Armenian Genocide. The concept of generational trauma refers to the transmission of trauma effects from one generation to the next, manifesting in heightened anxiety and emotional distress within families.

Migration, particularly in the context of Artsakh, has created additional psychological burdens. Displacement and the

loss of homeland contribute to identity crises, feelings of rootlessness, and emotional instability. Reports suggest that migration-related stress significantly impacts mental health, especially among the displaced populations of Artsakh. By September 2023, over 115,000 ethnic Armenians had been displaced to Armenia. Out of which, 36,000 were children. They joined the displaced refugees from the 2020 conflict which amounted to 26,000.³ Because of this, Armenia is in dire need of mental health and psychosocial support (MHPSS). This is due to the emergent mental issues that the displaced people are experiencing, issues including being separated from family, a lack of stability and safety, and loss of livelihood as well as a loss of social network. Research has shown that out of the over 100,000 refugees who were displaced from Artsakh (Nagorno-Karabakh) 22,500 may experience mental health issues. This was postulated as a result of research that was previously conducted on people who have been through war and conflict in the last 10 years, which showed that 1 in 5 (22%) of survivors will struggle with some form of mental issues as a result. These include post-traumatic stress disorder, anxiety, depression, bipolar disorder, or schizophrenia.⁴

However, there is a noted lack of long-term research on therapeutic interventions specifically tailored to war survivors. While short-term therapies are

available, there is a gap in understanding the long-term efficacy of these interventions, particularly in cases of complex trauma resulting from sustained conflict. As mentioned before, psychotherapy was not a common practice in Soviet Armenia before the 1988 earthquake, the events of which set the stage for the development of therapeutic practices in Armenian society. During the first Nagorno-Karabakh war access to therapeutic interventions was on the rise, including a lot of diasporan psychologists who had joined in efforts to provide care for the victims. Later on during the 2020 war, there were facilities that accepted service members and provided therapeutic interventions to them. The program was set up by Armenia's Ministry of Defense. The initial goal of the program was to evaluate whether the service members were fit for duty and provide short-term psychiatric care. As a result of the initial evaluations, it became evident that most of the service members were unfit for duty, as a result of which the program became more long-term. The common interventions provided to the participants were exposure-based behavioral therapy, eye movement desensitization and reprocessing (EMDR), trauma-informed care, existential/humanistic, and psychoanalytic approaches. Some less common interventions were also provided such as biofeedback, Ericksonian hypnosis, massage therapy, and spiritual healing. It was also recom-

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The Influence of War on Mental Health issues in Armenia

mended to use the arts as a therapeutic means, the recreational therapies used were art, music, and exercise. However, cultural stigmas further complicate access to therapy for soldiers and civilians. In Armenian society, seeking mental health support is often viewed as a sign of weakness, especially among soldiers who are expected to embody resilience and strength. This cultural barrier leads to many war-affected individuals not seeking the psychological support they need, prolonging their suffering and in-

creasing the risk of untreated trauma.⁵ In conclusion, war has far-reaching psychological consequences, particularly in the Armenian context where historical and ongoing conflicts intertwine with cultural stigmas, migration, and a lack of sustained therapeutic support. Addressing these issues requires a multi-faceted approach that includes overcoming cultural barriers, conducting long-term research on interventions, and providing tailored mental health resources to war-affected populations. —

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#03 Azerbaijan

Approaches of Protecting the Child's Psychological Health in Incomplete Families

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ABSTRACT. Divorce can have significant emotional and psychological effects on children, affecting their mental health, behavior, and social relationships. This study is based on 102 consultations held with children from divorced families, during which various challenges and traumas were identified. While some children may become more resilient and independent after a divorce, many others face emotional difficulties such as anxiety, sadness, and behavioral problems. The research highlights the importance of healthy communication between parents and a supportive environment to mitigate the negative effects of divorce. Additionally, the study discusses various challenges children face, such as a loss of self-esteem, academic decline, social relationship struggles, and emotional insecurity. It emphasizes the crucial role of parental collaboration and the need for providing children with a safe space to cope with the changes caused by divorce.

KEYWORDS. Divorce, children's mental health, emotional difficulties, behavioral problems, parental communication, self-esteem, academic decline, social relationships, resilience, psychological support.

METHOD. This study employed a qualitative research method, drawing from

data collected during 102 individual consultations with children from divorced families over the course of one year. Through in-depth discussions and observation, various emotional, behavioral, and academic difficulties experienced by children in the wake of their parents' divorce were documented. The children's responses were categorized into different themes, such as emotional distress, social difficulties and academic challenges. Additionally, the study explored the role of parental communication during the divorce process and its impact on the children's well-being. The information was analyzed to identify the key factors influencing children's emotional reactions and the effectiveness of strategies to address their needs.

RESULTS. The results of the study show that divorce affects children in different ways, depending on factors such as age, personality, and the level of support from both parents. The main challenges identified include

- **Emotional Difficulties:** Many children experience anxiety, sadness, and loneliness, with some showing signs of emotional distress.
- **Behavioral Problems:** Aggression, defiance, and withdrawal are common behavioral issues observed in children following a divorce.
- **Loss of Self-Esteem:** Children often

struggle with diminished self-worth, affecting their confidence and sense of security.

• **Academic Decline:** Emotional difficulties were found to negatively impact children's school performance, resulting in distractions and lack of motivation.

• **Social Relationship Challenges:** Children may have difficulties forming and maintaining friendships, as well as adjusting to social situations.

• **Changes in Family Dynamics:** Divorce alters family roles and children often question their position within the family.

• **Fears and Phobias:** Some children develop increased fears or phobias, which may be exacerbated by the divorce process.

• **Lying:** In an attempt to protect their parents or avoid conflict, some children resort to dishonesty during or after the divorce.

Additionally, the communication dynamics between parents were found to play a significant role in the children's emotional responses. Issues such as emotional tension, inadequate information, and negative attitudes from parents can exacerbate the challenges children face during divorce.

INTRODUCTION. Divorce is a life-altering event that can have profound emotional, psychological, and social effects on children. The breakdown of a family,

especially when it involves children, can lead to a range of difficulties that impact their development and mental health. The emotional well-being of children from divorced families often suffers due to a variety of factors, including the sudden changes in family structure, loss of daily contact with one parent, and the possible conflict between parents during and after the divorce process. In this context, understanding the challenges children face, as well as identifying the causes and strategies to mitigate these effects, is crucial for supporting their mental health and promoting resilience during this difficult period.

Over the course of 102 consultations held with children from divorced families, several patterns and recurring issues have emerged. These issues reflect a range of emotional and behavioral difficulties that affect children differently, depending on their age, personality, and the overall family dynamics. For some children, the process of divorce can trigger feelings of anxiety, sadness, and loneliness, while others may experience difficulties with their self-esteem, behavioral issues, and problems with academic performance. Furthermore, the changes in social relationships, particularly in terms of friendships and interactions with peers, can pose significant challenges for children navigating this new family reality.

One of the critical factors in determining how children cope with divorce is the

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way in which parents communicate during the separation. When parents fail to communicate effectively, or when they engage in negative, hostile exchanges, the child can feel caught in the middle of the conflict. This can lead to heightened stress, confusion, and emotional insecurity. In contrast, when parents manage to maintain respectful communication, work collaboratively, and show sensitivity to their child's emotional needs, children are more likely to experience better psychological outcomes. This research aims to explore the mental health challenges faced by children of divorced families and to highlight strategies for supporting their emotional and psychological needs. By analyzing the experiences of children through individual consultations, the study sheds light on the specific difficulties they encounter, such as emotional distress, behavioral problems, academic decline, and social adjustment issues. The role of parents, particularly their ability to provide a stable and supportive environment, is central to the child's coping process. Moreover, understanding how to foster positive communication, avoid negative interactions, and ensure children's emotional needs are met during the divorce process can help reduce the adverse effects on children's mental health. Ultimately, the goal of this study is to provide insights and practical recommendations for parents, educators, and mental health professionals to bet-

ter support children in managing the emotional challenges that come with divorce, thus promoting their overall well-being and resilience.

PSYCHOLOGICAL WELL-BEING OF CHILDREN FROM DIVORCED FAMILIES: A LITERATURE REVIEW. The psychological well-being of children from divorced families is the subject of numerous studies and theoretical approaches. Understanding the psychological condition, behavior, and social adaptation of children largely depends on the family environment and the relationship between parents. In this section, the literature that examines the impact of divorce on children's psychological health, key issues, and the interventions suggested by experts will be reviewed.

PSYCHOLOGICAL IMPACT OF DIVORCE ON CHILDREN. There are various theoretical approaches regarding the psychological impact of divorce on children. Bowlby's attachment theory emphasizes the importance of children's attachment to their parents and suggests that divorce affects children's attachment styles. Especially in younger children, separation from parents may lead to negative emotional reactions. Research by Johnston and Campbell (1988) also shows that children from divorced families often face negative psychological impacts, particularly when they lose one parent or experience emotional neglect from the other.

Moreover, the psychological effects of divorce on children can vary. Issues such as emotional distress and psychological adjustment tend to differ across age groups. Children aged 3-4 years often experience feelings of separation and insecurity, losing a sense of safety after their parents' divorce. Children between the ages of 6-12 may lose their self-confidence, face difficulties in social relationships, and in some cases, experience a decline in academic performance. Among the emotional and behavioral problems children experience, anxiety, depression, loneliness, aggression, and social isolation are common. Research by Kelly (2000) indicates that most children show emotional difficulties after divorce, and these effects tend to persist over the long term.

PARENT COMMUNICATION AND FAMILY DYNAMICS. The communication between parents in divorced families plays a significant role in the psychological well-being of children. Studies by Amato and Keith (1991) reveal that when there is high conflict or negative interactions between parents, children are more likely to experience psychological difficulties. Children may feel guilty and forced to choose sides between their parents, which negatively affects their emotional and psychological development. On the other hand, positive and cooperative communication between parents can help children adapt better psycholog-

ically. Research by Maccoby and Mnookin (1992) shows that when divorced parents approach their children with sensitivity and prioritize the child's well-being, it positively influences the child's emotional and social development.

SOCIAL AND ACADEMIC IMPACTS. Divorce leads to difficulties in children's social relationships and academic performance. Hetherington (2003) investigated the impact of divorce on children's school activities and found that children from divorced families tend to show a decline in academic performance. They struggle to focus on their studies, lose interest in school, and often face academic challenges. These children also experience difficulties forming social relationships within the classroom.

Regarding social relationships, children may face problems in making friends and may isolate themselves from their peers after divorce. Amato (2001) emphasizes that children from divorced families are more likely to be isolated at school and experience difficulties interacting with classmates.

INTERVENTION APPROACHES AND SUPPORT SYSTEMS. Providing support to children after divorce is crucial for maintaining their psychological health and positively influencing their development. Cohen and Wills (1985) found that supportive social networks and emotional support from parents enhance children's

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ability to cope with psychological difficulties. Emotional support provided to children can help them recover better from the trauma and anxiety caused by divorce.

In terms of therapeutic interventions, therapists and psychologists can offer therapy sessions and consultations to help children better understand the challenges they face due to divorce and cope with emotional trauma. Moreover, parents should receive guidance on how to understand their children's emotional states and provide them with better support.

CONCLUSION. A review of the literature shows that divorce can have negative psychological effects on children, but healthy communication between parents, support systems, and therapeutic interventions can significantly reduce these impacts. A coordinated approach between both parents and professionals is essential in addressing the psychological difficulties faced by children from divorced families. Positive interventions proposed for these children can help minimize the long-term effects of divorce on their psychological well-being.

Methodology

The methodology of this study aims to explore the psychological well-being of children from divorced families, focusing on the identification of common psychological issues and the strategies used to address them. The study adopts

a mixed-methods approach, combining both qualitative and quantitative data collection and analysis to obtain a comprehensive understanding of the impact of divorce on children. Below are the key components of the methodology:

1. Participants

The study involved a total of 102 children from divorced families who were part of consultations held throughout the year. The participants ranged in age from 3 to 12 years old. The children were selected from different social, economic, and cultural backgrounds to ensure a diverse sample.

2. Data Collection

Data collection was carried out using the following methods:

- Interviews:** Semi-structured interviews were conducted with both children and their parents. These interviews aimed to gather insights into the emotional, social, and academic challenges faced by children following divorce.

- Surveys:** A set of standardized questionnaires was distributed to both parents and children. The surveys assessed various aspects of the children's mental health, including emotional distress, behavioral problems, social relationships, and academic performance.

- Observations:** Behavioral observations were carried out during the consultations to understand the children's emotional responses, social interactions, and overall well-being.

- Case Studies:** Detailed case studies were created based on in-depth interviews and observations. These case studies focused on specific children who exhibited extreme emotional or behavioral responses to their parents' divorce.

3. Data Analysis

The collected data was analyzed using both qualitative and quantitative techniques:

- Quantitative Analysis:** Statistical tools were used to analyze survey data, focusing on the prevalence of various psychological difficulties among children. Descriptive statistics, correlation analysis, and regression models were employed to identify significant patterns.

- Qualitative Analysis:** Thematic analysis was applied to interview and observation data. Key themes such as emotional distress, academic challenges, and social isolation were identified and categorized. Case study data were also analyzed for recurring patterns and individual differences in responses to divorce.

4. Ethical Considerations

All participants were informed about the purpose of the study and their right to confidentiality. Consent was obtained from both parents and children (with appropriate adjustments for the age of the children). Special care was taken to ensure that the children felt safe and supported during the consultations. Ethical approval was sought and granted by the relevant ethics committee.

RESULTS. The findings from the study highlight the psychological challenges faced by children from divorced families, as well as the role of parental communication and support systems. The results can be summarized as follows:

1. Emotional and Behavioral Issues

- Emotional Distress:** A significant number of children (approximately 68%) reported feelings of sadness, anxiety, and loneliness after their parents' divorce. Children aged 6-12 years were more likely to express concerns about their future and experience feelings of insecurity.

- Aggressive Behavior:** Around 45% of children exhibited signs of aggression, defiance, or withdrawal, particularly in the 3-6 age group. Many children expressed frustration with the changes in their family structure.

- Self-Esteem Issues:** About 40% of children reported a decline in self-confidence, particularly those who had limited contact with one parent or faced high conflict situations between parents.

- Social Isolation:** Approximately 50% of children experienced difficulty in forming and maintaining friendships. Many isolated themselves from peers, which was particularly evident in children who had experienced high parental conflict.

2. Academic Performance

- Academic Decline:** A significant percentage of children (55%) showed a decline in academic performance following the divorce. This included a

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lack of motivation, difficult concentrating in class, and an overall decrease in academic achievement. Children who had trouble adjusting to the changes in their family were more likely to struggle in school.

3. Parental Communication

• **Conflict between Parents:** Children who reported high levels of conflict between their parents were more likely to experience emotional and behavioral issues. Negative communication or lack of communication between parents contributed to feelings of insecurity and confusion among children.

• **Positive Communication:** Children from families where parents maintained respectful communication, even after divorce, showed fewer signs of psychological distress. These children were more likely to demonstrate resilience and adaptability.

4. Support Systems

• **Parental Support:** Children who received emotional support from both parents had better emotional and psychological adjustment. Around 70% of children reported feeling more secure when their parents collaborated in providing consistent support and reassurance.

• **Therapeutic Interventions:** About 30% of children who received therapeutic support, such as counseling or therapy, showed significant improvements in coping with their emotions and behav-

oral issues. Psychological interventions helped children develop better coping strategies and address trauma related to the divorce.

5. Social Relationships

- **Friendships:** Children who experienced higher levels of emotional distress and aggression had difficulty making friends and often faced challenges in maintaining positive peer relationships. This was more pronounced in children aged 6–12 years.
- **Social Adjustment:** Children who were supported by both parents and had a stable environment post-divorce were more likely to successfully adjust socially and maintain friendships.

CONCLUSION. The study's results indicate that children from divorced families face various psychological challenges, with emotional distress, behavioral problems, and academic decline being the most common. Parental communication, particularly the level of conflict and cooperation between parents, plays a significant role in shaping the child's emotional well-being. Support systems, including emotional support from parents and therapeutic interventions, are essential for helping children cope with the effects of divorce. This research underscores the importance of creating a supportive and stable environment for children during and after parental separation. —

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#04.1 Georgia

The global migration of healthcare workers, the resulting losses and benefit

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INTRODUCTION. Nowadays, from a demographic point of view, the world's population is actively aging, but at the same time it is becoming more urbanized. This is one of the reasons why the global burden of disease has increased significantly. From an epidemiological point of view, today there is a pandemic of chronic diseases. Non-communicable diseases have long replaced infectious diseases, and in turn, managing chronic diseases requires more resources, both financial and human resources in healthcare, the lack of which is acute in all countries of the world today, although this problem is especially acute in such

a small and still developing country as Georgia. In this article, we will discuss the challenges facing the Georgian healthcare system due to the constant and high migration of medical personnel. It should also be noted that the number of mental illnesses and musculoskeletal system diseases is increasing very rapidly. All this requires an immediate restructuring of the healthcare system to meet the growing demands that are currently being met. However, it is also important to consider that in addition to the number of people, the geographical distribution of healthcare personnel is a major problem.

Region	Medical doctors	Nurses/ midwives	All other cadres ¹	Total ²	Medical doctors per 1000	Nurses/ midwives per 1000	All other cadres per 1000	Total per 1000 ²
Africa	225 120	1 039 709	620 315	1 885 144	0.27	1.22	0.73	2.22
Americas	2 025 041	4 692 099	2 637 289	9 354 429	2.09	4.85	2.73	9.68
Eastern Mediterranean	785 629	1 295 020	979 097	3 059 747	1.26	2.08	1.57	4.91
Europe	2 909 051	5 314 157	3 308 690	11 531 897	3.20	5.84	3.64	12.68
South-East Asia	1 062 373	2 776 662	2 093 276	5 932 311	0.57	1.50	1.13	3.20
Western Pacific	2 721 036	4 624 862	2 959 246	10 305 145	1.49	2.54	1.62	5.66
Income ³								
Low	144 826	399 478	323 979	868 284	0.19	0.51	0.41	1.11
Lower-middle	1 977 455	4 475 914	3 543 241	9 996 609	0.77	1.75	1.39	3.91
Upper-middle	3 880 669	6 603 520	4 259 087	14 743 276	1.61	2.74	1.77	6.12
High	3 725 300	8 263 597	4 471 607	16 460 504	2.92	6.48	3.51	12.91
World ⁴	9 728 249	19 742 509	12 597 914	42 068 673	1.38	2.81	1.79	5.99

Source: WHO 2015

There is a lot of data from 2013, where you can clearly see the number of medical personnel and their uneven distribution in the world, for example, in Europe and the Americas (North and South America) it is 2. In 2020, the global workforce stock was 29.1 million nurses, 12.7 million medical doctors, 3.7 million pharmacists, 2.5 million dentists, 2.2 million midwives and 14.9 million additional occupations, tallying to 65.1 million health workers. It was not equitably distributed with a 6.5-fold difference in density between high-income and low-income countries. The projected health workforce size by 2030 is 84 million health workers. This represents an average growth of 29%

from 2020 to 2030 which is faster than the population growth rate (9.7%). This reassessment presents a revised global health workforce shortage of 15 million health workers in 2020 decreasing to 10 million health workers by 2030 (a 33% decrease globally). WHO African and Eastern Mediterranean regions' shortages are projected to decrease by only 7% and 15%, respectively. Accounting for the population size and the density of health workers per 10 000 population in 2020 reveals a striking inequity, with high-income countries having a health workers density that is 6.5 times that of low-income countries (figure 1).

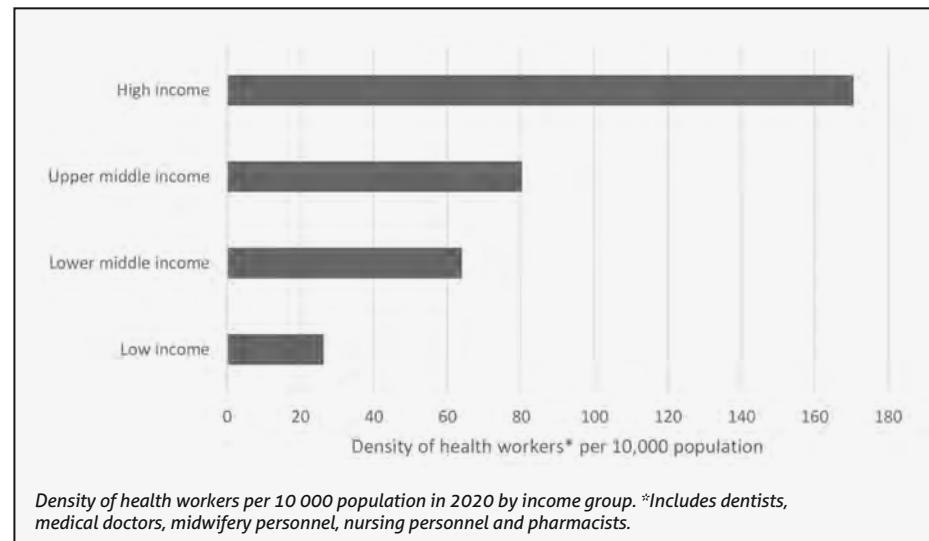


Figure 1: Density of health workers per 10 000 population in 2020 by income group.

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This finding underscores the fact that slightly more than one-fifth (22%) of the world's population have close to half (47%) of the global health workforce. This inequity has marginally decreased since 2013 when it was 7.6 times greater. Figure 2 depicts the inequitable distribution of health workers at a more granular level and the degree of subregional disparities.

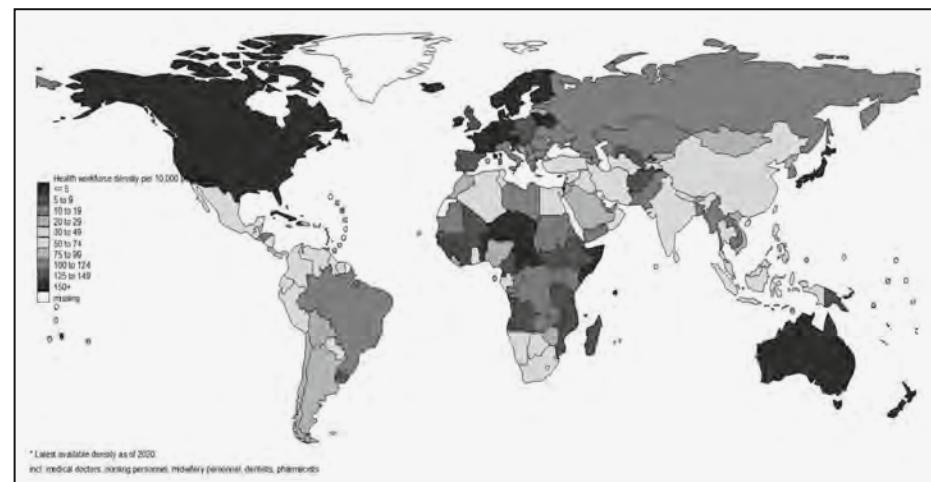


Figure 2: map of health workers per 10 000 population in 2020

Map of health workers (dentists, medical doctors, midwifery personnel, nursing personnel, pharmacists) density per 10 000 population in 2020. Cut-off points used for density per 10 000: 5, 10, 20, 30, 50, 75, 100, 125, 150. The middle cut-off point used is 50 health workers per 10 000 population and is close to the shortage benchmark (see "health

workforce shortage section" below), therefore countries in red colour scale on the map can be considered as having a health workforce shortage. Such a massive and growing migration of healthcare professionals is caused by several factors, the first and most important of which are globalization processes, a sharp increase in demand for medical services and the opening of

The results obtained as a result of global migration of healthcare workers vary from side to side: the country from which the professional goes suffers, while the country that receives him is certainly in a profitable position. In Georgia, there is a constant shortage of professional personnel in both inpatient and outpatient departments.

1. Unequal distribution of medical personnel in Georgia, both quantitatively and geographically. Among the 53 countries of the European region, Georgia ranks third in terms of the number of doctors per 100,000 population. In 2013–2017, the number of doctors in Georgia increased by 22% and reached 27,400. (20)

2. In Georgia, the number of doctors far exceeds the number of nurses, the number of nurses is sharply insufficient 30:70. Such a proportion is unchanged in 1940, 1965, 1970, 1975 and subsequent years, that is, 30% of the medical personnel were doctors, and 70% were nurses and other specialists of medium qualification (nurse, laboratory assistant, and workers of a similar profile) and the situation is changing radically in 2002–2019. The dynamics show us that the share of doctors is sharply increasing and the share of medium medical personnel is decreasing, whether this is a problem or not, of course this is a very big problem in the healthcare sector because medium medical personnel are the backbone of healthcare and spe-

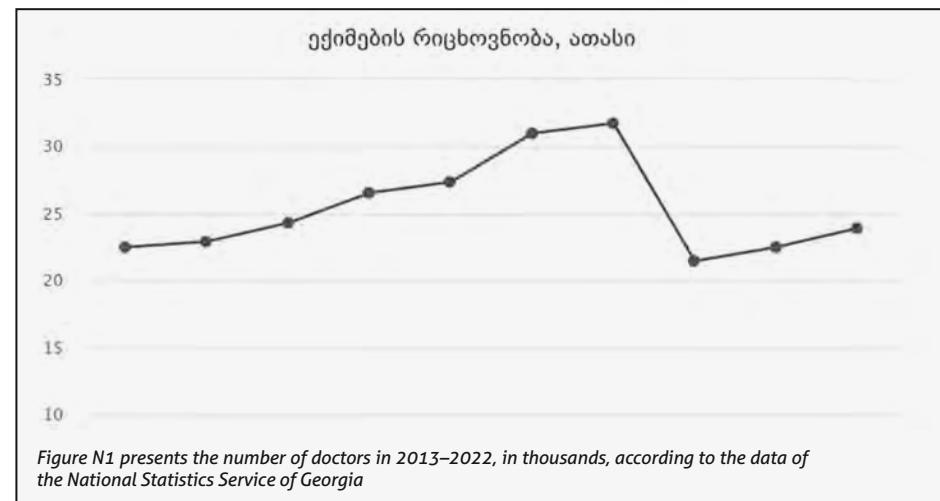


Figure N1 presents the number of doctors in 2013–2022, in thousands, according to the data of the National Statistics Service of Georgia

Figure 1: Number of doctors per 1000 population

borders. Migration of professionals in the medical field is not a new issue. This topic has been actively discussed since 1970, but in the last decade this number has exceeded all expectations and the results have a much more negative impact on developing countries, where the number of medical professionals is already small.

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cifically of clinics. Not only their quantitative reduction but also their qualification is noteworthy. Today we can say that the profession of a nurse in Georgia is almost on the verge of extinction, because the profession is not popularized and, accordingly, valued both financially and ethically. In the patient education system and quality treatment, one of the decisive roles is played by the average medical staff, specifically nurses. In the EU countries, there are an average of 2–2.7 nurses per doctor, and the

increase in this indicator is considered a positive trend. In Georgia, the number of doctors exceeds the number of nurses, although since 2019 there has been a growth in the ratio. It is necessary to stop the outflow of medical personnel, otherwise Georgia will find itself in a difficult situation, which includes an acute shortage of healthcare personnel. Economic strength, political stability, and continuous medical education are very important to stop this process.

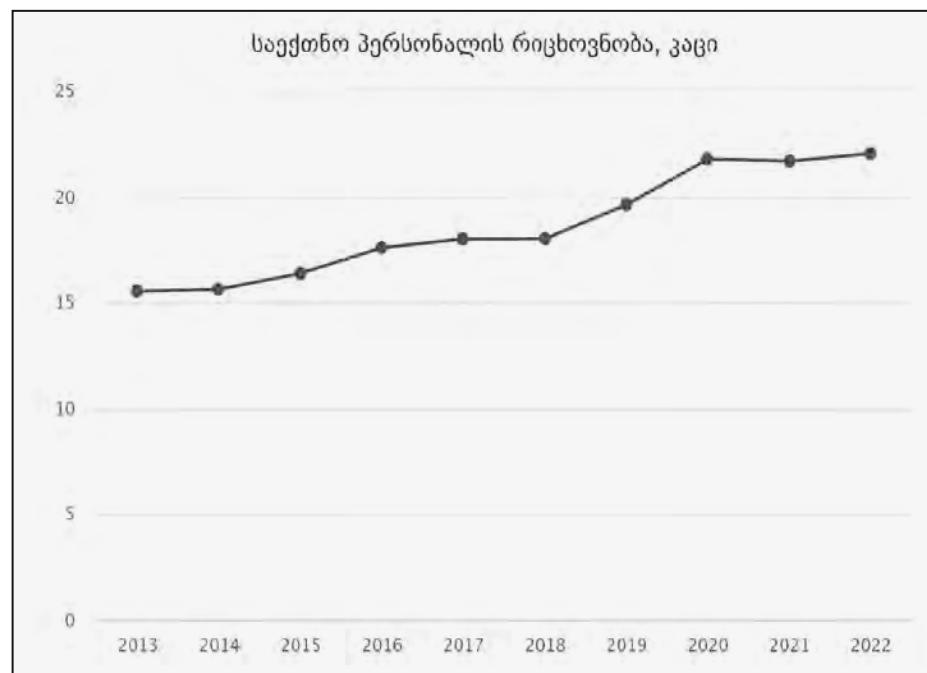


Figure 2 Number of nurses per 1000 population

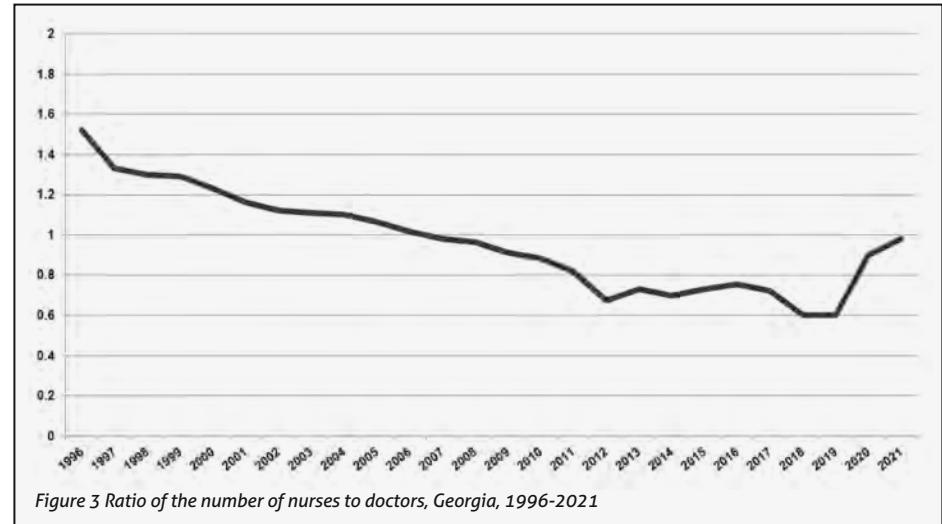


Figure 3 Ratio of the number of nurses to doctors, Georgia, 1996-2021

The migration of healthcare workers poses a significant challenge to global health systems. This long-standing and growing phenomenon is driven by fundamental labor market dynamics, including factors such as education, working conditions, and pay disparities across countries. The COVID-19 pandemic has further accelerated this trend. Unfortunately, migration often originates from countries already facing a shortage of healthcare professionals, exacerbating their healthcare system weaknesses and deepening inequalities in workforce distribution. Georgia serves as a clear example, with notable disparities in the distribution of doctors and nurses (Organization, 2023). (Walton-Roberts and Bourgeault, 2024) Georgia, despite its small size, experiences significant migration of health-

care professionals, contributing to an uneven distribution within the national healthcare system. In developed countries, the ratio of nurses to doctors is at least 2:1, while in Georgia, this ratio is only 0.8:1. A particularly pressing issue is the shortage of doctors in Georgia's mountainous regions, as few are willing to work there. Interestingly, statistical data shows that while Tbilisi, the capital, has the highest concentration of medical institutions, the region of Rachal-Lechkhumi has a comparatively higher number of nurses. One of the primary drivers of medical personnel migration from Georgia is the low salaries, which remain a significant challenge. ('CIF-Barometer_XIV_25-03-2021-CIFGT-ENG.pdf', no date).

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METHODS. We conducted a literature review to examine the distribution of doctors and nurses in Georgia and compare it with data from leading countries in Europe. According to the statistical data, Georgia has nearly twice as many doctors as the average European country, with approximately 10,000 more doctors. However, it has almost half the number of nurses, with a shortage of around 12,500. This imbalance in the distribution of doctors and nurses is a significant issue. One of the contributing factors is education. For instance, in 2016, Georgia had 18.4 newly graduated doctors per 10,000 inhabitants, while the number of nurses was just 0.6 per 10,000 citizens. These figures highlight not only the unequal distribution of healthcare professionals but also indicate underlying issues within the education system. The literature review clearly shows that the migration of medical professionals is a pressing global issue, especially for countries like Georgia. We surveyed 100 participants – 50 doctors and 50 nurses. Among the doctors, 15 believed that Georgia faces a migration crisis, while 35 disagreed. This disagreement is partly due to a lack of awareness among doctors about the doctor-nurse ratio in the country, as half of the doctors were unaware of the actual distribution. Nurses, on the other hand, frequently reported feeling understaffed, which contributes to the need for 72-hour shifts in their work environment.

RESULTS. In Georgia, unlike in European countries, a noticeable lack of productivity exists in hospitals. To improve productivity levels, Georgia requires 11,822 additional doctors, compared to 4,280 in European countries like Germany. These statistics highlight the detrimental impact of healthcare worker migration on a global scale, particularly for countries like Georgia.

CONCLUSION. To address the challenges of healthcare worker migration, the World Health Organization (WHO) introduced the Global Code of Practice on the International Recruitment of Healthcare Personnel in 2010. This Code was adopted by the World Health Assembly to mitigate the negative effects of health worker migration and to promote sustainability in the global healthcare workforce. By encouraging ethical recruitment practices, it aims to reduce the adverse impact on countries experiencing a shortage of healthcare workers, especially those in low- and middle-income nations. The implementation of the Code, as outlined in various reports, provides valuable insights into the trends in healthcare worker mobility, highlighting critical issues that need to be addressed to prevent further destabilization of health systems. These include balancing the distribution of health workers, ensuring adequate training in countries facing shortages, and safeguarding vulnerable

healthcare systems from the detrimental effects of excessive migration. By enhancing the management of health worker migration and improving data on workforce distribution, countries can avoid exacerbating their health system

weaknesses. This approach is vital in preserving the integrity of healthcare in developing nations and achieving more equitable access to healthcare services globally. —

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#04.2 Georgia

Disordered Eating Patterns and the Spectrum of Eating Disorders among Medical Students – A Cross-Sectional Study

Khan Janis, Balasubramanian Surya Rajhan, Ramdewo Sohan

ABSTRACT. Eating disorders (ED), a group of medical conditions influenced by biological factors, have a profound impact on both physical and mental health. Whereas global ED point prevalence stands at 7.8% in 2018, the latter indicator among medical students marks 10.4%, highlighting as a higher risk-group for targeting interventions. Variety of factors possibly contributing to ED development have been assessed worldwide, however our study aimed to explore the impact of disordered eating on acquired ED in international medical students in the country of Georgia.

An online questionnaire-based cross-sectional study was conducted from 01.11.2023 to 01.02.2024 among international medical students at European University, Tbilisi, Georgia. The survey was developed based on SCOFF assessment, while relevant variables were adapted, added and modified. We distributed the online survey electronically, via social network systems. Data compilation, cleaning and analysis was performed using STATA BE18 (StataCorp LLC). Chi-square test was used for assessing categorical variables.

Out of 202 survey participants, eligible for the data analysis were 156 medical students from European University Tbilisi, Georgia. The median age of the par-

ticipants was 19 years; gender distribution for females and males was 54.19% and 42.58%, respectively. Sixty-six (42%) participants skipped one meal a day and thirty-nine (25%) skipped two or more meals a day. Overall, out of 156 participants, 67% suffer from varieties of disordered eating. Additionally, female students tend to consume more food, including unhealthy snacks under the stress influence ($p=0.008$), while consumption of the healthy snacks and regular exercise was associated with male students ($p<0.001$).

Our study results suggest that the majority of medical students do not follow proper meal plans, leading to lack of daily nutritious requirements. Influence of the stress on the consumption of unhealthy snacks are highly prevalent in our cohort, increasing a risk of disordered eating and potentially developing ED.

ABBREVIATIONS. ED = Eating disorders, DE = Disordered eating, NEDA = National Eating Disorders Association, USDA = United States Department of Agriculture, NHS = National Health Services of the United Kingdom, SCOFF = Sick Control One Fat Food, AN = Anorexia Nervosa, WHO = World Health Organization, FDA = Food and Drug Administration, STAT BE18 = Special Tertiary Admission Test BE18

KEYWORDS. Eating disorders, Disordered eating, Cross-sectional study, Medical Students, Prevalence, Stress, Nutritional Habits

INTRODUCTION. Eating disorders have long been one of the top causes of severe mental health problems, impacting millions of people worldwide. While many variables contribute to the development of eating disorders, one critical component that should not be disregarded is the impact of disordered eating. According to the National Association of Anorexia Nervosa and Associated Disorders, approximately 24 million people suffer from eating disorders in the United States of America alone (Graber (2022)). According to the National Health Services of the United Kingdom (NHS) – "Eating disorder is a mental health condition where you use the control of food to cope with feelings and other situations." This leads to unhealthy eating behaviors and may lead to people eating too much or too little or worrying about their weight or body shape (NHS, 2024) (Table 1).

Medical students have a greater prevalence of mental illnesses because of the continuous stress and danger of burnout they face, with eating disorders being especially alarming for aspiring physicians since they are associated with a significant risk of impairment (Bizri et al., 2020). According to a cross-sectional study of medical students at the King

Abdul-aziz university, among the 417 medical students, the prevalence of eating disorders was found to be 32.1% (Ghamri et al., 2022). Our study delves into the complex relationship between eating disorders and disordered eating, exploring how the latter can serve as a precursor or trigger for significant mental health concerns. Recognizing and addressing the indicators of disordered eating is critical for preventing the development of fully formed eating disorders. Early intervention might include educational programs, counseling, and support groups aimed at promoting a positive relationship with food and body image. Encouraging open talks about body positivity and self-acceptance can help to create a more supportive atmosphere, lowering the prevalence of disordered eating practices.

The aim of the study was to find the major contributors for disordered eating that leads to eating disorders, including origin of the participants, number of the meals consumed per day and snack type and frequency and its link with physical activity level. In contrast with similar studies, we focused on medical students from European University Tbilisi, Georgia. Different data collection methods were incorporated, such as direct interviews, questionnaires, etc. Data was collated, cleaned and analyzed, followed by distribution of the results to the participants in order to highlight the

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prevalence of the eating disorders caused by disordered eating.

intervals. Individuals with habit of the disordered eating may feel guilty, anxious,

Category	Definition	Types	Severity
Eating Disorders	Mental health problems that have been clinically identified and have certain diagnostic criteria	Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder	High: Needs psychological or medical help
Disordered Eating	A wide range of inconsistent eating habits that don't always fit the criteria for an eating disorder	Overeating, excessive exercise, chronic dieting, and skipping meals	Moderate: If left untreated, it can result in eating problems.

Table 1 The differences between eating disorders and disordered eating.

1.1. Understanding Disordered Eating

Disordered eating encompasses a variety of irregular eating patterns that deviate from the normal eating habit but may not always satisfy the diagnostic criteria for a full-fledged eating disorder. These habits can take many forms, including restricted eating, binge eating, purging, and excessive exercise (Bulimia Nervosa, 2024). Eating disorders are severe mental diseases that may affect anyone. This also applies to those suffering from eating disorders. Disordered eating is more prevalent than clinical eating disorders. Disordered eating refers to subclinical eating problems. Previous studies found a link between disordered eating, stress, and anxiety (Anderson, n.d.). We define a healthy meal to be one that includes protein, carbohydrates, fat and fiber consumed 3 times per day at regular

or ashamed about their connection with food, but their behaviors may not be as dramatic or pervasive as those documented in clinical eating disorders may (Harris and Barraclough (1998b) (Arcelus et al., 2011). The origin of the participants was explored in this study because the majority of the students studying at the European university, Tbilisi are international students who come from different cultural backgrounds and countries. This could enforce various eating habits and while leaving their homes to study, students are faced with new cultural norms. Stress, change of environment and food variety triggers development of the disordered eating habit. The number of the meals consumed per day and snacks type and frequency were of great importance to this study to help identify whether participants have eating disorders or not. Exercise was also considered to be an important factor in determining whether or not people have eating disorders because when people exercise, they have different goals (such as losing weight or gaining muscle), this leads to them eating less or more respectively in conjunction with exercise.

1.2. Disordered Eating as a Precursor

It is critical to note that disordered eating can lead to the development of more serious eating disorders. For some people, what begins as a harmless endeavor to live a healthy lifestyle or reduce weight, can spiral into a harmful habit of behavior. The NEDA website defines eating disorders as excessive feelings, attitudes, and behaviors related to weight and food (NEDA, 2018) (Anderson, n.d.). Pressure to adhere to cultural beauty standards, peer influence, and a need for control are all significant elements in the progression from disordered eating to a diagnosable eating disorder. Eating disorders (ED) are among the most severe mental diseases, accounting for some of the highest death rates (Castellini et al. 2022).

1.3. The Role of Societal Pressures

Societal influences, especially media portrayals of idealized body images, can have a substantial impact on the development of disordered eating. The continual bombardment of excessive beauty standards can lead to skewed self-images and an unhealthy relationship with food. These conditions cause severe impairment and distress in a person's life. Con-

cerns about weight and body image can lead to a severe and disabling condition (King, 2013) (Anderson, n.d.). In order to fulfill these unachievable expectations, people may turn to excessive dieting or other disordered eating practices, unintentionally laying the ground for the onset of eating disorders.

1.4. Psychological Factors

Anorexia Nervosa (AN) is an eating disorder marked by excessive loss of weight and impaired body image (Anderson, n.d.). Disordered eating is linked to psychological issues including poor self-esteem, anxiety, and perfectionism. According to King (2013), anorexia has the greatest fatality rate among all psychological disorders (Anderson, n.d.). Individuals who face these mental health difficulties may turn to food and eating behaviors as a coping mechanism or to retake control of their lives. Over time, these coping methods can become increasingly established, eventually leading to the emergence of clinically serious eating disorders.

This study explored the key contributors to disordered eating at the European University Tbilisi, Georgia. Focusing factors such as meal habits, snack frequency, physical activity levels and cultural backgrounds. This study addressed the following questions: What major factors contribute to the disordered eating habits of the students at the European University Tbilisi, Georgia? How do these factors relate to the prevalence of eating disorders? By exploring these questions,

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this study examined the relationship between disordered eating and ED.

METHODOLOGY. An online questionnaire-based cross-sectional study was conducted from 01.11.2023 to 01.02.2024 among international medical students at European University, Tbilisi, Georgia. The survey was developed based on SCOFF assessment, while relevant variables were adapted, added and modified. Online survey was distributed electronically, via social network systems. Data compilation, cleaning and analysis was performed using STATA BE18 (StataCorp LLC). SCOFF approach is used as a screening method to identify the eating disorders which helps to find a likely case of disordered eating. As our study was questionnaire based, the idea of the sco approach was modified to fit our study design, allowing us to incorporate more questions in the survey rather than only yes/no questions.

Throughout the study, the participants were informed well in advance that the participation in the study was voluntary and they were only included in the study after getting their consent. Moreover, personal information, if provided, e.g. names, contact number etc. were kept confidential and not published anywhere.

RESULTS. Total of 202 medical students at the European University Tbilisi, Georgia participated in the survey. Forty-six (22.77% from the total) responses were

excluded due to incomplete responses leaving 156 participants for the study cohort. Among 156 participants, 54.19% of the participants were female and 42.58% were male and 3.23% of participants chose not to reveal their gender. In regard to the age of the participants, the minimum age of participants was 18 years old, and the maximum age of the participants was 29 years old. The median age was 19 with a standard deviation of 2.32. Moreover, among the participants included in the study sixty (38%) were from semester 1, followed by forty-three (28%) from semester 3 and remaining from other semesters. In regards to the meal, Sixty-six (42%) participants skipped one meal a day and thirty-nine (25%) skipped two or more meals a day (Table 2). Overall, out of 156 participants, 67% suffer from varieties of disordered eating. Additionally, female students tend to consume more food, including unhealthy snacks under the stress influence ($p=0.008$), while consumption of the healthy snacks and regular exercise was associated with male students ($p<0.001$).

Participants' origin was categorized according to continental dispersion; it was found that 67% of the participants were from Asia, 16% from Africa, 14% from Europe, and followed by North America and Australia respectively (Figure 1). When comparing participants' geographical origin to their exercise habits, exercise participation rates were

Meal quantity by gender				
Meal quantity by gender	Categories	Frequency	Percentage %	Cumulative %
1 meal per day	Female	25	64.10	64.10
	Male	14	35.90	100
	Prefer not to say	0	0	100
2 meals per day	Female	37	56.06	56.06
	Male	24	36.36	92.42
	Prefer not to say	5	7.58	100
3 meals per day	Female	22	51.16	51.16
	Male	21	48.84	100
	Prefer not to say	0	0	100
3 or more meals per day	Female	0	0	0
	Male	7	100	100
	Prefer not to say	0	0	100
Pearson chi2(6) = 18.1814 Pr = 0.006				

Table 2. Meal quantity by gender

observed: 29% from Asia, 9% from Africa, 50% from Europe and Australia, and 66% from North America.

Majority of the participants – eighty-nine (59.33%), reported snack frequency 1–2 times per day, while the most consumed snacks included crisps, sweets, and fruits. Referring to the stress effect on eating habits of the participants, it

was found that fifty-eight (37.66%) of the participants eat less or no food under stress. Out of 156 participants, 155 answered the question about exercise, sixty-nine (41.93%) females, thirty-one (20%) males, and five (3.22%) others did not exercise. While nineteen (12.25%) females and thirty-five (22.58%) male participants' exercise. Overall, the survey

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revealed that 65% of the participants do not exercise regularly.

one meal a day. This shows that skipping meals leads to less energy intake



DISCUSSION. The aim of the present research was to identify and prioritize the major disordered eating patterns leading to the fully-formed eating disorders, specifically in the population of the immigrant medical students with different cultural backgrounds.

According to our survey results, one of the most concerning findings was the high prevalence of skipping meals, with sixty-six (42.31%) of the participants skipping one meal a day and thirty-nine (25.00%) even skipping two meals a day. These include mostly females, thirty-seven (44.05%) skipping one meal a day and twenty-five (29.76%) skipping two meals a day. Of the male participants, fourteen (21.21%) eat one meal a day, twenty-four (36.36%) two meals a day and twenty-one (31.82%) only eat

and leads to abnormal functions of the metabolic process that require energy (World Health Organization: WHO, 2020). This disruption of meals can contribute to nutritional deficiencies, negatively impacting academic performance and making them more prone to stress. Medical students face both academic pressure and emotional pressures, and irregular eating habits can further interfere with their circadian rhythms. Another study by Johns Hopkins (2022) reveals that it is important to have consistent meal timing to maintain well-being and it suggests that skipping meals can affect both physical and cognitive functioning. Based on these findings, we suggest educational institutions implement and promote balanced eating habits among students. Another significant finding was the rela-

tionship between exercise and healthier eating habits. Of the remaining fifty-four (33.99%) participants who exercised, a large portion chose healthier snacks, for example, fruits and nuts. On the other hand, one-hundred-one (66.01%) who do not exercise consumed more processed and sugary snacks. These findings also support research by the American Heart Association, which states that exercise encourages people to make healthier food choices (American Heart Association, n.d.). It seems that regular exercise appears to play a significant role in adopting a balanced lifestyle by making people more conscious of their diet. Based on our findings, most students don't work out on a regular basis, suggesting a gap in their lifestyle balance. Therefore, encouraging exercise in addition to better eating practices may be a useful strategy for enhancing medical students' general health.

It was also revealed that stress played a noteworthy role in eating habits, as 38% of individuals in the study reported less food intake or missed meals when they experienced stress. It combines with findings from other studies about appetite suppression caused by stress where an individual's body undergoes a "fight-or-flight" (sympathetic) response, which is brought about by stress, which subsequently inhibits hunger (Harvard Health, 2021). For medical students having very high stress levels- could build an unhealthy cycle; for instance, poor eating

habits from stress will lead to altered energy levels, cognitive functioning, and academic performance. An added cause for concern is the fact that there is evidence showing that chronic causes of stress lead to developing eating disorders. The study recommends and advocates that stress management be incorporated into academic-based institutions to energize breaking the cycle it upholds by both concerns of mental and physical well-being. Stress-reduction programs might be considered at the university level, which could ultimately help students modify emotional and physiological responses to academic pressure, thereby promoting healthier eating behaviors.

The most important limitation of the study is the possible event of the selection bias as the participants were only chosen from JoAnn campus of the European University, Tbilisi and excluded the other two campuses. In addition, the participants were required to fill in the questionnaire that required them to think about past events, which could have led to recall bias. Moreover, the study was focused on eating disorders caused by disordered eating rather than focusing on a particular factor, this could have led to an overestimation. In addition, some of the participants skipped some questions in the questionnaire, which could have led to biased results. In order to avoid such bias, a well-planned study with one particular

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risk factor should be studied at a time, to ensure that that particular attribute can cause a certain outcome. To tackle the bias, the questionnaire questions should be made mandatory to answer, so avoid skipping questions. In addition, as the participants included eighty-four (54.19%) females in the study, their eating habits may be affected by pre-menstrual syndrome. Which leads to more food cravings, hence causing the female participants to eat more than the usual food. This extra food might have also been junk food, including chocolate, crisps, etc. This could have led to bias in the results as well because these symptoms may vary from person to person and male participants do not suffer from it, therefore it could have been a confounding factor contributing to the study outcome. Furthermore, as 67% of the participants were from Asia, dif-

ferent origins might have been another confounding factor because people from different regions have different eating styles and habits. To avoid this, study focus should only be intracontinental rather than intercontinental.

CONCLUSION. Our findings contributes to the deeper understanding of disordered eating habits of medical students, highlighting importance of deviation from the proper meal plans and lacking sufficient calories to meet their daily requirements. Our study results suggest that the majority of medical students do not follow proper meal plans, leading to lack of daily nutritious requirements. Influence of the stress on the consumption of unhealthy snacks are highly prevalent in our cohort, increasing a risk of disordered eating and potentially developing ED. —

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#04.3 Georgia

Through the Lens of a Camera: Exploring Health Determinants in Rural Settings with Medical Students

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ABSTRACT.

Introduction: The project "6 Days of the Country Doctor" aimed to deepen students' understanding of health determinants through engagement with country doctors (CDs) in the mountainous areas of Georgia. By facilitating observations of rural populations and their interactions with local physicians, the project fostered a collaborative learning environment. Students observed, learned, and shared experiences that highlighted the complexities of healthcare in these settings.

Methods: The project involved 17 students across four mountainous regions of Georgia over three years (2022–2024). Prior to their visits, students received training in photography and storytelling to document the everyday experiences of country doctors. Following field work, a survey with multiple-choice and open-ended questions assessed the impact of the experience among 2022–2023 participants. An online questionnaire was administered to doctors (n=11) and students (n=12), achieving an 83% response rate.

Results: The project enhanced students' awareness of medical challenges in rural communities and the health determinants at play. Ninety percent (90%) of students noted that the project helped them understand rural medical prob-

lems and the impact of social, cultural, and environmental factors on health. Learning photography and storytelling positively influenced students' well-being. Additionally, ninety-two percent (92%) of doctors reported that the project raised the profile of CDs among the population and boosted their motivation, noting positive feedback from patients. Project impact extended to the following areas: 1) dermatological screening outreach organized by Petre Shotadze Tbilisi Medical Academy (TMA); 2) TMA has been offering English classes to CDs based on their identified needs; and 3) one CD has joined TMA's Grant Commission for Social and Cultural Student Projects.

Conclusion: The project fostered a deeper understanding of health determinants in rural areas while emphasizing the benefits of community engagement. It garnered media attention, further connecting students and the institution with country doctors. Collaborative initiatives inspired by project findings, involving more students, are also in the planning stages, highlighting an ongoing commitment to rural health improvement and education through local partnerships. The project has gained interest among international counterparts, and future plans include enabling international students' involvement in it.

INTRODUCTION. Encouraging healthcare professionals to work in rural areas is a global challenge. Many people leave rural areas to seek careers in larger cities. The transdisciplinary photo project "6 Days of the Country Doctor" aimed to examine students' attitudes towards medical practice in rural areas while helping them understand the role of health determinants on the population. In Georgia, there are mountainous regions where living and working conditions are harsh. The rural environment impacts the work of County Doctors (CDs) and complicates healthcare access. Observing the challenging work of country doctors helped medical students understand the role of various factors in health outcomes. The transdisciplinary approach enabled students to observe, learn, and share their experiences through photography and storytelling.

MATERIAL AND METHODS. The project involved 17 students from four mountainous regions of Georgia over three years (2022–2024). These regions included Adjara, Guria, Lechkhumi, and Svaneti. Prior to their visits, students received training in photography and storytelling to document the everyday experiences of country doctors during the expedition. In these regions, students shadowed doctors while simultaneously documenting the encounters. Following the field work, a survey with multiple-choice and open-ended questions assessed the impact of

the experience on the 2022–2023 participants. An online questionnaire was administered to the doctors (n=11) and students (n=12). The questions for students focused on examining the impact of this experience on their motivation towards their studies, while questions for the physicians centered on the impact of the project on their everyday activities and how they perceived sharing their experiences with the students. The response rate was 83%.

RESULTS. During these visits, students had the opportunity to observe the association of health determinants (social, cultural, and environmental) with health outcomes in the communities. Feedback from the students demonstrated that they recognized the linkage between social factors and health. Among the social determinants, limited access to healthcare due to poor infrastructure was noted. Many patients lived far from medical centers, and doctors often traveled under difficult conditions to reach them. Environmental factors, particularly extreme weather conditions and indoor air pollution from cooking practices, were also emphasized, alongside the high prevalence of chronic respiratory conditions such as Chronic Obstructive Pulmonary Disease (COPD). Students also observed that the population adhered to a traditional diet rich in fats and carbohydrates, and the smoking rate was very high. Consequently, the high prevalence of

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cardiovascular diseases was unsurprising. The interaction between doctors and patients highlighted cultural sensitivity and mutual respect for cultural and religious differences, as seen in the communication dynamics between Muslim patients and Christian doctors. After the expedition, a survey was conducted with both the students and the country doctors. Ninety percent of the students reported that the project helped them understand the challenges of rural medicine and the influence of social, cultural, and environmental determinants on health. The survey also showed that learning photography and storytelling was beneficial for the students, offering them a new way to process and reflect on their experiences. The doctors reported that the project raised their profile in the community and enhanced their motivation toward their profession.

DISCUSSION. The results demonstrated that students enhanced their understanding of the impact of health determinants through various contexts. The importance of social conditions was evident in terms of healthcare access, which was limited due to very challenging living conditions in rural areas. Some houses were located far from medical centers, and doctors had to visit patients themselves. The roads were barely paved, and in some cases, physicians had to drive along cliffs. Doctors

noted that in winter, they use special skis to reach their patients. Healthcare access becomes even more limited during those months, despite some areas being equipped with medications and technology.

Another interesting factor was food culture and nutritional patterns. Georgia is famous for its cuisine. In Adjara, for example, traditional dishes are quite oily and rich in carbohydrates, which can be associated with the hypertension observed in almost every adult patient. Hence, checking blood pressure was a routine part of every visit. Smoking, especially among men, was another common risk factor, further exacerbating health conditions.

Environmental determinants often overlapped with social ones. Poor road conditions made healthcare access difficult. Additionally, extreme weather conditions in these regions created significant obstacles for healthcare access. The most prominent feature, however, was the way people heated their homes and cooked indoors. Even in summer, many homes had indoor stoves, and it was not surprising that the prevalence of COPD in these regions was very high.

Cultural determinants of health were also observed. Georgia is a predominantly Orthodox Christian country, but Adjara (one of the visited regions) has a large Muslim population. In one village, where the entire population was Muslim, the relationship between the Chris-

tian doctors and their Muslim patients was an example of mutual respect. Cases demonstrating cultural competency were abundant. One story shared by a student involved an elderly woman who refused to use alcohol (ethanol) as an antiseptic due to her religious beliefs. The doctor, respecting her choice, found an alternative. In another instance, a doctor arrived with students at a patient's home right in the middle of her prayer time. The doctor waited patiently until the patient finished praying before attending to her.

Examples like these helped students understand how respecting patients' cultural and religious beliefs can lead to better health outcomes. This level of trust and respect allowed doctors to provide better recommendations, which patients were more willing to follow.

OUTLOOK. The project has had far-reaching impacts beyond the personal

experiences of students and doctors. It was featured on national TV channels, and the photos taken during the expedition were displayed in exhibitions visited by numerous people. The bond between students and doctors has continued to grow, leading to further social activities such as a dermatological screening held by the student group and Tbilisi Medical Academy staff for the population in Adjara. Several doctors have even started learning English through courses offered by Tbilisi Medical Academy. One of the country doctors has joined TMA's Grant Commission for Social and Cultural Student Projects. Each year, more students are eager to engage in social service initiatives targeted at the regions visited. The third and final season of the project concluded in September 2024, featuring the Svaneti and Lechkhumi regions and their doctors. Consequent results dissemination activities are planned for early 2025.—

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#05.1 *Indonesia***Central Nervous System Infection in Indonesia:
A Microbiology Perspective**

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ABSTRACT. Central nervous system (CNS) infections are serious health concerns in Indonesia due to the country's tropical climate, large population, and varying levels of healthcare access. The microbiological landscape of CNS infections in Indonesia includes a wide range of bacterial, viral, fungal, and parasitic pathogens. Understanding the specific microbiological causes and their epidemiology is crucial to improving diagnosis and treatment outcomes. This study aims to investigate the microbiological causes of brain infections in Indonesia, focusing on the identification of key pathogens, and diagnostic challenges. A prospective cohort study was conducted (from May 2019 to June 2023) among suspected brain infections patients admitted to Cipto Mangunkusumo Hospital in Jakarta, Indonesia. Clinical, laboratory and radiological assessment were standardized. The cerebrospinal fluid (CSF) samples were analysed using standard microbiological methods, including smear, culture, polymerase chain reaction (PCR), and serological testing to identify responsible pathogens. Of 852 patients screened, 524 were diagnosed with a CNS infection. Among HIV-uninfected patients,

CNS tuberculosis (47,6%) was the most common, meanwhile CNS toxoplasmosis (10,4%), bacterial (9,5%) and viral (4,4%) infections were uncommon. On the other hand, among HIV-infected patients, CNS toxoplasmosis (28,5%) was most common, followed by neurosyphilis (26,1%), CNS tuberculosis (15,5%), and cryptococcal meningitis (8,7%). A microbiologically confirm diagnosis was achieved in 26,7%, while in 18,7% CNS infection cases the cause is unknown. This study identified *Mycobacterium tuberculosis* has an important role as the cause of CNS infections. Different pattern of pathogen in HIV-infected and HIV-uninfected patient groups were found. This study emphasizes the need for enhanced microbiological diagnostic facilities and the development of national guidelines for the management of CNS infections in Indonesia. A combination approach of various supporting examinations increases the chances of early diagnosis of CNS infection. Whilst progress has been made, no single assay can be used as a rule out test.

Keywords: CNS infections, microbiological diagnosis, pathogen pattern, brain infections, cerebrospinal fluid

INTRODUCTION. Central nervous system (CNS) infections remain a considerable health problem due to their association with high morbidity and mortality rates.¹ These infections are particularly concerning in tropical regions such as Indonesia, where environmental factors like high humidity and temperature enhance the growth and transmission of various pathogens. CNS infections can be caused by a wide range of microorganisms, including bacteria, viruses, fungi, and parasites, each presenting wide range clinical manifestations and complications.^{1,2} The situation is worse in developing areas where there is lack of resources. Due to the lack of necessary health services, many of these people do not have timely and effective treatments.³ For accurate diagnosis and appropriate measures to be taken, it is necessary to identify the causative microorganism because different types of pathogens require different therapeutic approaches. However, the resources needed for modern diagnostics are lacking in many places, including Indonesia. Despite their effectiveness, most approaches are slow and often miss a lot of infections.⁴

Furthermore, socio-economic disparities and unequal access to healthcare exacerbate the burden of CNS infections in such settings. Patients may present at advanced stages of illness, further complicating diagnosis and treatment.³ Addressing this issue requires not only enhancing diagno-

stic capabilities but also implementing comprehensive public health strategies to improve early detection and access to care. This study aims to identify key pathogens in CNS infections.

METHODS. This prospective cohort study was conducted at Cipto Mangunkusumo Hospital from May 2019 to June 2023. The inclusion criteria were adult patients with suspected of CNS infections. A comprehensive diagnostic workup was performed for all enrolled patients. 6 ml Cerebrospinal fluid (CSF) samples were collected and undergo several examinations, including smear tests like Gram staining, acid-fast bacilli (AFB) staining, and India ink staining. Bacterial culture and polymerase chain reaction (PCR) techniques were employed to identify pathogens with greater accuracy. Serological testing was also conducted to detect specific infections when applicable. Xpert MTB/RIF Ultra assay, were integrated into the protocol to enhance the detection of *Mycobacterium tuberculosis*. Alongside these microbiological methods, standardized radiological and clinical assessments were carried out to ensure a comprehensive evaluation of each case.

RESULTS. A total of 852 patients with suspected CNS infections were screened during the study period. Of these, 524 cases were confirmed as CNS infections based on clinical and diagnostic evaluations, in which were 207 patients

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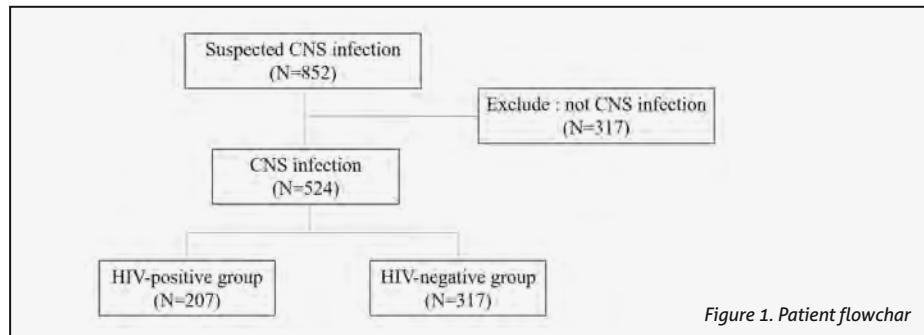
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Figure 1. Patient flowchart

with HIV infections and 317 patients without HIV infections.

The study revealed significant differences in pathogen prevalence between HIV-positive and HIV-negative patients. Among HIV-negative individuals, CNS tuberculosis was the most common infection, accounting for 47.6% of cases. Other infections, including bacterial (9.5%), viral (4.4%), and CNS toxoplasmosis (10.4%), were observed less frequently. In contrast, HIV-positive patients showed a different pattern of infection. CNS toxoplasmosis was the most prevalent, affecting 28.5% of this group, followed by neurosyphilis at 26.1%. CNS tuberculosis and cryptococcal meningitis were less common in this population, with prevalence rates of 15.5% and 8.7%, respectively.

Despite the use of comprehensive diagnostic methods, microbiological confirmation was achieved in only 26.7% of cases. Furthermore, in 18.7% of the confirmed CNS infection cases, the causative pathogen could not be identified,

underscoring the limitations of current diagnostic tools and approaches.

No	Final Diagnosis	Total (n(%))
HIV-positive Group		
1	Toxoplasmosis	59 (28.5)
2	Neurosyphilis	54 (26.1)
3	Tuberculosis	32 (15.5)
4	Cryptococcosis	18 (8.7)
5	Viral CNS infection	5 (2.4)
6	Bacterial CNS infection	2 (0.9)
7	Unknown	37 (17.9)
HIV-negative group		
1	Tuberculosis	151 (47.6)
2	Toxoplasmosis	33 (10.4)
3	Bacterial CNS infection	30 (9.5)
4	Viral CNS infection	14 (4.4)
5	Autoimmune encephalitis	14 (4.4)
6	Neurosyphilis	7 (2.2)
7	Parasitic CNS infection	5 (1.6)
8	Unknown	60 (18.9)

Table 1. Final diagnosis in CNS infections

DISCUSSION. The study highlights *Mycobacterium tuberculosis* as a key pathogen in CNS infections, particularly among HIV-uninfected patients. However, pathogen patterns differed significantly

based on HIV status, reflecting the influence of immune suppression.³ The study revealed that only 26.7% of cases achieved microbiological confirmation, highlighting significant gaps in diagnostic capacity. Traditional methods, including CSF smear and culture, remain the cornerstone of diagnosis but are limited by their time-consuming nature and incomplete pathogen coverage. For instance, while smear techniques such as Gram staining and India ink provide rapid initial insights, they often fail to detect less common or more elusive pathogens. Bacterial culture, while reliable, can take days to yield results – time that critically ill patients simply cannot afford. Similarly, serological tests can offer valuable clues but are not universally applicable.

The study emphasized the potential of molecular diagnostics to bridge this gap. Techniques like polymerase chain reaction (PCR) demonstrated high sensitivity and specificity, offering the ability

to detect a broader range of pathogens more quickly.⁵ However, these technologies remain underutilized in many parts of Indonesia due to cost and infrastructure constraints.

The low rate of microbiological confirmation underscores limitations in current diagnostic practices, including time-consuming culture methods and insufficient pathogen coverage. Molecular diagnostics, with their high sensitivity and specificity, are poised to play a critical role in improving outcomes.

CONCLUSION. This study emphasizes the importance of strengthening microbiological diagnostic facilities and developing national guidelines for CNS infection management. A multimodal approach combining traditional and advanced diagnostics can significantly enhance early detection. While progress has been made, no single assay can be universally applied, necessitating continued innovation in diagnostic strategies. —

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#05.2 *Indonesia***Leptospira spp. Isolated from Patients and Rats in Semarang and Demak, Central Java, Indonesia: Implications for Public Health.**

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ABSTRACT. Leptospirosis is an infectious disease transmitted through animals caused by bacteria from the genus *Leptospira*. Currently, more than 35 species in this group and more than 300 serovars play a role in public health importance globally for their virulence. However, recent updates on circulating serovars in Indonesia have not been reported yet. This study aims to isolate *Leptospira* from patients and rodents and confirm it as a pathogenic *Leptospira* that causes the infection. This was a cross-sectional study, conducted from May to June 2023. We collected the serum and urine of acute fever patients in Public Health Centers and District Hospitals in Semarang and Demak, Central Java. Culturing was performed in liquid Ellinghausen and McCullough modified Johnson and Harris (EMJH) and semi-solid Fletcher culture medium by dripping 1 to 3 drops of blood or urine into the media. A simple random sampling was conducted to trap the rats around the settlements and collect the kidneys for

further leptospirosis analysis. We analyzed molecularly (PCR) the serum and urine patients with the *lipL32* gene as the target for pathogenic *Leptospira*. All the typical motility and morphology of *Leptospira* of the culture samples from patients and rats were then tested by PCR-targeted *lipL32* and *SecY* genes. We collected 234 acute fever patient samples from Semarang and Demak mostly women, aged 18–69 years old, with occupations such as housewives and farm workers. We confirmed that 22 out of 234 (9.4%) patients' samples are positive for Leptospirosis by qPCR. We revealed 11 positive pathogenic cultures confirmed by PCR from the patients and acquired 13 potential *Leptospira* spp cultures from the rats, however, we only survived 7 cultures from rats because the rats' cultures were generally contaminated by cocci, bacilli, vibrio, comma, and filamentous, which inhibited the *Leptospira* growth. We confirmed that we had 18 pathogenic *Leptospira* spp. cultures isolated from patients and

rats circulating in the Semarang and Demak areas, the highest endemic areas in Indonesia. It is crucial to characterize these circulating strains, including having the genome of each isolate sequenced and compared with the *Leptospira* genome

known worldwide to determine its virulence and epidemiological importance.

KEYWORDS. leptospirosis, *Leptospira*, culture, PCR, Indonesia —

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#05.3 Indonesia

Cytomegalovirus elevates IL-6 and IL-1 β levels, affecting sensory profiles and eating behaviors in children with autism

Isti Anindya, Rini Sekartini, Ibnu Agus Ariyanto, Amin Soebandrio

ABSTRACT. Elevated cytokine levels, including IL-6 and IL-1 β , can contribute to persistent brain inflammation in children with autism and cytomegalovirus (CMV) infection, exacerbating autism-related behaviors and symptoms. This study evaluates the impact of CMV-induced cytokine increases on the sensory profiles and eating behaviors of children with autism. A cross-sectional design was employed, involving children aged two to five years who tested positive for CMV: children with autism (N = 98) and neurotypical children (N = 96). Serological tests using ELISA were conducted to measure IgG CMV, IL-6, and IL-1 β biomarkers. Sensory profiles were assessed using the SSP (Short Sensory Profile) and feeding behaviors were evaluated using the BAMBI (Brief Autism Mealtime Behavior Inventory). Statistical analyses were performed using Kendall's tau and chi-square tests. Results show that autism signi -

cantly affects children's sensory profile ($p < 0.001$), with notable differences between the groups. Correlation analysis revealed a significant association between IgG CMV and IL-6 ($p = 0.026$) and IL-1 β ($p = 0.014$) in children with autism. Additionally, eating behaviors in autistic children correlated with both IL-6 ($p = 0.017$) and IL-1 β ($p = 0.006$). Sensory characteristics were found to correlate with IL-1 β ($p = 0.053$). These findings suggest that CMV-infected children with autism are at increased risk of IL-6 and IL-1 β dysregulation, contributing to sensory processing issues and maladaptive eating behaviors. Further research is needed to enhance CMV testing protocols and better understand the virus's role in the development of sensory and behavioral issues in children with autism.

KEYWORDS. CMV, IL-1 β , IL-6, Sensory Profiles, Eating Behaviors, Autism —

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#06.1 Jamaica

Variations in Hormonal Status Among College Athletes in Jamaica: Insights into HGH, DHEA-S, Estradiol, and Testosterone

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ABSTRACT.

Background: This study aims to establish and compare the steroid profile of college athletes in various sports disciplines, focusing on anti-doping efforts and promoting athletes' health, well-being, and fair competition. This profile analyses biomarkers such as Testosterone, Human Growth Hormone, Estradiol, Dehydroepiandrosterone. Blood and urine samples from 60 athletes (35 males, 25 females) with a mean age of 20 ± 1.979 were analyzed using Cobas 6000 and Cell-Dyn Ruby II analyzers, with statistical analysis conducted using IBM SPSS version 25. Results: The paired samples test compared pre-season and competition periods for various blood parameters. Hormonal analysis revealed significant changes in Human Growth Hormone ($p=0.048$), Testosterone ($p=0.003$), and Dehydroepiandrosterone-Sulfate ($p=0.004$), with non-significant changes in Estradiol ($p=0.099$). Conclusion: Hormonal analysis revealed that during competition, testosterone, HGH, and estradiol levels generally decrease, while DHEA levels increase, suggesting physiological responses to competitive stress.

Keywords: Steroidal Profil, Free and Total Testosterone (T), Dehydroepiandrosterone-Sulfate (DHEA-Sulfate), Es-

tradiol, Human Growth Hormone (HGH), University/College Athletes, Jamaica.

INTRODUCTION Anabolic androgenic steroids (AAS) are primarily utilized for the purposes of improving appearance and performance. Because of their negative consequences, their use is becoming a rising public health issue and societal concern. According to our findings, people who use AAS have more aggressive behaviors, suicidal thoughts/attempts, and crime than people who don't (Börjesson, Möller, et al., 2020). Anabolic steroids are synthetic compounds created by altering the molecular structure of testosterone, the main natural androgenic anabolic steroid found in the interstitial cells of the testes. In 1954, the first report of an athlete using anabolic steroids to gain weight and power was published. The IOC outlawed the use of anabolic steroids in sports in 1974, and radioimmunoassay analysis was used to implement control tests for the 1976 Montreal Olympic Games; nevertheless, the technique can only identify a limited number of exogenous steroids. As new doping substances are developed throughout time, the list of forbidden compounds is revised on a regular basis, necessitating the development of novel

analytical methods for their detection and determination in biological matrices. Knowledge of the steroid metabolic route in the human body is essential for doping control analysis, and analytical methodologies must allow simultaneous detection and measurement of both the prohibited precursor agents and their metabolites. (Gosetti et al., 2013)

The use of anabolic androgenic steroids (AAS) and other performance-enhancing chemicals might fluctuate over time, it's important to keep track of what's being used and what can be discovered.

The steroid module consists of serum and urine biomarkers such as: testosterone, epitestosterone (an inactive epimer of testosterone) and four metabolites of testosterone, namely 5β -androstane- $3\alpha,17\beta$ -diol, androsterone, 5α -androstane- $3\alpha,17\beta$ -diol and etiocholanolone. The use of ratios such as testosterone/etiocholanolone, 5α -androstane- $3\alpha,17\beta$ -diol/ 5β -androstane- $3\alpha,17\beta$ -diol and, androsterone/testosterone are robust and are unchanged due to workload of athletes or circadian rhythm (Van Renterghem et al., 2011). However, these biomarkers and ratios are altered significantly by exogenous steroids. There are proposed markers for the detection of exogenous testosterone use on sports based on the use of an adaptive mathematical model founded on Bayesian inference (Van Renterghem et al., 2011).

The steroid module of ABP is determined using GC-MS(/MS) analysis of urina-

ry concentrations of the following endogenous anabolic androgenic steroids (EAASs): testosterone (T), epitestosterone (E), androsterone (A), etiocholanolone (Etio), 5α -Androstane- $3\alpha,17\beta$ -diol (5α Adiol), and 5β -Androstan (5β Adiol). (Ponzetto et al., 2019).

In the interpretation of steroid profile of athletes' factors that might influence the levels of endogenous steroids must be taken into consideration. These factors include: variability among individuals with varying steroid synthesis and metabolism, ACTN3 polymorphism, use of contraceptive pills by females, pregnancy, large alcohol intake, higher than usual endogenous human chorionic gonadotropin levels in males, microorganisms in the urine which may alter the accurate concentrations of steroids and their metabolites and inhibitors of 5α -reductase (Ahmetov et al., 2014; Mareck et al., 2008).

MATERIAL AND METHODS.

Data Collection and Participants Selection

Blood samples were collected from 60 athletes (35 males, 25 females) with a mean age of 20 ± 1.979 who competed in the disciplines of football, netball, cricket, track (sprint and distance), throws/field, volleyball and basketball (see Table 1). All the athletes were well trained, competed at the intercollegiate level, few were national representatives in their discipline. All blood samples were

#06.1 Jamaica

Variations in Hormonal Status Among College Athletes in Jamaica: Insights into HGH, DHEA-S, Estradiol, and Testosterone

collected on a weekend where there was no training.

Samples were centrifugated, aliquoted and analysed in the Chemical Pathology Laboratory, The University of the West Indies, Mona (Accredited Laboratory). A haematology analyser (Cell-Dyne Ruby) was used analyse haematology markers. Ethical approval was granted by the University of West Indies, Mona Campus Research Ethics Committee.

RESULTS.

Sex	Male	35
	Female	25
	Football	5
	Netball	14
Sporting Discipline	Cricket	14
	Volleyball	11
	Sprints	8
	Distance	1
	Throws	2
	Basketball	5
Total		60
Age	18-20	16
	21-26	40
	27-Over	4

Reference Ranges	
Estradiol	Male 0-56 pg/mL, Female 0-160 pg/mL
Human Growth Hormone (HGH)	0.08-5.00 ng/mL
Testosterone	Male 270-1734 ng/mL, Female 63-129 ng/mL
Dehydroepiandrosterone Sulfate (DHEAS)	Male 80-560 ug/dL, Female 35-430 ug/dL

Data Preparation and Presentation

The Statistical Package for the Social Sciences (SPSS), version 25 (SPSS Inc., Chicago, IL) software was used to perform analysis on all data. Associations between categorical variables were evaluated by Pearson's chi-squared test. The Spearman's rank correlation test was necessary for correlation analyses that can be observed between continuous variables. (See table 4)

Table 1: Showing the Demographic Data Description: Table showing the various sports disciplines, sex and total number of the participants.

Table 2: Showing Reference Ranges for Hormones included in Steroidal profil

Participants	Estradiol(pre)	Estradiol(c omp.)	Human Growth Hormone (HGH) pre	Human Growth Hormone (HGH) comp.	Testosterone(pre)	Testosterone(c omp.)	Dehydroepiandrosterone Sulphate (DHEAS) pre	Dehydroepiandrosterone Sulphate (DHEAS) comp.	Key		Normal	High Female	Low Female	High Male	Low Male
									Sex	Sports Discipline					
ABP001	40	29	0.04	0.03	635	448	323	470	male	Volleyball					
ABP005	46	41	0.48	1.04	467	369	227	384	male	Cricket					
ABP007	296	122	0.53	0.08	26	25	120	218	female	Volleyball					
ABP008	40	30	0.05	0.03	392	538	172	207	male	Cricket					
ABP009	52	45	0.58	0.81	752	684	260	297	male	Cricket					
ABP021	26	45	1.53	0.34	800	684	266	323	male	Cricket					
ABP022	24	32	2.41	3.43	459	513	136	182	male	Cricket					
ABP003	74	218	0.44	0.05	39	41	94	92.8	female	Throws					
ABP004	135	58	5.41	0.78	19	19	133	166	female	Throws					
ABP006	267	32	2.89	2.81	45	35	330	427	female	Distance					
ABP013	34	38	3.06	7.83	764	606	162	205	male	Sprint					
ABP029	36	38	0.84	0.7	1059	908	324	346	male	Sprint					
ABP002	136	51	1.29	4.44	22	15	63	48	female	Netball					
ABP012	20	107	1.67	1.3	19	58	242	267	female	Netball					
ABP015	312	46	3.36	6.59	15	17	77	64	female	Netball					
ABP016	186	43	10.98	12.6	11	18	80	149	female	Netball					
ABP017	210	49	1.3	1.23	42	45	161	300	female	Cricket					
ABP020	147	23	0.35	0.03	15	19	90	146	female	Netball					
ABP023	50	23	0.08	0.06	24	19	145	163	female	Netball					
ABP024	156	302	0.11	1.95	40	52	117	157	female	Netball					
ABP028	41	27	0.08	0.25	676	520	83	145	male	Football					
ABP030	32	35	0.1	0.09	405	453	186	220	male	Cricket					
ABP032	177	5	3.31	1.27	54	24	132	214	female	Netball					
ABP033	112	189	3.02	1.17	11	19	82	146	female	Netball					
ABP034	105	110	5.54	1.11	12	20	99	138	female	Netball					
ABP035	81	121	0.44	0.81	7	28	101	223	female	Netball					
ABP036	23	16	0.55	0.06	671	485	164	199	female	Volleyball					
ABP025	5	16	1.23	0.59	12	21	136	89	female	Netball					
ABP050	49.1	29	0.081	1.02	745	343	185	195	male	Football					
ABP063	31.5	30.1	0.607	1.58	587	454	363	207	male	Basketball					
ABP079	33.6	36.2	0.992	0.56	705	461	128	90.5	male	Volleyball					
ABP100	31.8	36.6	0.18	0.23	396	720	157	206	male	Cricket					
ABP109	23.8	13	0.591	0.1	334	195	174	73	male	Sprint					
ABP101	32.6	28.6	0.035	0.05	403	453	403	312	male	Cricket					
ABP040	46	49	11.52	2.75	859	668	303	537	male	Cricket					
ABP042	104	21	1.5	0.03	25	373	185	208	male	Football					
ABP074	37.5	34	3.4	0.09	420	392	409	495	male	Cricket					
ABP080	7	63.1	0.17	0.158	436	303	243	228	male	Cricket					
ABP060	40	34.4	4.67	4.67	622	559	265	288	male	Basketball					
ABP061	26	25.8	0.21	0.21	737	654	101	146	male	Basketball					
ABP062	26	28.9	1.76	1.76	561	546	56	66.8	male	Basketball					
ABP056	19	17.5	0.98	0.41	388	272	132	176	male	Basketball					
ABP073	23	25.6	0.19	0.19	439	459	123	246	male	Cricket					
ABP098	98	29	1.32	0.33	78	9.28	136	33	male	Football					
ABP102	28	29.1	1.54	1.54	389	379	237	133	male	Cricket					
ABP090	91	57	5.29	4.99	33	23.1	210	141	female	Netball					
ABP046	42	33	0.13	0.09	733	613	213	397	male	Volleyball					
ABP052	17	21	2.23	1.53	724	674	287	332	male	Sprint					
ABP067	98	268	1.03	0.15	98	12.1	67	71	female	Volleyball					
ABP072	46	20	4.58	3.33	67	22	98	115	female	Volleyball					
ABP075	20	13	0.13	0.06	342	271	348	227	male	Volleyball					
ABP070	139	765	1.06	0.85	74	34	115	178	female	Netball					
ABP082	46	5	0.29	0.63	70	16.3	102	196	female	Volleyball					
ABP084	22	26	0.14	0.09	601	474	187	254	male	Volleyball					
ABP085	32	24	1.09	0.49	383	260	233	309	male	Sprint					
ABP078	95	103	2.14	1.83	75	63	197	224	female	Volleyball					
ABP089	17	21	0.07	0.1	397	367	268	280	male	Football					
ABP093	98	29	1.32	0.33	78	9.28	136	33	female	Sprint					
ABP092	78	26	0.98	0.51	65	28.8	120	153	female	Sprint					
ABP095	26	21	0.13	0.09	333	150	215	118	male	Sprint					

Figure 1: Showing Steroidal Profile for Athletes

#06.1 Jamaica

Variations in Hormonal Status Among College Athletes in Jamaica: Insights into HGH, DHEA-S, Estradiol, and Testosterone

	N	Minimum	Maximum	Mean	Std. Deviation
Estradiol Pre-Season	60	5	372	73.75	73.376
Estradiol During Competition	60	5	302	55.88	64.924
Human Growth Hormone Pre-Season	60	0.04	11.52	1.9008	2.68881
Human Growth Hormone During-Competition	60	0.03	12.60	1.3751	2.22213
Testosterone Pre-Season	60	7	1059	328.17	296.689
Testosterone During Competition	60	9	908	282.35	257.646
Dehydroepiandrosterone Pre-Season	60	56	409	181.68	89.250
Dehydroepiandrosterone During Competition	60	33	537	210.87	112.603

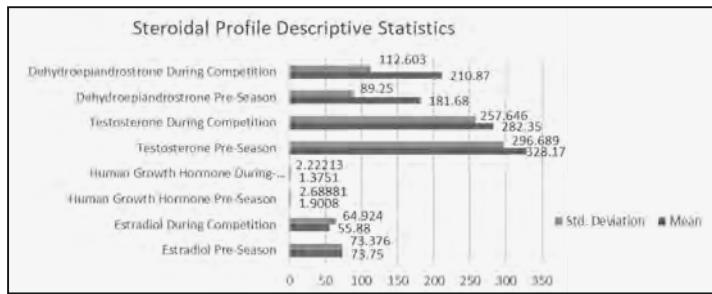


Table 3: Steroidal Profile Descriptive Statistics
Description: The descriptive statistics table provides a summary of the steroid profile for a group of 60 individuals across two different periods: pre-season and during competition. The biomarkers analyzed include Estradiol, Human Growth Hormone (HGH), Testosterone, and Dehydroepiandrosterone (DHEA).

	Paired Differences						t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	Lower	Upper			
Paired r1 Estradiol During Competition - Estradiol Pre-Season	-17.867	82.576	10.661	-3.465	39.198	1.676	5	9	0.099
Paired r2 Human Growth Hormone During-Competition - Human Growth Hormone Pre-Season	-0.52563	2.01703	0.2604	-0.00458	-1.04669	2.019	5	9	0.048
Paired r3 Testosterone During Competition - Testosterone Pre-Season	-45.819	112.941	14.581	-16.643	-74.995	3.142	5	9	0.003
Paired r4 Dehydroepiandrosterone During Competition - Dehydroepiandrosterone Pre-Season	29.185	76.270	9.846	48.888	-9.482	-2.964	5	9	0.004

Table 4: Showing Paired Samples Test of Steroidal Profile
Description: Paired Samples Test, comparing hormone levels of athlete's in pre-season and during competition. The hormones were Estradiol p-value: 0.099, Human Growth Hormone (HGH) p-value: 0.048, Testosterone p-value: 0.003 and Dehydroepiandrosterone-Sulfate (DHEAS) p-value: 0.004.

Participants	Estradiol (pre)	Estradiol (comp.)	Difference	Human Growth Hormone (HGH) pre	Human Growth Hormone (HGH) comp.	Testosterone (pre)	Testosterone (comp.)	Difference	Dehydroepiandrosterone Sulfate (DHEAS) pre	Dehydroepiandrosterone Sulfate (DHEAS) comp.	Difference	Sports Discipline	
ABP001	40	29	-.11	0.04	0.03	-.049	63.35	448	-.187	32.3	470	147	
ABP036	23	16	-.7	0.55	0.06	-.07	67.1	485	-.186	164	199	Volleyball	
ABP075	20	13	-.3	0.13	0.06	-.07	34.2	271	-.71	348	227	Volleyball	
ABP084	22	26	.4	0.14	0.09	-.05	60.1	474	-.127	187	254	Volleyball	
ABP046	42	33	-.9	0.13	0.09	-.04	73.3	61.3	-.120	21.3	357	Volleyball	
ABP005	46	41	-.5	0.48	1.04	0.56	46.67	369	-.98	227	384	157	
ABP059	52	45	-.7	0.58	0.23	-.023	75.2	684	-.68	260	297	Cricket	
ABP021	26	45	.19	1.53	0.34	-.119	80.0	684	-.116	266	323	Cricket	
ABP022	24	32	.8	2.41	3.43	1.02	45.9	51.3	.54	136	182	Cricket	
ABP008	40	30	-.10	0.05	0.03	-.02	39.2	53.8	.146	172	207	Cricket	
ABP030	32	35	.3	0.1	0.09	-.001	40.05	45.3	.48	186	220	Cricket	
ABP079	33.6	36.2	.26	0.992	2.46	-.0432	70.5	46.1	-.244	90.5	37.5	Cricket	
ABP100	31.8	36.6	.48	0.18	0.23	-.05	39.96	72.0	.324	157	206	Cricket	
ABP102	28	29.1	.1	1.54	1.54	0	38.89	37.9	-.10	23.7	133	Cricket	
ABP074	37.5	34	-.3.5	3.4	0.09	-.3.31	42.0	39.2	-.28	40.9	495	Cricket	
ABP080	7	63.1	56.1	3	11.52	0.158	0.012	43.36	30.3	-.133	24.3	228	Cricket
ABP040	46	49	.3	2.75	2.75	-.877	85.9	66.8	-.191	30.3	53.7	Cricket	
ABP073	23	25.6	.26	0.19	0.19	0	43.39	45.9	.20	12.3	246	Cricket	
ABP013	34	38	.4	3.06	7.83	4.77	76.4	60.6	-.158	162	205	43	
ABP029	36	38	.2	0.84	0.7	-.014	10.59	9.08	-.151	32.4	346	Sprint	
ABP109	23.8	13	-.10.8	0.591	0.1	-.0491	33.4	19.5	-.139	174	71	Sprint	
ABP026	32.6	28.6	-.4	0.035	0.03	-.0005	40.03	45.3	.50	40.3	312	Sprint	
ABP101	17	21	.4	2.23	1.53	-.724	67.4	62.4	-.50	287	332	Sprint	
ABP052	32	24	-.8	1.09	0.49	-.06	38.3	26.0	-.123	23.3	309	Sprint	
ABP055	26	21	-.5	0.13	0.09	-.04	33.3	15.0	-.183	21.5	11.8	Sprint	
ABP050	49.1	29	-.20.1	0.081	1.02	0.939	74.5	34.3	-.402	185	195	10	
ABP028	41	21	-.83	0.08	1.5	-.017	62.6	52	-.156	83	145	62	
ABP042	104	98	-.32	0.33	0.3	-.147	25	37.3	-.348	185	208	23	
ABP098	17	21	-.4	0.07	0.1	-.099	78	9.28	-.6872	13.6	33	-103	
ABP089	17	21	-.4	0.07	0.1	-.03	39.7	36.7	-.30	268	280	12	
ABP053	31.5	30.1	-.14	0.607	1.58	0.973	58.7	45.4	-.133	363	207	-156	
ABP025	40	34.4	-.5.6	4.67	4.67	0	62.2	55.9	-.63	285	288	23	
ABP041	26	25.8	-.0.2	0.21	0.21	0	0	65.4	-.83	101	146	45	
ABP062	26	28.9	2.9	1.76	1.76	0	56.1	54.6	-.15	56	66.8	10.8	
ABP056	19	17.5	-.1.5	0.98	0.41	-.057	38.8	27.2	-.116	13.2	17.6	44	

Figure 3: Showing Steroidal Profile Male by Sports Discipline

Description: The table displays various hormonal levels for male participants in different sports both pre-season and during competition. The hormones measured include Estradiol, Human Growth Hormone (HGH), Testosterone, and Dehydroepiandrosterone Sulfate (DHEAS). In the Difference Column, negative number indicates an increase in value while a negative number indicates a decrease in value. The blue colour indicates results below reference range (See table 2).

#06.1 Jamaica

Variations in Hormonal Status Among College Athletes
in Jamaica: Insights into HGH, DHEA-S, Estradiol, and
Testosterone

Participants	Estradiol (pre)	Estradiol (comp.)	difference in changes		Human Growth Hormone (HGH) pre		Human Growth Hormone (HGH) comp.		difference in changes		Testosterone (pre)		Testosterone net(comp.)		difference in changes		Testosterone (pre)		drosterone (DHEAS) pre		drosterone (DHEAS) sulphate (DHEAS) comp.		Sports Discipline		
			difference in changes	difference in changes	Human Hormone (HGH) pre	Human Hormone (HGH) comp.	difference in changes	difference in changes	Testosterone (pre)	Testosterone (pre)	Testosterone (pre)	Testosterone (pre)	Testosterone (pre)	Testosterone (pre)	difference in changes	Testosterone (pre)	difference in changes	Testosterone (pre)	difference in changes	Testosterone (pre)	difference in changes	Testosterone (pre)	difference in changes	Testosterone (pre)	
ABP003	74	214	140	0.44	0.05	-0.39	19	41	2	94	92.8	-1.2	92.8	-1.2	94	133	0	133	166	133	166	133	166	Throw	Throw
ABP004	135	58	-77	5.41	0.78	-4.63	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ABP006	267	32	-235	2.89	2.81	-0.08	45	35	-10	330	427	97	97	97	97	330	427	97	330	427	97	330	427	97	Distance
ABP002	136	51	-85	1.29	4.44	3.15	22	22	0	63	48	-15	48	-15	48	63	58	39	242	267	25	25	267	25	Netball
ABP012	20	107	87	1.67	1.3	-0.37	19	19	0	17	2	77	77	77	77	17	2	77	64	80	149	69	149	69	Netball
ABP015	372	46	-326	9.38	6.89	-2.49	15	15	0	11	18	7	80	7	80	11	18	7	161	300	139	139	300	139	Netball
ABP016	165	43	-122	10.98	12.6	1.62	11	11	0	45	3	161	161	161	161	45	3	161	90	146	56	56	146	56	Netball
ABP017	219	49	-170	1.3	1.23	-0.07	42	42	0	19	4	90	90	90	90	19	4	90	146	161	161	161	161	161	Netball
ABP020	137	23	-114	0.35	0.03	-0.32	15	15	0	19	4	161	161	161	161	19	4	161	161	161	161	161	161	Netball	
ABP023	50	23	-27	-0.06	-0.02	-0.02	24	24	0	19	-5	167	167	167	167	19	-5	167	167	167	167	167	167	Netball	
ABP024	156	302	146	0.11	1.95	1.84	40	40	0	52	12	117	117	117	117	52	12	117	117	117	117	117	117	Netball	
ABP032	177	5	-172	9.31	1.27	-8.04	54	54	0	24	-30	132	132	132	132	24	-30	132	214	82	146	64	146	64	Netball
ABP033	112	189	77	3.02	1.17	-1.85	11	11	0	19	8	82	82	82	82	19	8	82	99	138	39	39	138	39	Netball
ABP034	105	110	5	5.54	1.11	-4.43	12	12	0	20	8	99	99	99	99	20	8	99	101	223	122	122	223	122	Netball
ABP035	81	121	40	0.44	0.81	0.37	7	7	0	28	21	9	9	9	9	28	21	9	136	89	47	47	136	89	Netball
ABP025	5	16	11	1.23	0.59	-0.64	12	12	0	21	9	210	210	210	210	21	9	210	141	141	141	141	141	141	Netball
ABP090	91	57	-34	5.29	4.99	-0.3	33	33	0	23.1	-9.9	39	39	39	39	23.1	-9.9	39	115	178	63	63	178	63	Netball
ABP070	139	268	129	1.06	0.85	-0.21	74	74	0	34	-40	115	115	115	115	34	-40	115	178	178	63	63	178	63	Netball
ABP067	98	268	170	1.03	0.15	-0.88	98	98	0	12.1	-85.9	67	67	67	67	12.1	-85.9	67	71	71	4	4	71	4	Volleyball
ABP072	46	20	-26	4.58	3.33	-1.25	67	67	0	22	-45	98	98	98	98	22	-45	98	120	218	117	117	218	117	Volleyball
ABP007	296	122	-174	0.53	0.08	-0.45	26	26	0	25	-1	102	102	102	102	25	-1	102	196	224	196	196	224	196	Volleyball
ABP082	46	5	-41	0.29	0.63	0.34	70	70	0	16.3	-53.7	63	63	63	63	16.3	-53.7	63	12	197	27	27	197	27	Volleyball
ABP078	95	103	8	2.14	1.83	-0.31	75	75	0	63	-12	197	197	197	197	63	-12	197	224	224	27	27	224	27	Volleyball
ABP093	98	29	-69	1.32	0.33	-0.99	78	78	0	9.28	-68.72	136	136	136	136	9.28	-68.72	136	33	33	-103	-103	33	33	Sprint
ABP092	78	26	-52	0.98	0.51	-0.47	65	65	0	28.8	-36.2	120	120	120	120	28.8	-36.2	120	153	153	33	33	153	33	Sprint

Figure 4: Showing Steroidal Profile of Female athletes by Sports Discipline.

Description: The table comprises hormone levels (Estradiol, HGH, Testosterone, and DHEAS) measured pre-season and during competition in female collegiate athletes from various sports: Throws, Distance running, Netball, Volleyball, and Sprinting. The analysis compares changes in hormone levels to standard reference ranges. In the Difference Column, a positive number indicates an increase in value while a negative number indicates a decrease in value. The Red colour indicates results above reference range, while the Yellow colour indicates results below reference range (See table 2).

DISCUSSION. The steroid profile of both male and female athletes was established (See figure 3 & 4). The Steroidal profile consists of 4 hormones biomarkers from 60 participants who competed in eight sporting disciplines, Football, Netball, Basketball, Volleyball, Cricket, Sprints, Throws, and Distance. These measurements are taken to monitor the impact of sports activities on the athletes over a year period (See figure 1). The paired samples test provided compares the pre-season and competition periods for various hormones parameters in athletes. This analysis helps us understand how these parameters change within the same group of athletes across two different time points. Estradiol Pre-Season levels ranged from 5 to 372, with an average of 73.75 and this indicates a high variability in estradiol levels among individuals (see table 3). During Competition: The levels ranged from 5 to 302, with a mean of 55.88. Compared to pre-season, the average estradiol level decreased, and the variability also slightly decreased. Estradiol Pre-Season & Estradiol During Competition Correlation was 0.292, Significant (p-value) at 0.024. There is a weak but statistically significant positive correlation between pre-season and during-competition Estradiol levels. This suggests that while there is some consistency in Estradiol levels from pre-season to competition, the relationship is relatively weak. This also indicates that the

relationship observed is unlikely due to chance. Ennour-Idrissi (2015) and Warren, M. P., & Perlroth, N. E. (2001) found that intense physical activity often leads to lower estradiol levels. This decrease reflects the body's response to stress, where physiological adaptations prioritize immediate survival and performance needs over reproductive functions. As physical stress increases, the hypothalamic-pituitary-gonadal (HPG) axis is activated, leading to reduced estradiol production. A comprehensive model of Relative Energy Deficiency in Sports (RED-S) includes disruptions in energy availability, bone health, and menstrual function. Low energy availability (EA) is known to cause significant hormonal changes, including decreased estradiol levels. This is particularly relevant for female athletes, where intense training and inadequate nutrition can lead to menstrual dysfunction and lower estradiol, affecting overall health and performance (Dipla, K., Kraemer, R. R., Constantini, N. W., & Hackney, A. C., 2020). Studies on collegiate athletes have shown that periods of high stress, such as competitive seasons or academic examinations, are associated with significant hormonal changes, including reductions in estradiol. These stress-induced hormonal fluctuations are part of the body's broader response to manage and mitigate the impacts of prolonged stress on physical and psychological health (Lopes Dos Santos, M., Uftring, M.,

#06.1 Jamaica

Variations in Hormonal Status Among College Athletes in Jamaica: Insights into HGH, DHEA-S, Estradiol, and Testosterone

Stahl, C. A., Lockie, R. G., Alvar, B., Mann, J. B., & Dawes, J. J., 2020).

Human Growth Hormone (HGH) Pre-Season levels ranged from 0.04 to 11.52, with a mean of 1.9008 and a standard deviation of 2.68881 (see table 3). This shows considerable variability in HGH levels. During Competition: Levels ranged from 0.03 to 12.60, with an average of 1.3751 and a standard deviation of 2.22213. The mean HGH level decreased during competition, and the variability also reduced somewhat. Human Growth Hormone Pre-Season & Human Growth Hormone During Competition Correlation was 0.678, Significant e (p-value) at 0.000. There was a strong positive correlation between pre-season and during competition human growth hormone (HGH) levels. The correlation was highly significant ($p < 0.001$), suggesting a robust relationship between HGH levels measured at different times. Godfrey et al. (2003) reported that elevated cortisol levels during intense physical activity can suppress HGH secretion. Athletes experience a significant rise in cortisol before competition due to psychological stress, which prioritizes immediate energy needs over anabolic processes like growth and recovery. Cortisol increase can inhibit HGH release, reflecting the body's shift towards managing acute stress rather than promoting repair (van Paridon, K. N., Timmis, M. A., Nevison, C. M., & Bristow, M., 2017). Studies using ecological momentary as-

essment (EMA) have shown that acute stressors and the accompanying emotional responses significantly elevate cortisol levels, which can persist and affect HGH levels throughout the day. This highlights the broader impact of stress on hormonal balance and overall physiological functioning (Weber, J., Angerer, P., & Apolinário-Hagen, J. 2022). Testosterone Pre-Season levels ranged from 7 to 1059, with a mean of 328.17 and a standard deviation of 296.689 (see table 3). This indicates very high variability in testosterone levels. During Competition Levels ranged from 9 to 908, with a mean of 282.35 and a standard deviation of 257.646. There was a decrease in both the mean level and the variability of testosterone during competition. Testosterone Pre-Season & Testosterone During Competition Correlation: 0.927, Significant e (p-value) at 0.000. There was an extremely strong positive correlation between pre-season and during competition testosterone levels. The correlation was highly significant ($p < 0.001$), indicating a very consistent relationship between testosterone levels measured at these two times. Viru and Viru (2001) highlighted that both physical and psychological stress can lower testosterone levels. This suppression is part of the body's broader stress response, which prioritizes immediate survival and energy needs over anabolic processes. Intense physical activities, such as those experienced

in competitive sports, lead to elevated cortisol levels. This increase in cortisol is inversely related to testosterone levels. Studies have shown that during periods of high physical and mental stress, such as military training, testosterone levels decrease significantly as the body's stress response mechanisms become activated (van Paridon, K. N., Timmis, M. A., Nevison, C. M., & Bristow, M., 2017). Research monitoring young elite university athletes found that stress during competition periods correlates with decreased testosterone levels. The findings suggest that managing stress effectively is crucial to maintaining optimal hormonal balance and performance in athletes (Hamlin, M. J., Wilkes, D., Elliot, C. A., Lizamore, C. A., & Kathiravel, Y. 2019). Dehydroepiandrosterone (DHEA) Pre-Season levels ranged from 56 to 409, with an average of 181.68 and a standard deviation of 89.250 (see table 3). This suggests substantial variability in DHEA levels. During Competition: Levels ranged from 33 to 537, with a mean of 210.87 and a standard deviation of 112.603. Interestingly, the mean DHEA level increased during competition, and the variability also increased. Dehydroepiandrosterone (DHEAS) Pre-Season & Dehydroepiandrosterone During Competition correlation 0.738, Significant e (p-value) at 0.000. There was a strong positive correlation between pre-season and during competition DHEAS levels. The correlation was highly significant ($p < 0.001$), suggesting a strong and consistent relationship between DHEA-S levels at these two periods. Sampson W (2000) suggests that DHEA levels rise in response to stress, aiding in the body's adaptive mechanisms. Research shows that DHEA and its sulfated form, DHEA-S, are secreted in response to stress, playing a crucial role in modulating the body's response to physical and psychological stressors. DHEA possesses neuroprotective, anti-inflammatory, and antioxidant properties. These effects are particularly beneficial under stress, as DHEA helps mitigate the negative impacts of elevated cortisol levels, promoting a balanced stress response and aiding in mental and physical recovery (Nenezic et al, 2023 & Dutheil et al, 2021). Studies monitoring physiological responses in elite athletes, such as synchronized swimmers, found that DHEA levels rise significantly during competition. This increase is part of the body's broader strategy to manage the heightened demands of competitive performance, supporting both physical endurance and mental focus. (Collomp, K., Buisson, C., Lasne, F., & Collomp, R. (2015) & Almási et al, 2021)

Summary of Steroidal profile Findings

- Estradiol: Both the mean and variability of estradiol levels decreased during competition, suggesting that the competition period might be associated with lower and more consistent estradiol levels.

#06.1 Jamaica

Variations in Hormonal Status Among College Athletes in Jamaica: Insights into HGH, DHEA-S, Estradiol, and Testosterone

- HGH: There was a reduction in both the mean level and variability of HGH during competition, indicating a potential decrease in HGH levels during this period.
- Testosterone: Both the mean and variability of testosterone levels decreased during competition, similar to estradiol and HGH, suggesting a consistent pattern of reduced hormone levels during competitive periods.
- DHEA: In contrast to the other hormones, DHEA levels increased during competition, along with an increase in variability. This might indicate a different regulatory mechanism or response to competition for DHEA compared to the other hormones.

Summary of Paired Sample Correlation**Test of Steroidal Profil**

- All hormone levels show positive correlations between pre-season and during competition measurements, indicating that participants' hormone levels are generally stable over time.
- Testosterone shows the strongest correlation (0.927), implying that testosterone levels are highly consistent between pre-season and competition periods.
- Human Growth Hormone (HGH) and Dehydroepiandrosterone Sulfate (DHEA-S) also show strong correlations, indicating substantial consistency in these hormone levels.
- Estradiol has a weakest but positive correlation (0.292), suggesting some variability in estradiol levels between the two periods.

HORMONE ADAPTATIONS IN ATHLETES BASED ON SEX DIFFERENCES.**Estradiol Levels**

Pre-Season: Males: Mean = 40.16, Std. Dev = 36.080, Std. Error = 6.013. Females: Mean = 124.13, Std. Dev = 86.120, Std. Error = 17.579. During Competition: Males: Mean = 30.97, Std. Dev = 10.687, Std. Error = 1.781. Females: Mean = 93.25, Std. Dev = 90.612, Std. Error = 18.496. Estradiol and HGH are typically higher in females due to their roles in reproductive function and growth. Estradiol levels are significantly higher in females than in males during both pre-season and competition periods. For both sexes, the levels tend to decrease during competition.

Human Growth Hormone (HGH) Levels

Pre-Season: Males: Mean = 1.2413, Std. Dev = 2.06964, Std. Error = 0.34494. Females: Mean = 2.8900, Std. Dev = 3.21335, Std. Error = 0.65592. During Competition: Males: Mean = 0.9430, Std. Dev = 1.57442, Std. Error = 0.26240. Females: Mean = 2.0233, Std. Dev = 2.85726, Std. Error = 0.58323. Females have higher HGH levels than males in both periods. Both males and females show a decrease in HGH levels during the competition. Both hormones decrease during competition due to the physiological and psychological stress experienced by athletes. Elevated stress levels, particularly from competitive environments, can suppress these hormones to prioritize energy expenditure for immediate physical demands.

Testosterone Levels

Pre-Season: Males: Mean = 521.08, Std. Dev = 228.474, Std. Error = 38.079. Females: Mean = 38.79, Std. Dev = 27.128, Std. Error = 5.537. During Competition: Males: Mean = 452.84, Std. Dev = 192.414, Std. Error = 32.069. Females: Mean = 26.61, Std. Dev = 14.082, Std. Error = 2.875. Testosterone and DHEA are generally higher in males due to their roles in muscle mass development and overall physical performance. Males have significantly higher testosterone levels than females. Both sexes show a decrease in testosterone levels during the competition period. During competition, testosterone levels decrease significantly. This decrease is linked to elevated cortisol levels induced by competition stress, which suppresses anabolic processes, including testosterone production (Viru & Viru, 2001).

Dehydroepiandrosterone (DHEA) Levels

Pre-Season: Males: Mean = 217.08, Std. Dev = 87.882, Std. Error = 14.647. Females: Mean = 128.58, Std. Dev = 61.455, Std. Error = 12.545. During Competition: Males: Mean = 245.37, Std. Dev = 117.524, Std. Error = 19.587. Females: Mean = 159.12, Std. Dev = 82.761, Std. Error = 16.894. DHEA levels are higher in males than females in both periods. Both males and females show an increase in DHEA levels during the competition period. In contrast to Testosterone, DHEA levels increase during competition. This increase is a part of the body's adaptive mechanism to cope with

stress, enhancing resilience and supporting recovery. DHEA's anti-inflammatory and neuroprotective properties help mitigate the adverse effects of stress, thereby aiding performance under competitive conditions (Sampson, 2000). Females typically have higher levels of estradiol and HGH, while males have higher levels of testosterone and DHEA. There are studies that provide a comprehensive analysis of how these hormones fluctuate under stress, highlighting the body's adaptive responses to intense physical and psychological demands

CONCLUSION. The results suggest that competitive periods may be associated with lower and more consistent levels of estradiol, HGH, and testosterone, while DHEA levels increase and become more variable. This could reflect physiological adaptations to the stress and demands of competition.

These results suggest that, for the most part, the hormone levels of the participants are stable over time, particularly for testosterone, HGH, and DHEAS. Estradiol levels, while also correlated, show more variability. Sex Differences: There are clear differences in hormone levels between male and female athletes, consistent with biological differences. Estradiol and HGH are higher in females, while Testosterone and DHEA are higher in males. Competition vs. Pre-Season: Both males and females generally show a decrease in Estradiol, HGH, and testos-

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Variations in Hormonal Status Among College Athletes in Jamaica: Insights into HGH, DHEA-S, Estradiol, and Testosterone

terone during competition, potentially due to the physical and psychological demands of competition. However, DHEA levels increase, which may indicate a stress response to the competitive environment.

CONFLICT OF INTEREST. The authors declare no commercial or financial relationships that could be construed as a potential conflict of interest. —

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#06.2 Jamaica

Supporting Students' and Teachers' Mental well-being: Post-COVID19 School Leadership approaches in five Jamaican schools

Shellon Samuels-White

ABSTRACT. School leadership is critical in shaping outcomes such as student achievement, school climate, and teacher effectiveness (Grissom et al., 2021). With growing societal health challenges, exacerbated by the COVID-19 pandemic, educational leaders must now foster health-promoting cultures within their schools (Eriksson et al., 2010).

This qualitative, multi-site case study investigates the leadership practices of five school principals in rural Jamaica, post COVID19. Data were collected using semi-structured interviews and was analysed using thematic analysis. The research addresses the following questions: 1) How has the COVID-19 pandemic impacted the mental health of students and teachers? 2) How are school leaders responding to these challenges post-pandemic? 2b) What long-term strategies are being adopted by school leaders to promote good mental health in their schools?

Findings revealed that principals modified the formal curriculum to promote social and emotional learning, introduced wellness initiatives and created safe spaces for mental health discussions. While the findings are specific to the participating schools, they provide valuable insights into school leadership practices in the post-pandemic era and contribute to

the growing body of literature on health-promotion in Jamaican school environments. Although initiatives by the Ministries of Health and Education toward establishing Health Promoting Schools have been underway since 2011, the adaptation of these practices to address the mental health needs of students and staff in the post-COVID19 era remains underexplored. This study, therefore, highlights the specific strategies employed by school leaders in support of mental health post-pandemic.

INTRODUCTION. The COVID-19 pandemic has impacted mental health worldwide, with students and teachers experiencing heightened levels of anxiety, stress, and emotional burnout. Even before the pandemic, mental health challenges among students in Jamaica were significant. A 2011 survey by the School Health Enhancement Committee (SHEC) found that over 50% of students often experienced feelings of sadness, 20% experienced hopelessness, and up to 16% had contemplated self-harm. For support, most students relied on parents or peers, highlighting the limited systemic capacity to address these issues. Similarly, a UNICEF 2022 report revealed that 53% of Jamaican adolescents had contemplated suicide even

before the pandemic. Additionally, Globally, depression and anxiety are now among the leading causes of illness in adolescents (World Health Organisation (WHO), 2024).

Recognizing these challenges, Jamaica initiated efforts to promote health in schools. The School Health Enhancement Committee (SHEC), as part of a broader framework to transform all schools into Health Promoting Schools, launched an initiative aimed at fostering healthy environments, providing emotional and social support, and integrating health education into school curricula. However, the pandemic magnified pre-existing mental health concerns. On the other hand, teachers also faced significant emotional strain, managing remote learning alongside their personal well-being. Despite these needs, Jamaica's mental health services remain under-resourced, with a psychiatrist-to-patient

ratio of 1:1,582 and a school counsellor-to-student ratio of 1:500, far below the international recommendation of 1:250 (for consistency) (Murphy, 2023; American School Counsellor Association, n.d). Moreover, schools are increasingly recognized as critical settings for promoting mental health and resilience. According to the WHO (2024), health-promoting schools integrate health education into the curriculum, provide social and emotional support, and create environments conducive to physical and mental well-being. Research suggests that fostering a healthy school environment positively impacts academic performance and long-term student outcomes (Minihan et al., 2022; Schmid, 2021). Of such, school leaders play a pivotal role in this process, influencing organizational culture, implementing policies, and sustaining health promotion efforts.

Category	Details
Study Design	Qualitative case study
Data Sources	Semi-structured Interviews: 45-60 minutes, online
Interview Details	Q1-Q3: Aligned with RQ1 (Impact on mental health of students and teachers); Q4-Q7: Aligned with RQ2 (Leadership responses); Q8-Q14: Aligned with RQ3 (Long-term strategies for sustaining mental health support). Key: (Q: Questions; RQ: Research Questions)
Participant Sampling	Purposive sampling of 5 school principals (2 females, 3 males) from diverse school types: • 2 small primary schools (Students ages 6-11 years, 7-8 teachers) • 2 medium-sized primary schools with infant departments (Students ages 4-11 years 10-45 teachers) • 1 high school (Students ages 12-18 years, 109 teachers).

METHODOLOGY
The table below summarizes the study design, data collection methods, and participant demographics.

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RESULTS. The COVID-19 pandemic deeply affected students' mental health, leading to anxiety, depression, and emotional distress. Many struggled to readjust to in-person learning, particularly those from single-parent households facing financial hardships. Principals reported increased absenteeism, disengagement, and learning loss, with some students feeling overwhelmed and "mentally giving up."

Attention spans declined, and students showed indifference toward lessons, struggling with structured learning. Overuse of technology during remote learning contributed to disengagement, with students becoming overly attached to their devices. Social withdrawal was also prevalent, as students had difficult communicating and collaborating with peers.

Behavioural challenges escalated, including aggression, hyperactivity, and anti-social behaviour. Some students engaged in self-harm or experienced mental health crises. One principal recounted a student's suicide attempt, highlighting the severity of their struggles beyond disciplinary concerns.

The impact of the COVID19 pandemic on teachers' mental health

The COVID-19 pandemic placed immense strain on teachers, leading to frustration, burnout, and emotional distress. A major challenge was the significant learning loss among students, forcing

teachers to re-teach foundational concepts. Many felt their efforts during remote learning had been undermined, as some students relied on parental assistance rather than genuinely engaging with lessons.

Teachers also faced mounting pressure from education authorities, struggling to balance professional demands with personal responsibilities. Increased workload and constant adaptation to new instructional methods led to exhaustion. Many reported stress-related symptoms, including frequent tension headaches and anxiety over health risks. Feelings of guilt were common, as teachers felt unable to give adequate attention to their own children. Emotional instability also emerged, with educators appearing more impatient and reactive. Returning to pre-pandemic routines proved difficult as many had adjusted to the flexibility of remote learning. Schools had to help staff readjust to structured schedules and expectations. Overall, teachers experienced significant emotional and physical strain, stretched by student learning gaps, institutional demands, and the challenges of resuming traditional teaching structures.

Post-Pandemic Mental Health Support Initiatives

The findings revealed a range of initiatives by school leaders in response to the ongoing mental health challenges

faced by both students and teachers in the post-pandemic era. These initiatives focused on emotional regulation, social reintegration, stress management, and overall well-being, with some overlapping between the two groups.

One key area of focus for both students and teachers was emotional regulation. School leaders have implemented counselling sessions to support emotional needs, with one school providing gender-specific support initiatives. For students, Social Emotional Learning (SEL) elements have been integrated into the formal curriculum, particularly within the Health and Family Life Education (HFLE) subject – a curriculum initiative that not only reinforces the connection between health and education, but also uses a holistic approach within a planned and coordinated framework, to address emotional and life skills. Similarly, for teachers, professional development (PD) sessions emphasized emotional well-being and mental health awareness.

Social reintegration has also emerged as a priority for students, as they navigate the challenges of reconnecting with their peers and adjusting to life outside of the isolation experienced during the pandemic. School leaders revived co-curricular activities such as clubs (e.g., Red Cross, Cadet) and church programs, which two principals said have proven beneficial in promoting students' emotional resilience. Additionally, fun days, movie days, and field trips provide stu-

dents with opportunities for relaxed social interaction. The School-Wide Positive Behaviour Interventions and Supports (SWPBIS) program had been introduced into some primary schools which is a multi-tiered framework to support student behavioural, academic, social, emotional, and mental health.

Stress management and issues of burnout has been another key focus. For students and teachers, participation in physical fitness activities such as "Jamaica Moves" (a national initiative aimed at enhancing physical health to boost mental well-being) was encouraged. Similarly, teachers have been encouraged to engage in planned wellness programs, which include activities such as staycations, birthday clubs, and "fun Thursdays". These activities, principals say are designed to provide teachers with some necessary breaks and to alleviate the pressures of their roles, which have been exacerbated by the pandemic. School leaders have also focused on providing support for teachers' emotional resilience through peer support groups, and PD sessions centred on self-care. The "2 in 10" strategy, which encourages teachers to engage with students on a personal level for two minutes each day, for 10 days, serves not only to address students' emotional distress but also to foster a sense of connection and emotional relief for the teachers. In addition, school leaders have acknowledged the impact of family dynamics

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on students' mental health. In response, some principals have organized workshops for parents, providing guidance on how to support their children emotionally. Table 1.3 summarises the initiatives.

Long-term strategies for sustaining mental health support

Schools have adopted a variety of interconnected strategies: forging partnerships and collaborations, modifying curricular programs, prioritising policy development and emphasising students and teachers support and professional development.

Four of five schools emphasized collaboration with external health professionals, including the Ministry of Health, social workers, and alumni in the diaspora. For instance, Principal A noted, "We engage the social worker assigned to our school region and engage the Past Student's Association [alumni] to

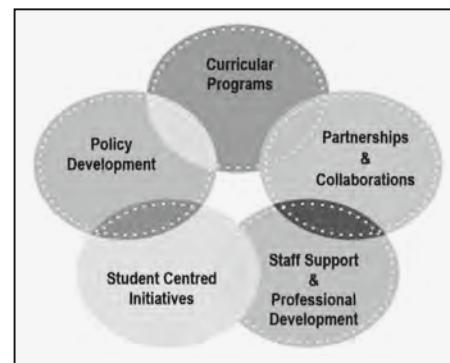


Figure 1: Long-term strategies/initiatives to be used to support mental health issues in school.

provide continuous support". Schools also included external professionals in professional development initiatives to enhance wellness. These partnerships were critical for three of the five schools as they were without resident guidance counsellors and could only rely on the "Roving" Guidance Counsellor" assigned to serve a cluster of schools within the school region. He/she would visit schools periodically to offer counselling services or to respond to specific needs.

Importantly, mental health priorities were integrated into school curricula and school improvement plans. A significant emphasis was placed on the Health and Family Life Education (HFLE) curriculum, with Principal E stating, "The ministry is pushing HFLE as a curriculum priority, and we are paying attention to it more." Furthermore, the two principals who had resident guidance counsellors indicated that they mandate that mental health goals feature in the guidance counsellors' annual strategic plans. As Principal B articulated, "I believe that every school improvement plan should include mental health support activities and they should be integrated as part of the school mission". In addition, collaboration with external health official provided vital resources for professional development (PD) and wellness initiatives. Principal C reflected, "We partner with external professionals to deliver PD ses-

sions on self-care and social emotional learning techniques, which are critical for preserving our teachers' mental health." Additionally, mentorship programs where experienced staff guided new teachers, were instituted to ensure continuity in providing mental health support to all teachers when they join the staff

Staff Support and Professional Development

Staff well-being is addressed through ongoing professional development on avoiding burnout and promoting self-care. Mentorship programs are formalized to guide both new teachers and students, especially boys. Principal C reflected, "Post-pandemic, my focus has shifted to the well-being of individuals, which in turn supports academics".

DISCUSSION AND IMPLICATIONS. The findings underscore the many challenges experienced by students and teachers during the COVID-19 pandemic, with ripple effects continuing to shape the post-pandemic educational landscape. The pandemic spotlighted systemic vulnerabilities in schools' ability to address mental health needs effectively. Students' emotional struggles, including anxiety, sadness, and social withdrawal, align with Ogundele's (2018) assertion that behavioral changes in children often signal underlying emotional distress rather than intentional misconduct. The pervasive hyperactivity, truancy, and

aggression observed in some students were not merely discipline issues but expressions of deeper psychological needs. These findings affirm the need for trauma-informed approaches in education to ensure schools become safe spaces for emotional healing.

For teachers, the pandemic amplified professional challenges, with many educators struggling to balance personal and professional demands. The emotional instability reported by teachers mirrors findings in literature that emphasize the heightened stress educators faced globally during the pandemic, resulting in increased attrition rates and diminished job satisfaction.

The initiatives adopted by schools, reveal a promising shift toward addressing mental health holistically. However, the findings suggest uneven implementation across schools, indicating a need for standardized policies and frameworks to ensure all students and teachers receive adequate support. For educators, professional development focusing on emotional resilience and self-care represents a necessary step. Nonetheless, a more systemic support – such as workload reduction – may be required to address burnout sustainably. Encouragingly, the emphasis on partnerships and collaborations, reflects an understanding that mental health challenges require a community-wide response. Additionally, embedding mental health education within curricula, such as

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through Health and Family Life Education (HFLE), aligns with global best practices in promoting emotional literacy and resilience (Kwaning et al., 2023). Therefore, there is a call for a systemic policy response to ensure mental health remains a priority within educational systems. Governments should bolster the integration of SEL and mental health education in the Jamaican school curricula, supported by adequate funding for training and resources. Guidance counsellors, though essential, are insufficient in number; thus, all educators should be equipped with basic skills to identify and address mental health concerns in their students and in themselves.

OUTLOOK. Future research could investigate how these frameworks can be tailored to diverse socio-economic and cultural contexts in Jamaica. Given the study's focus on immediate post-pandemic challenges, longitudinal research is needed to assess the enduring impact of mental health initiatives being implemented by school leaders now. Future studies could also examine the effectiveness of specific strategies, such as SEL integration or teacher wellness programs, in mitigating emotional and behavioral challenges. Additionally, exploring the role of family dynamics in shaping students' mental health would provide deeper insights into holistic approaches. —

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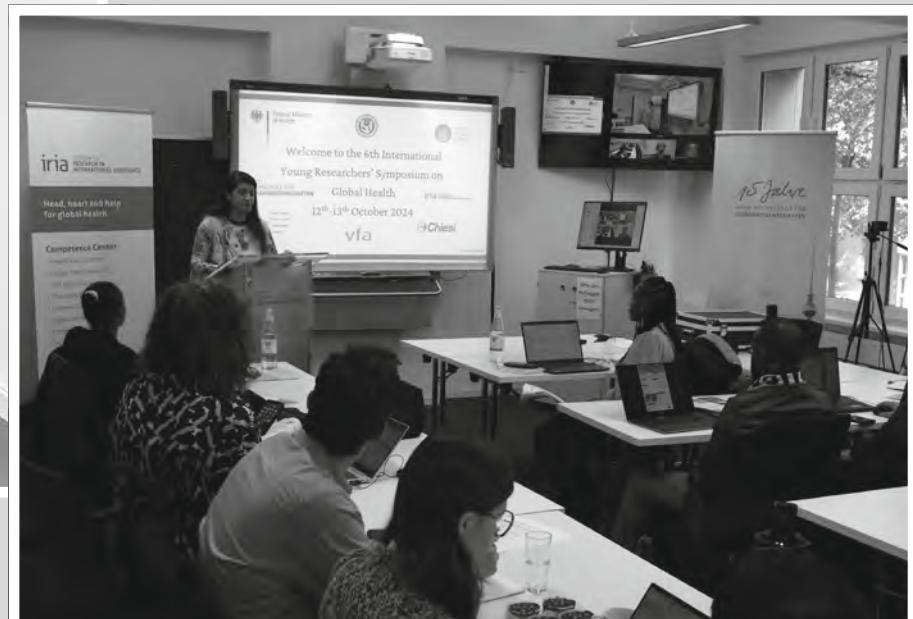
6th International Young Researchers' Symposium on Global Health at Akkon University



Akkon/IRIA Team with international participants of IYRS 2024



Participants of the IYRS at Akkon University, among them Selamawit Woldai, Federal Ministry of Health (front)



Impulse presentation Fareeha Armughan PHD, Sustainable Development Policy Institute (SDIP), Islamabad, Pakistan

#07 Kenya

Moran Mapping Project Kenya

Sally Bahati Masha

HIV remains a critical public health issue in many rural and underserved communities, including the Maasai of Kenya. Despite national prevention efforts, the Maasai community continues to face unique barriers to HIV prevention, such as cultural norms, stigma, limited access to healthcare, and low levels of awareness. The **MORAN MAPPING PROJECT** seeks to address these challenges by developing a culturally-sensitive, community-driven HIV prevention strategy that aligns with Maasai traditions and values.

My contribution to the **YOUNG RESEARCHERS SYMPOSIUM ON GLOBAL HEALTH** focuses on how the Moran Mapping Project utilizes indigenous leadership structures, particularly the **MORAN (YOUNG MAASAI WARRIORS)**, to engage youth and the broader community in HIV education and prevention. By leveraging

Moran leaders as peer educators, the project fosters trust, cultural resonance, and community participation in HIV testing, treatment, and awareness efforts. I discuss how participatory mapping and dialogue sessions, involving Moran leaders, elders, and women, help to identify high-risk behaviors and opportunities for targeted interventions.

Through this project, we aim to not only reduce HIV transmission rates in the Maasai community but also create a sustainable, culturally-embedded prevention model that can be adapted for other pastoralist/nomadic and indigenous populations. By integrating local cultural practices, HIV prevention efforts become more effective, creating a culturally competent health strategy that resonates with the community and leads to improved health outcomes. —

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#08 Mexico

The Family Environment and Its Effect on Self-Care Mediated by Assertiveness in Older Adults

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SUMMARY.

Objective: To analyze the influence of family communication, family support, and family functionality and assertiveness on self-care behaviors in older adults in Saltillo, Coahuila.

Method: The research adopted a predictive correlational design and a sample size of 254 older adults aged 60 years or older in the city of Saltillo, Coahuila was calculated. Data were collected using the following instruments: Care for Myself Scale (CCM), Family Apgar Scale, Degree of Family Support Rating Scale, Family Communication Scale, Assertiveness Subscale III.

Results: Self-care behavior is influenced by the variables of age, family communication, family support, family functionality and assertiveness with an adjusted R² (.578) with a significance level of p=0.000, the predictor variables in this model are assertiveness (p=0.000) and family communication (p=0.000)

Conclusion: The study revealed that the family environment has a considerable influence of 85% on the assertiveness of older adults, assertiveness, in turn, significantly affects 81% on self-care behaviors, these findings suggest that a positive family environment can promote self-care habits for older people.

Keywords: Aged, Family Structure, Assertiveness, Self Care

INTRODUCTION. It is important to highlight that by the year 2050, the global population of older adults will have doubled to 2.1 billion. Similarly, the number of people aged 80 and it is expected to triple, reaching 426 million, according to the World Health Organization (WHO, 2022). Based on these projections, it is evident that the growing population will also lead to an increase in non-communicable diseases and geriatric syndromes within this demographic.

In relation, as we age, biological and social changes become evident. Exposure to risk situations related to personal, family, community, and health needs identifies older adults as a vulnerable population. For this reason, biopsychosocial and family elements are of utmost importance for better adaptation to the changes during this stage of life (INAPAM, 2019).

Human relationships form the primary support network for older adults. These relationships are mainly developed within the family setting, whose primary function is to provide a favorable environment that facilitates the adaptation of older individuals to their roles and age-related changes (Meza, 2023).

Older adults are considered a vulnerable population, making it essential for them to develop a healthy, independent, and autonomous aging process to

meet their physical and social needs and prevent rapid progressive deterioration. This can be achieved through self-care, as it helps them remain physically and mentally active for carrying out daily activities (Posso, 2021).

Therefore, it is necessary to promote a healthy lifestyle through independent self-care behaviors, preparing older adults for healthy aging. Self-care behavior is defined as all the actions we undertake for the benefit of our health, without formal medical supervision. These responsible practices influence how we think and feel, encompassing physical, motor, emotional, and cognitive actions. This allows us to act upon it, as it is a tangible and accessible reality for reducing or preventing diseases (Parra, 2022).

When an older adult engages in self-care behaviors, it is reflected in how they contribute to the family environment, as it provides them with autonomy and empowerment in decision-making. This, in turn, encourages them to adopt behaviors that enhance their physical well-being, as they recognize the need to incorporate psychological or technological strategies. These strategies benefit older adults by fostering healthy family environments (Campos-García et al., 2018).

Family factors, according to Durón-Ramos et al. (2019), are composed of two dimensions: physical and social resources. For this discussion, only social aspects will be considered, which are determined by the functionality of family mem-

bers. The family serves as a source of material, emotional, psychological, and service-related resources. These provide tools that enable older adults to perform effective self-care by meeting fundamental needs, decisions making, and fostering family assertiveness (Sánchez et al., 2019; Pérez et al., 2019).

Therefore, family support is a key factor that promotes self-care, significantly influencing both physical and mental health. For this reason, it is important to encourage strong and lasting relationships that strengthen the autonomy, security, or dependence of older adults, thus providing a favorable family environment (Cardona et al., 2019).

Another family factor that primarily influences the behavior of older adults is family functionality, which consists of a support network that provides the older adult with tools and skills to foster confidence and security in decision-making. It always ensures independence, allowing them to continue leading a normal or as-close-to-normal life as possible, and enabling them to contribute benefits to society (Gaeta and Galvanovskis, 2009). In contrast, the older adult will always have emotional or social needs that drive them to seek a circle of people with whom they can relate, engage in recreational activities, and share knowledge. In this way, communication creates bonds of trust that foster closer connections with the family and enable the older adult to fulfill household obligations or respon-

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sibilities, as they possess experience and wisdom on topics that can be shared within society (García-Vinces et al., 2022).

On the other hand, assertiveness allows older adults to make their own choices without harming or being harmed by others, while respecting the decisions of others. When focusing on the family environment, the main characteristic involves expressing feelings and being able to defend their rights, alongside demonstrating honesty, respect, and self-confidence. This helps to foster healthy human relationships and contributes to family environments (Bustamante, 1998).

Together, a healthy family environment combined with assertiveness creates an atmosphere in which older adults feel secure, supported, and empowered to care for themselves. This context is favorable, as it not only significantly improves their quality of life but also promotes their independence, overall well-being, and ability to actively contribute to society (Costa, 2022).

GENERAL OBJECTIVE. To analyze the influence of family communication, family support, family functionality, and assertiveness on self-care behaviors in older adults in Saltillo, Coahuila.

METHODOLOGY.**Study Design, Population, and Sampling**

The research adopted a predictive correlational design, and a sample of 254 older adults aged 60 years or older in

the city of Saltillo, Coahuila was calculated. This calculation was based on a Type I error probability of 0.05, a power of 90% ($1-\beta = 0.9$), and an effect size of 0.2. A non-probabilistic convenience sampling method was used.

PROCEDURE.**Ethical and Legal Considerations**

This study strictly adhered to the Regulations of the General Health Law on Research for Health [Official Journal of the Federation (DOF, 2014)], considering the criteria established by the Official Mexican Standard NOM-012-SSA3-2012 (DOF 2012) for research involving human beings, as well as the General Law on the Rights of Older Adults (DOF, 2016). All participants provided written informed consent. This study has been approved by the Research Ethics Committee, with registration number FAENUS-CEI-ME-2023-17, and the Research Committee, with registration number FAENUS-CI-ME-2023-26, of the "Dr. Santiago Valdés Galindo" Faculty of Nursing.

Research Criteria

The inclusion criteria required that older adults score between 0 and 2 on the Pfeifer instrument, indicating the absence of cognitive impairment. Participants must have lived in Saltillo, Coahuila, for more than one year and could be of any gender. Older adults with difficulties in verbal communication, as per a prior medical diagnosis, were excluded,

as well as those who were unable to answer the questions on their own. Additionally, participants were excluded from the study if they could not complete the instrument application and/or evaluation process, if they voluntarily decided to withdraw, or if, due to health reasons, they were unable to continue the interview and complete the questionnaire.

MEASUREMENT INSTRUMENTS.**Sociodemographic Data Form**

Information was collected to characterize the population based on personal, biological, and sociocultural factors, including age, sex, current occupation, marital status, educational level, current diseases, years of evolution of these diseases, and family type.

Self-care Scale

Self-care behavior was assessed using the "Care for Myself Scale" (CCM), designed by Corral et al. in 2021. It consists of 16 items that evaluate participants' consistency in taking care of their physical and mental health, self-control, healthy eating habits, management of leisure time, and use of relaxation practices. A higher score on this scale indicates a higher level of self-care. The authors reported a Cronbach's alpha of 0.97 for the scale, indicating acceptable reliability.

Family Functionality

The Family Apgar Scale by Gómez and Ponce (2010) was applied, validated for adults in Mexico, with a Cronbach's alpha of 0.84. This instrument consists

of 5 items that assess the constructs of adaptation, association, development or growth, action, and resolution. The scoring is based on a Likert scale, where 0 means "almost never," 1 means "sometimes," and 2 means "almost always." A higher score on this scale indicates better family functionality.

Family Support

The family support assessment scale by Leiton (2003) was applied, validated in the elderly population with a Cronbach's alpha of 0.92. The instrument consists of 10 items divided into three subscales, with scores ranging from 10 to 30. Based on these scores, a range of 10 to 19 indicates low family support, 20 to 25 indicates moderate family support, and 26 to 30 indicates high family support.

Family Communication

Family communication was evaluated using the "Family Communication Scale" by Rivadeneira and López (2017), which consists of 10 items and has a Cronbach's alpha of 0.91. The total score is obtained by summing the scores of each item, with a range from 10 to 50 points. A higher score indicates better family communication.

Assertiveness

The assertiveness variable was measured using the Assertiveness Subscale III by Flores and Diaz (2004), which has a Cronbach's alpha of 0.91. This subscale consists of 15 items, 12 of which are positive and 3 negative. The total score ranges

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from 15 to 75 points. Based on the score obtained, a normative and conversion table is used to determine whether the person is non-assertive, indirectly assertive, or assertive.

Data Analysis Plan

Descriptive statistics were used; for nominal and ordinal variables, frequencies and percentages were applied, and for ratio variables, the mean, standard deviation, maximum, and minimum values were calculated. The skewness and kurtosis test for normal distribution was computed, and Pearson's correlation test was applied. Subsequently, the model analysis was conducted through multiple linear regression. The adjusted R-squared value was identified to explain the variables of assertiveness, family communication, family functionality, and family support on the dependent variable of self-care behavior. Additionally, the model's significance was assessed through ANOVA, predictor factors, and the structural model measured by the significance of the goodness-of-fit indicators and practical indicators.

RESULTS. The final sample consisted of 254 older adults, primarily male, with ages ranging from 60 to 91 years, with a mean age of 70.2 years (SD = 7.6). Most of them are employed, married, and have a secondary education. The nuclear family structure predominated, and the presence of chronic diseases, such as hypertension, was common (Table 1).

Variable	f	%
Men	139	54.7
Married	122	48
High school	75	29.5
Hypertension	81	31.9
Nuclear family	110	43.3

Note: f= frequency, %= percentage, n=254.

*Table 1
Sociodemographic Data of Participants*

It is evident that the participants exhibit scores above the reported means in each variable, suggesting the presence of positive and assertive family environments, as well as the adoption of favorable self-care behaviors by older adults. The results of skewness and kurtosis indicate a normal distribution (see Table 2).

CORRELATION. The correlation results indicated that, with increasing age, there is less family communication. Additionally, it was found that the greater the family functionality, assertiveness, family support, and family communication, the greater the self-care behavior (see Table 3).

The explanatory model of self-care behavior is shown with an adjusted R² of (.57) and a significance of p = (0.000). The predictor variables are assertiveness and family communication (Table 4).

Variable	Media	DE	As	K
Family functionality	7.97	2.60	-1.457	1.524
Assertiveness	60.32	10.98	-1.122	1.179
Family support	24.89	5.16	-1.408	1.269
Self- care	49.48	14.33	-.772	.415
Family communication	39.89	10.05	-1.163	.679

Note: DE= standard deviation, As = asymmetry, K=Kurtosis.

*Table 2.
Characteristics of the population and normality of the data*

	age	assertiveness	Asertividad	Family support	Self- care	Family communication
Age	1					
Family functionality	-.039	.533	1			
assertiveness	-.137*	.551**		1		
	.029	.000				
Family support	-.004	.778**	.542*	1		
	.951	.000	.000			
Self-care	-.142	.580**	.649**	.611**	1	
	.023	.000	.000	.000		
Family communication	-	.680**	.632**	.792**	.705**	1
	.051	.000	.000	.000	.000	
		.416				

Note: *Significant correlation at the level 0,05 | ** Correlación es significativa en el nivel 0,01

*Table 3
Relationship of family environments, age and assertiveness with self-care behavior*

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Multiple regression model	Sum of squares	mean square	gl	F cal	p
Regression	30078.51		5	68.070	0.000
	4	6015.703			
Residual	21916.92	88.375	248		
	3				
R^2 ajustado= .578					
Variables	B	ES	T	p	
Age	-.076	.079	-.1828	.069	
Functionality	.094	.373	1.392	.165	
Assertiveness	.303	.072	5.507	.000	
Family support	-.054	.223	.675	.500	
communication	.402	.105	5.446	.000	
Nota: gl=grados de libertad, F cal= F de Snedecor, p=Nivel de significancia, B= Beta, ES= Error típico, T=t-students.					

Table 4
Explanatory model of self-care behavior

Figure 1 shows the results of the structural model of the family environment and its effect on care, mediated by assertiveness. The factors comprising the family environment construct include the variables: (family communication, family functionality, family support), which significantly influence the assertiveness variable, with a covariance of (.85). This, in turn, affects the outcome variable (self-care behavior) with a covariance of (.57). The assertiveness variable acts as a mediator in the model with a covariance on the self-care behavior variable of (.81). Regarding the goodness-of-fit indicators of the model,

the χ^2 was significant ($\chi^2 = 66.091$, [19 df], $p < .001$, relative $\chi^2 = 3.47$), and the practical indicators ($BBNFI = .96$; $BBNNFI = .94$; $CFI = .97$) as well as the $RMSEA = .09$, indicate that the theoretical model fits the empirical data with an ($R^2 = .57$).

DISCUSSION. The objective of this research was to analyze the influence of age, family communication, family support, family functionality, and assertiveness on self-care behaviors among older adults in Saltillo, Coahuila. According to the sociodemographic analysis, there was a higher prevalence of

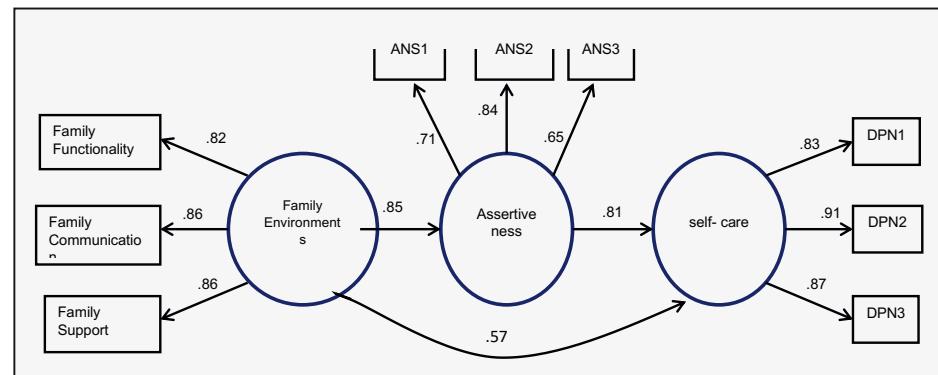


Figure 1. Structural model of the family environment and its effect on care are mediated by assertiveness, with significant factor loadings and structural coefficients ($p < .05$). Goodness-of-fit indices: ($\chi^2 = 66.09$, [19 df], $p < .001$, relative $\chi^2 = 3.47$, $BBNFI = .96$; $BBNNFI = .94$; $CFI = .97$, $RMSEA = .09$, $R^2 = .57$).

males, which can be attributed to the data collection methodology, the collection sites, and the coincidence of collection schedules with working hours. This is relevant to the study since most participants reported being employed. Additionally, the results are influenced by the fact that older men often gather in parks to socialize, exercise, enjoy the outdoors, and participate in local cultural activities. These findings align with studies by Ordaz et al. (2015) and Jarque et al. (2022), where males comprised a significant proportion of the population and were involved in both work and recreational activities.

Participants' ages ranged from 60 to 91 years, with most being married and having a secondary education level. The nuclear family structure predominates, and hypertension is the most common health condition. These results are con-

sistent with previous studies by Mejía-Álvarez et al. (2023) and Toala & Samada (2019), which highlight that living in a nuclear family promotes effective communication, healthy relationships, mutual respect, unity, and a sense of belonging in the home. This environment fosters confidence, joy, gratitude, and love. Additionally, about one-third of the surveyed population suffers from hypertension, a figure consistent with data from the 2018 National Health and Nutrition Survey (ENSANUT). Compared to national statistics, the prevalence of previously diagnosed hypertension in Coahuila is above the national average (18%). The population also scored as assertive, consistent with findings by Gaeta & Galvanovskis (2009), who demonstrated that assertiveness is a vital component of self-care and personal autonomy. Assertive individuals can protect their rights,

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establish healthy boundaries, make decisions that benefit their well-being, and communicate effectively to avoid excessive dependence, thereby promoting a more independent and fulfilling life. This study also revealed a moderate level of family support among participants, aligning with Reynoso-Vázquez et al. (2020), who found that greater family support led to better health-promoting behaviors and adherence to treatment. The reported results further indicate that the studied population enjoys favorable family functionality. This finding is consistent with Castelo-Rivas et al. (2023), who showed that family functionality inversely affects older adults' mental health—greater family functionality correlates with lower anxiety, depression, and stress levels, which can be attributed to support provided by healthy family networks (Anarte & Varela, 2021).

Family communication proved significant in this study, scoring above average. This indicates that participants maintain good communication with their families, translating into healthier self-care behaviors. These results align with Garcés-Pretel et al. (2022), who found that open family communication significantly reduces negative stress, thereby improving health outcomes. These findings highlight how social interactions and relationships influence health-related decisions and behaviors. Such relationships play a crucial role in adopting healthy behaviors by

providing support and encouragement, as described in Aristizábal et al. (2011). Their study showed that family communication, support, and functionality scored above average, fostering decision-making within the family environment and promoting health and well-being. These findings align with Medellín et al. (2012).

In this study, self-care behavior was influenced by 57% through the family environment, mediated by assertiveness in older adults in Saltillo, Coahuila. Family communication influences self-care behavior by transmitting knowledge and values, providing emotional support and motivation, serving as a behavioral model, facilitating conflict resolution and role negotiation, and promoting access to self-care resources and services.

CONCLUSION. This study concluded that the sample exhibited functional families with favorable support and communication, resulting in good self-care behaviors. Additionally, the population was found to be assertive, a beneficial characteristic for the outcome variable. Most participants demonstrated significant levels of assertiveness, shown to be a favorable factor influencing the studied variable's results. These findings underscore the importance of the family environment and assertive behavior in maintaining the health and well-being of the population.

It was demonstrated that assertiveness, communication, functionality, and family

support are significantly related to and positively influence self-care behaviors reported by family members. These findings suggest that a positive family environment can foster more effective self-care habits among older adults. —

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#09.1 Pakistan/Germany

Empower Her – Bridging Reproductive Health in Rural Pakistan

*Clara Salome Dannenberg, Esther Mönning,
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BACKGROUND. Sexual and reproductive health and rights (SRHR) are core human rights and essential to individual good mental and physical well-being as well as to community well-being. SRHR includes the number and spacing of children, access to information and education, freedom of coercion, discrimination and violence, ante- and postnatal care, and access to quality health care services (UN OHCHR, n. d.). Pakistan, which ranks in the last third of countries according to the Sustainable Development Report, faces multiple obstacles that deter especially women from accessing the full range of SRHR (Sachs et al., 2023).

Although national legislation promises equal treatment for men and women, an end to gender-based violence, and equal opportunities for boys and girls, the existence of these laws alone often fails to bring about real change as implementation remains challenging. For example, the legal age for marriage is 18 in all Pakistani provinces. Still, 18 % of women are married before the age of 18, and 3,6 % even before the age of 15 (UNFPA Pakistan, 2023).

Contraception use is staggering at 30 %, and of all those who use contraception, about one third relies on traditional methods such as withdrawal (Meherali et al., 2021). While most married Pakistani women are aware of at least one

modern contraceptive method, there is still an unmet need of about 17 % for family planning methods (UNFPA Pakistan, 2023). About half of the parents have never broached the topic of sexual health with their children, while many parents and teachers reject the idea that sexual education in schools should cover pregnancy prevention for religious reasons (Shaikh and Ochani, 2018). Concurrently, STI-knowledge is extremely poor even in at-risk communities, leading to considerable prevalence and unawareness of infection (Rajdev et al., 2016; Ali et al., 2017; Al Kanaani et al., 2018, 2018). High maternal and child mortality, over half of which are caused by preventable, communicable diseases or lack of attendance at birth by health care professionals, reflect the failing state of the health care system. A lack of efficient, governance, skilled personnel, access, equal resources, transparency, and monitoring limit the strength of the Pakistani health care system (Kurji, Premani and Mithani, 2016; Khan et al., 2023; Sachs et al., 2023). Women in rural areas face even more obstacles in accessing health care, such as limited financial autonomy, cultural segregation from public spaces (purdah), travel restrictions and unsafe public transport, a lack of female health care workers, limited health literacy, and a lack of faith in governmental instituti-

ons (Hossain and Kabir, 2001; Karatela et al., 2016; Habib et al., 2021). The introduction of lady health workers, a door-to-door public service for women by specially trained female staff, has led to some advances in SRH, such as increased usage of modern family planning methods (Douthwaite and Ward, 2005). However, lady health workers are responsible for multiple primary health tasks and cannot alone cover the need for comprehensive SRHR in Pakistan. Improvements in SRHR need to be facilitated on multiple levels and with different approaches. Individual empowerment and education should be the main focus of non-state actors with short project durations.

Gamification has recently emerged as a method to enhance education in SRHR. A study on nursing students solving an escape room based on their SRHR knowledge showed that this way of learning can be fun and engaging while enabling knowledge repetition (Martínez-Galiano et al., 2024). While evidence of effect on behavior is so far inconclusive (DeSmet et al., 2015), digital gamified approaches in SRHR education have been shown to be more effective than traditional teaching methods, and can increase student participation, motivation, and attitude (Haruna et al., 2021). In low-resource settings, board games such as snake-and-ladder games have also been shown to positively influence knowledge (Tianingrum, Kurniasari and Amalia, 2020).

CONCLUSION. Programs aimed at SRHR are highly needed in Pakistan. For practical use for non-state actors, factors that can benefit contraceptive use and subsequently SRHR can be divided into beneficial and hindering factors that can again be grouped by changeability. Completion of primary and secondary school, improved decision-making ability, employment and wealth, awareness, and knowledge are factors that are favourable to the use of contraceptives. Hindering and changeable encompass illiteracy and disapproving family members.

While more general and focused research is needed to evaluate which interventions in SRHR are most effective in the Pakistani context, a game-based method based on the mentioned factors that can be influenced even with short project periods is a promising and innovative approach to strengthen SRH in rural Pakistan.

ONGOING RESEARCH: EMPOWER HER – BRIDGING REPRODUCTIVE HEALTH IN RURAL PAKISTAN.

In Punjab, Pakistan, only a rare number of studies examining sexual and reproductive knowledge and attitudes can be found. Even less research exists on evidence-based and scientifically evaluated interventions in the field. To address both issues at the same time, the authors conducted a game-based method combined with qualitative research in the period from October to December 2024.

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The method was developed by reviewing the literature on factors influencing SRHR locally and by exchanging experiences with other organizations that already implemented SRHR interventions. The project seeks to combine knowledge transfer and empowerment for the local population with gaining a scientific insight and deeper understanding of how young people experience their SRHR in their everyday lives and which factors they perceive as helpful or harmful in accessing SRHR.

The research project is a joint project of the University of Lahore (UoL) and Akkon University for Applied Human Sciences in Berlin. Performed in the rural area of Sheikhpura, Punjab, in Pakistan. This research cooperation is a part of the ASA (Arbeits- und Studienaufenthalte)-program 2024. ASA is a global learning program by Engagement Global and provides participants with a stipend for living and travel costs funded by the German Federal Ministry of Economic Cooperation and Development (BMZ).

The objective is to gain insights on gamified approaches to SRHR as well as on individual experiences and practices in rural areas of Punjab. With regards to the short duration of three months and the therefore limited data collection means, the project is considered as a pilot project. The project consists of a pre-game survey, the game-based method, and a post-game evaluation. To win the game, participants have to answer questions on maternal health, menstruation, contraception, women's rights, and educational opportunities in Pakistan. It links learning to a playful approach and allows for collaboration between participants to further strengthen local empowerment. Participants were interviewed with a standardized questionnaire on their assessment of reproductive health and respective needs. Post-game evaluation will be used to assess method efficacy, participant's experience, and potential areas for improvement. —

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#09.2 Pakistan/Germany

Raising Awareness for Fighting Cervical Cancer among Adolescents Girls: A Pilot Project

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ABSTRACT

BACKGROUND. In low- and middle-income countries like Pakistan, cervical cancer is a serious health concern. Even though it is preventable, social and cultural taboos, as well as limited access to healthcare, provides barrier to substantial knowledge and early intervention.

METHODOLOGY. It was a quantitative study where pre and post seminar data was collected using purposive sampling technique. Total 278 participants were included in the study.

RESULT. The findings demonstrated a noteworthy improvement, with 97.6% expressing increased knowledge, 95.2% realizing that cervical cancer can be prevented, 94.8% becoming aware of screening tests and 86.8% of respondents said they would be willing to get the HPV vaccine, highlighting how well the seminar promoted healthy habits

CONCLUSION. The initiative effectively increased adolescent awareness of cervical cancer prevention. With community and policy backing, these programs might be scaled up to drastically lower Pakistan's cervical cancer rates.

INTRODUCTION. Cervical cancer remains a significant global health challenge,

particularly in low- and middle-income countries (LMICs), where over 90% of cervical cancer deaths occur due to limited awareness, inadequate screening, and restricted access to healthcare services (Pieters et al., 2021). Despite being one of the most preventable types of cancer, cervical cancer continues to claim thousands of lives annually, with Pakistan being no exception. In 2020 alone, approximately 4,000 women in Pakistan succumbed to cervical cancer, often diagnosed at advanced, untreatable stages (Pieters et al., 2021).

Addressing the cultural and systemic barriers that hinder preventive efforts is critical in combating this disease. In many LMICs, including Pakistan, discussing reproductive health is taboo, which exacerbates the lack of public awareness about cervical cancer and its prevention (Compaore et al., 2016; Modibbo et al., 2016). This pilot project, a collaborative effort between the University of Lahore in Pakistan and Akkon University in Germany, aims to bridge this awareness gap. By conducting educational workshops and seminars targeting university students, the project seeks to empower young women and men to advocate for reproductive health rights, emphasizing early detection and the role of HPV vaccination. This paper explores the outcomes of this initiative, highlighting its impact

on raising awareness, reducing stigma, and fostering a proactive approach toward cervical cancer prevention in a culturally sensitive manner. The findings underscore the potential of educational interventions in transforming health behaviors and attitudes in resource-constrained settings.

MATERIAL AND METHODOLOGY. This study was conducted to raise awareness among young adolescent female population, which was exclusively conducted in Lahore, Pakistan. It was a quantitative study where pre and post seminar data was collected using purposive sampling technique. Total 278 participants were included in the study where knowledge was assessed on the basis of a structured questionnaire. Majorly demographic and descriptive data analysis was done using software SPSS 27.0.

RESULTS. Total 278 young girls from 4 different university attended the seminar of cervical cancer with a mean age of 20.45 ± 2.63 years. A majority of participants were affiliate with The University of Lahore (37.8%), followed by Superior University (33.1%) and PU and LCWU (29.1%). As this study intended to focused on young girls so most of girls were single (89.2%), with only 10.8% reporting being married. Before seminar only 37.4% had heard of cervical cancer, while 52.2% had not, and 10.4% were unsure. The knowledge

was limited, with just 16.9% aware of the risk factors or causes, 70.1% unaware, and 12.9% unsure. Less than one third (23.4%) were aware that cervical cancer is preventable, a majority (56.8%) were not, and 19.8% were uncertain. Out of 278 only 14.7% of young girls had heard of cervical cancer screening tests, with 74.8% unaware and 10.4% unsure.

Before seminar 41.4% were willing to do cervical cancer screening test if services were made available even if they don't know about it, while 39.9% were unwilling, and 18.7% were unsure. A significant majority (76.3%) had not heard of the Human Papilloma Virus (HPV), with only 23.7% having some knowledge. Knowledge about the HPV vaccine was low, with only 19.8% aware that it could prevent cervical cancer, while 80.2% were unaware. Nearly half (49.3%) were willing to take the HPV vaccine if available, 18.7% were unwilling, and 32.0% were unsure.

Total 250 girls attempted the post-seminar survey about awareness, knowledge, and attitudes of cervical cancer. After the seminar, 97.6% reported about their improved knowledge about cervical cancer while 98.8% developed more understanding of cervical cancer risk factors/causes. Awareness regarding prevention of cervical cancer increased significantly, with 95.2% responding affirmatively, while 2.8% remained unaware, and 2.0% were unsure. Post-se-

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minar knowledge about cervical cancer screening tests and HPV were 94.8% and 94.4%, respectively.

If services were made available, 83.2% expressed willingness to undergo cervical cancer screening and 91.2% believed vaccination against HPV can prevent cervical cancer. Out of 250 girls, 96.8% found the seminar informative, while 86.0% indicated they would talk to family and friends about cervical cancer and its prevention after the seminar. When asked about the most useful aspect of the seminar, the responses included awareness (10.4%), knowledge (18.8%), treatment (7.6%), prevention (9.2%), early detection (4.4%), and everything (2.4%). However, a significant 47.2% did not respond this open-end question.

DISCUSSION. The pilot project significantly enhanced adolescent female awareness and understanding of cervical cancer. Before the seminar only 37.4% of participants had heard of cervical cancer, 16.9% were aware of its risk factors, and 23.4% had the knowledge that it is preventable. Apart from that only 19.8% of people knew that HPV and its vaccine could prevent cervical cancer. Nonetheless, the findings of the post-seminar demonstrated a noteworthy improvement, with 97.6% expressing increased knowledge, 95.2% realizing that cervical cancer can be prevented, and 94.8% becoming aware of screening tests. In addition, 86.8% of

respondents said they would be willing to get the HPV vaccine, highlighting how well the seminar promoted healthy habits. These results highlights that the significant e of continued educational initiatives in order to maintain long-term behavioral improvements in spreading awareness regarding this silent killer (Markovic-Denic et al., 2018) .These results are consistent with other researches done in the future highlighting the value of educational initiatives in increasing public awareness and understanding of cervical cancer (Ebu et al., 2019). By disseminating correct information and increasing awareness, such programs can significantly lower the incidence of cervical cancer and improve the health of young women so they can take charge of their own health(Rosser et al., 2015, Naz et al., 2018).

CONCLUSION. This study outcome can provide essential details for lawmakers, healthcare providers, families, and the general public to create focused initiatives to increase awareness regarding cervical cancer (Hirani et al., 2021). By breaking the taboos around cervical cancer we can deduce greater understanding, higher HPV vaccination and screening rates, and earlier detection, all of which will drastically lower mortality caused by this disease (Thahira-banubrahim et al., 2021). By indulging women in open conversations regarding reproductive health, we can empower

women that can ultimately eliminate stigma and can promote an engaged health culture. Public health outcomes will improve through a decrease in the burden of disease and an improvement in women's quality of life, while communities will gain more knowledge and misunderstandings will be replaced with evidence-based information (Sultana et al., 2019).

OUTLOOK. Through community alliances and local healthcare systems, the idea might potentially scale by reaching underprivileged areas. Cervical cancer rates among teenage girls can be significantly decreased by continued education initiatives, HPV vaccination integration, and policy reform advocacy.—

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#09.3 Pakistan

Enhancing Public Health and Environmental Sustainability through Cycling Culture: A Case Study of Mall Road, Lahore

Muhammad Zeshan Ashraf

ABSTRACT. This paper explores the use of bicycles as a public health intervention and a means of environmental improvement in Pakistan taking Mall Road Lahore, as a case study. By incorporating the intervention model used by Copenhagen, Denmark; Pune, India; and the Netherlands in Lahore, cycling facilities are added into the city planning. Based on the findings, cycling advocacy measures can have a very positive effect on the reduction of air pollutants, enhancement of health conditions and support to the economic viability of the region. The study also provides, staged development of cycling infrastructural facilities, policy development and awareness creation on how to neighbourhoods' cycle in Lahore.

INTRODUCTION. In Lahore, the capital city of province Punjab, Pakistan, the worsening urban air quality problem has reached alarming proportions as reported air quality levels are always above the recommended levels by the WHO (Ashraf et al., 2022). Among the major sources are emissions resulting from traffic industrial waste, and low-grade fuel combustion (Chen et al., 2023). Considering the negative impact such as the incidence of respiratory diseases, bronchitis, or myocardial ischaemia, sustainable transport soluti-

ons are the most appropriate and much needed measures. As shown from other world cities, cycling is possible to offer masses a meaningful alternative to displace pollution and improve the quality of mobility in urban environments (Lee et al., 2021).

Where this work focuses on health improvements and environmental enhancement through the reinforcement of the use of bicycles as a primary mode of transport on Mall Road, Lahore. Based on international best practices, the study develops strategies for construction of cycling facilities and promotion of cycling in Lahore.

MATERIALS AND METHODS. The research employs a case comparative approach, examining how cycling facilities impact the urban landscape in cities like Copenhagen in Denmark, Pune in India, and the Netherlands. Secondary data was obtained from report and studies including but not limited to government reports, scholarly articles, and environmental studies. The case study cities were intentionally chosen because they have been able to incorporate cycling into the city's transportation planning and attain relevant benefits towards the environment and public health (Jensen, 2015; Pucher & Buehler, 2008).

In respect to the local context, a site analysis of the mall road, Lahore was performed to evaluate the existing traffic patterns, infrastructure distribution in the region, and assessment of potential zones for development of cycling routes and related features. Interviews with residents in the urban setting more specifically urban planners and public health experts were conducted to get their opinion on the proposed interventions.

RESULTS. High levels of air pollution have a visible effect on public health and society. The case studies show great evidence that increased cycling brings considerable improvement to environmental and health standards. For instance, in Copenhagen, more than 40% of trips are made by bicycles users and there has been a 92% cut in harmful emissions when compared to cars (Jensen, 2015). In the same way, Pune's dedicated cycle tracks have led to 25% more cycling trips and cut the annual carbon emissions of the city by over 500 tons (Center for Science and Environment, 2021). 27% of all trips in the Netherlands are taken by bicycle, demonstrating how increasing cycle infrastructure leads to transformation in urban mobility, allowing reduction of noise and improvement of air quality (Bos & Provoost, 2018).

As a contrast to that, presently Mall Road, Lahore does not have any cycle track, which helps in non-adequate traf-

fic and air pollution. The authors propose a project in three phases:

- Phase-I The construction of additional cycle lanes running parallel with other lanes.
- Phase-II Banning all private motor vehicles along the route.
- Phase-III Restricting motor vehicles use to public transport and government vehicles only; hence giving cyclists and pedestrians priority.

DISCUSSION. The first one is related to the provision of cycling infrastructure on Mall Road. It would be beneficial as vehicles level would be decreased thus reducing the air pollution. There are studies which suggest that if motor vehicle usage is kept at a limited level, then there can be a reduction in particulate matter by 20-40% (Ashraf et al., 2022).

Furthermore, active transportation encourages a physically and mentally employed populace, which lowers the prevalence of sedentary lifestyle chronic diseases (Lee et al., 2021).

Likewise, the increase in cycling would have positive economic repercussions too. More people walking around in the area would also result in business for local shops and a reduction in economic costs, as there will be cheaper healthcare associated with environment induced diseases in long run. (Chen et al., 2023). On the other hand, certain hurdles have to be tackled in order to promote the

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use of bicycles in Lahore. A view associated with socioeconomic stratification regarding a bicycle, is therefore, a presumption of poverty, drawing upper and middle-class inhabitants away from the exercise. More so, the city was predominantly built for motor vehicles, and as such a wholesale policy and physical transformation is required (National Highway Authority, 2020).

To counter these obstacles, a big picture strategy is necessary. This includes:

Policy Formulation: Putting in place policies that give priority to cycling such as controlling the speed of other vehicles, and giving some benefits to the businesses which advocate for cycling.

Public Awareness Campaigns: Making people aware of the necessity of cycling and its benefits for the health and environment by engaging the community and the schools.

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Inclusive Planning: Designing cycling facilities in such a way that they can cater for all people including women, children and the aged.

CONCLUSION. After reviewing international case studies as well as the case provided by local conditions, using a bicycle on Mall Road, Lahore would be an effective measure to help deal with the air pollution and public health issues in the vicinity which then can be expanded in whole city to improve its environmental indicators. The phased approach of implementing cycling infrastructure together with the favorable policies and the participation of the people can help make Lahore a more sustainable city. By using a bicycle rather than a motor vehicle, Lahore could help lower its emission levels, improve the urban mobility and better the health of its inhabitants. —



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#09.4 Pakistan

Psychological impact of treating suicide bombing victims on emergency medical personnel in teaching hospital of Peshawar: A focus on post traumatic stress disorder

Taimoor Riaz Ullah

ABSTRACT

BACKGROUND. Emergency medical personnel play a crucial role in managing trauma victims, particularly in regions affected by violence. This study aims to assess the psychological impact of treating suicide bombing victims on emergency medical personnel in a teaching hospital in Peshawar, focusing on the prevalence of Post-Traumatic Stress Disorder (PTSD).

METHODS. A cross-sectional study was conducted from June 2023 to May 2024 involving 115 emergency medical personnel, including paramedics, nurses, and doctors. Participants were recruited using convenience sampling and completed a structured questionnaire that included demographic information and the DASS Checklist to assess PTSD symptoms. Data were analyzed using descriptive and inferential statistics, with a significance level set at $p < 0.05$.

RESULTS. Among the 115 participants, 67.8% were male and 32.2% were female, with a significant association between gender and PTSD symptoms ($p=0.03$, 95% CI [0.03, 0.67]). The age distribution revealed that 39.1% were in the 30–39 age group ($p=0.04$, 95% CI [0.02, 0.10]), and 58.3% of participants were married, although marital

status was not significantly associated with PTSD ($p=0.07$). Regarding professional experience, 34.8% of personnel had 6–10 years of experience ($p=0.02$, 95% CI [0.02, 0.10]), while 73.9% reported receiving training ($p=0.04$, 95% CI [0.03, 0.47]). Exposure to traumatic incidents showed that 39.1% had encountered 6–10 incidents ($p=0.01$, 95% CI [0.03, 0.47]). Psychologically, 39.1% reported PTSD symptoms ($p=0.03$, 95% CI [0.02, 0.10]), 52.2% indicated anxiety disorders ($p=0.01$, 95% CI [0.14, 0.86]), and 43.5% experienced symptoms of depression ($p=0.03$, 95% CI [0.01, 0.07]). Inferential statistics highlighted that personnel lacking a support system (60.9%, $p=0.02$, 95% CI [0.02, 0.49]) demonstrated higher levels of anxiety and depression.

CONCLUSION. The prevalence of PTSD symptoms among emergency medical personnel treating suicide bombing victims in this study is notably high. Factors such as gender, age, years of experience, and exposure to traumatic incidents significantly impact their mental health.

KEYWORDS. Emergency medical personnel, suicide bombing victims, post-traumatic stress disorder (PTSD), anxiety, depression, Peshawar, mental health, support systems, trauma exposure. —

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#10.1 Ukraine

Mental Health of the Population in the Volyn Region during Wartime

*Olha Bukareva, Viktoriia Komarchuk,
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ABSTRACT. This article is devoted to the study of the issues of preserving the mental health of Ukrainians during the war, in particular in the Volyn region. The main attention is paid to the analysis of the psychological impact of the war on the mental health of the population of the Volyn region. This article analyzes the results of a survey of Volyn residents within the framework of the All-Ukrainian program of psychological health "How are you?". The issue of providing counseling services and psychological support to improve the mental health of students at Lutsk National Technical University was also highlighted.

INTRODUCTION. The issue of mental health in Ukraine is becoming increasingly relevant every day. This is primarily due to daily stress, volatility, unpredictability, and the uncertainty of the situation in the country. The war in Ukraine has been ongoing for the third year, and it is evident that during this time, the mental health of Ukrainians has inevitably deteriorated. As a result, both the civilian population and military veterans exhibit a range of conditions such as post-traumatic stress disorder (PTSD), depressive episodes, depression, anxiety disorders, and others. Additionally, as of March 2024, since the beginning of

the full-scale invasion, 18,944 businesses in Ukraine have been relocated from dangerous regions to safer ones.¹ These processes negatively affect participants in the labor sphere, impacting both their mental health and their ability to work and overall productivity. According to experts from the State Labor Service of Ukraine, psychological and social issues lead to lost working time, increase the risk of workplace accidents, and create a tense atmosphere within teams.² Therefore, the relevance of studying the mental health of citizens during the war and post-war reconstruction is beyond doubt.

ANALYSIS OF RECENT STUDIES AND PUBLICATIONS.

A significant number of domestic and international researchers have studied the impact of military conflicts on mental health. Among them are I. Pyholenko, O. Tkachyshyna, L. Kotolova, I. Dolinchuk, S. Kuzikova, V. Zlyvkov, S. Lukomska, T. Shcherbak, O. Kotukh, F. Baingan, I.J. Bodh, B.L. Green, K. Siegfried, Sh. A. Sheikh, and others.

Furthermore, the issue of ensuring the psychophysiological resilience of various population groups in Ukraine during martial law and post-war recovery has been explored by Kokun O.M., Bakhmutova L.M., Kruzheva T.V., and others in.³ They propose modern diagnostic

approaches, methods for increasing resilience, and ways to provide psychological support.

Karamushka L. M. analyzed the content and key components of individual mental health (using organizational employees as an example) during wartime and its potential risks.⁴ The author provided recommendations on maintaining and supporting employees' mental health in key areas such as stress resistance, relationship-building, professional activity, and self-actualization.

Sharovatova O.P. and Morozov A.I. in their study⁵ argue that awareness of the situation and future steps, the presence of a clear action plan in emergencies, and constructive communication help reduce anxiety levels and enhance employees' psychological resilience in difficult times. Fedorchuk-Moroz V.I. and Bondarchuk L.F. recommend that business leaders and managers pay attention to the mental health of different categories of employees, including discharged military personnel, those who did not participate in combat, and individuals with disabilities involved in production – whose numbers will increase over the years due to military actions.⁶

Tsona V. in⁷ states that the most significant loss of working hours results from mental health issues, specifically due to increased workloads and the lack of managerial support – two aspects relevant to businesses of any size.

RESULTS. The full-scale invasion of Ukraine in February 2022 significantly impacted the lives of Ukrainians, including their mental health. Oleksandra Mashkevych, Director of the Department of Medical Services at the Ministry of Health of Ukraine, states that more than 15 million people in the country will require psychological assistance. Among them, 3.5 million will experience certain mental disorders, and about one million will have moderate to severe mental health issues. Since the beginning of the full-scale invasion in 2022, the use of antidepressants has peaked, and sales of over-the-counter sedatives doubled in March–April 2022 compared to 2021. The previous peak was recorded in March 2020 due to panic caused by the COVID-19 pandemic.⁸

Since March 2023, the nationwide mental health program "How Are You?" has been in operation, launched in Ukraine at the initiative of Olena Zelenska. It operates with the support of the government, non-governmental organizations, and partners such as the WHO, UNICEF, USAID, the International Organization for Migration, the International Medical Corps, the World Bank, the international independent medical organization Doctors Without Borders, and the UN Development Program. Additionally, various executive bodies of Ukraine, including the Ministry of Health, the Ministry of Social Policy, the Ministry of Education and Science, the Ministry of Econo-

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my, and the Ministry of Internal Affairs, are involved in the program. Each region has interregional program coordinators who collaborate with local authorities to develop steps for its implementation. Experts have developed practical tools for mental health care and resilience-building, particularly for children and adolescents, veterans, and healthcare workers. In the Volyn region, as part of the program, a survey of nearly 4,000 residents was conducted. The results showed:

- 22% of respondents from Volyn have experienced potentially traumatic events during the war.
- 27.2% have experienced panic attacks where nothing could calm them down.
- 33.1% feel indifferent to things they usually enjoy and experience apathy.
- 31% report feelings of hopelessness and persistent thoughts about the meaning of the future.

Age analysis has shown that these conditions are most prevalent among young people. Therefore, in Volyn, numerous activities are being conducted to address mental health and provide psychosocial support for schoolchildren and students (more than a thousand individuals).

From 2023 to 2024, the following initiatives have been implemented:

4,872 group mental health and psychosocial support sessions were held in general secondary education institutions in Volyn. Over 70 educational events on mental health, stress management, and

burnout prevention were organized for students. More than 30 training sessions and meetings were conducted for academic and educational staff.⁹ Several mental health initiatives are also being implemented in the healthcare sector. In Volyn, the mhGAP (Mental Health Gap Action Program) – which aims to involve non-specialized psychiatric personnel in providing proper mental health care – has been successfully completed by 97% of family doctors in medical institutions across the region.

Out of 54 municipalities in the region, 49 currently provide psychological support services.

In four municipalities of the Volyn region, resilience centers have been established to provide psychological support. Various civil society organizations in Volyn are involved in the implementation of these programs.

In the Lutsk City Community, the FOX-HOUSE Inclusive Resilience Center was opened. It offers comprehensive support services to community residents, with a particular focus on defenders and their families.

In Novovolynsk, a Resilience Center was established by the Caritas Volyn organization. Over 2,000 people have sought assistance there, including: (955 individual consultations; 1,273 group sessions).

More than one-third of those seeking support were military personnel and their families, while another third con-

sisted of internally displaced persons (IDPs).⁹

Every year, on the occasion of World Mental Health Day, which is observed globally on October 10, LNTU organizes trainings, workshops, and guest lectures to raise awareness and promote mental well-being among students.

To enhance students' resilience, a Mediation and Psychology Center has been established at the university. This center provides individual psychological counseling, prevention, and correction of negative emotional states, as well as mediation services.

CONCLUSIONS. Summarizing the above, it is evident that the demand for psychosocial support among Ukrainians will continue to grow both during and after the war. In our opinion, it is essential to continuously assess the demand for these services and gather feedback on their implementation. One potential approach is to involve students in organizing mentorship programs aimed at improving the mental health of young people. Furthermore, it is crucial for employers to implement specific measures to reduce risks, enhance psychosocial well-being, and create a healthy work environment. —

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#10.2 Ukraine

Emotional burnout of volunteers since the beginning of the full-scale invasion of Ukraine

Yuliia-Mariia Shandra, Liliia Fedyshyn, Nataliia Smoliuk

BACKGROUND. Ukraine has been at war for more than two years. This war is a major cause of mental health problems for people because it directly threatens people's lives and involves many different kinds of violence, such as political, military, economic, and sexual violence^[1,2]. This affects both civilians and soldiers^[3].

Volunteering is well-known both in Ukraine and globally. Volunteers work to overcome natural disasters, assist victims of man-made disasters, participate in supporting hungry children in impoverished countries, and support victims of sexual and labor trafficking^[4].

Studies have shown that war can have a significant impact on the mental health of volunteers. Volunteers who provide support to the military are particularly susceptible to burnout due to the prolonged nature of the conflict^[5].

Emotional burnout is a widespread problem among volunteers in Ukraine during wartime.

One of the main reasons for the deterioration of mental health among volunteers can be considered:

- Emotional and psychological strain caused by working with individuals facing challenging life situations and advocating for their rights and dignity
- Lack of work-life balance
- Lack of recognition for their efforts and insufficient support and respect from

colleagues, the community, or management

- Overload, stress, and physical and emotional exhaustion due to a fast-paced lifestyle and heavy workload
- The experience of empathy and a constant sense of another person's pain

Research objectives: This study aimed to evaluate the level of emotional burnout among volunteers and the justification of recommendations for overcoming it.

Materials and methods: a survey was conducted among volunteers in the Rivne region. The survey, which was created using Google Forms, included general questions and the standardized "Assessment of one's burnout potential" questionnaire by J. Gibson. This questionnaire was adapted to fit our specific focus on volunteers.

We asked general questions about people's age and volunteering experience. Then, we used a special part of the survey based on Gibson's questionnaire^[6] to measure burnout. This questionnaire looks at three things: how people feel detached from their work (depersonalization), how satisfied they are with their work (personal accomplishment), and how emotionally drained they feel (emotional exhaustion). Based on the answers, we were able to determine if someone had a low, medium, or high level of burnout^[7].

RESULTS. The survey involved 97 volunteers. Respondents were categorized.

The analysis of the results showed that women were predominant among the study participants. The average age of the volunteers who participated in the study was 36.2 years with a standard error of the mean of 2.7 years.

A significant majority of respondents (77.3%) held a university degree. The majority of volunteers were from urban areas, indicating a possible correlation with a higher level of volunteer activity in cities.

The majority of volunteers we surveyed have supported the Ukrainian military and displaced people since the start of the full-scale invasion, showing their strong sense of civil duty and commitment to Ukraine

Over half of surveyed volunteers dedicate up to 10 hours per week to volunteering. According to the Gibson Burnout Inventory, all volunteers demonstrated signs of emotional burnout.

The level of depersonalization was high, with an average score of 6.6. A moderate level was observed in 42.3%, and a high level in 57.7% of individuals.

Personal contentment was low and exceeded the low-level threshold by a factor of 5.8. Emotional exhaustion was also high, exceeding the threshold by a factor of 3.7.

Regarding the assessment of burnout potential components, it was reliably established that men, compared to wo-

men, have a higher level of low personal accomplishment.

Next, the burnout potential of volunteers was assessed based on the duration of their volunteer work. It was found that the highest level of depersonalization occurred within the first 6 months ($p=0.025$), the lowest level of personal accomplishment was among those who had been volunteering since the beginning of the war ($p<0.001$), and the highest level of emotional exhaustion was observed in the periods of up to 6 months and 1 year ($p=0.017$).

Analysis of burnout potential components revealed that a high level of depersonalization was found in those who volunteered up to 10 and up to 25 hours per week. The lowest level of personal accomplishment was observed among those who worked more than 25 hours a week.

CONCLUSION. The psychological well-being of volunteers is a key factor in the effectiveness of their work. To maintain it, it is necessary to provide volunteers with psychological support, organize trainings on stress management and emotional burnout, and create opportunities for communication and experience sharing. In this way, we can reduce the statistics of burnout among them. Preserving the psychological health of volunteers is one of our priorities. Core principles of self-care for volunteers:

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- Focus on what you can control, not the things you can't
- Maintain a consistent daily schedule, it's essential. To be effective at your job, you need to balance work with rest. Getting enough sleep is a vital part of this balance.
- Maintain a healthy and balanced diet. Balanced nutrition is key for volunteers to maintain a stable emotional state and perform their duties effectively.
- Stay connected with your loved ones. It's important
- Stick to your sleep schedule. A full night's sleep should last 7–8 hours.
- Try relaxation techniques^[7, 8] Finally, we can recall another piece of advice from the online therapy platform Pleso: 'Take care of yourself first – your physically and mentally. That is the only way you can truly help others^[9]. —

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#10.3 Ukraine

Epidemiological characteristic, ecological and biological peculiarities of Lyme borreliosis in Ukraine

Bilyk Yaroslav

BACKGROUND. In recent years, the significance of Lyme borreliosis and tick-borne encephalitis worldwide has been constantly increasing due to the growing number of carriers of these diseases. As a result of ecological environmental changes, infected ticks are being spread to new territories by birds, alongside the large-scale migration of people, leading to a significant spread of Ixodes tick-borne borreliosis.

Between 2011 and 2021, there was a general trend toward an increase in the number of Lyme borreliosis cases in Ukraine: approximately 28,400 cases were registered. The increase in human and domestic animal contact with ticks, along with the presence of natural foci of tick-borne infections, heightens interest in studying the prevention of Ixodes tick-borne borreliosis. Transmissible diseases, characterized by their specific geographical spread, represent a significant public health problem.

The aim of the study was to study of the epidemiological characteristics of Lyme borreliosis in Ukraine between 2011 and 2021.

MATERIALS AND METHODS. The study used data from regional disease control and prevention centers on Lyme borreliosis incidence in Ukraine, as well as data on the prevalence of the disease among the Ukrainian population over

the period 2011–2021. Statistical and epidemiological research methods were used during the research.

RESULTS. According to the Ministry of Health of Ukraine, the number of registered cases since 2010 has ranged from 500 to 1,500 annually. In 2021, approximately 1,200 cases were established, while in 2023, there were 4,911 cases, with a rate of 1,198 per 100,000 people. The highest number of cases is observed in Western Ukraine. Data from the regional disease control and prevention centers of the Ministry of Health of Ukraine regarding Lyme disease incidence from 2011 to 2021 show that both the average seasonal tick population and the number of Lyme borreliosis cases in the Ukrainian population are increasing. In 2011, the population of Ixodid ticks was about 5,000, with 1,000 Lyme borreliosis cases registered, while by 2021, the tick population had reached nearly 100,000, and the number of cases rose to 4,700. This indicates a widespread presence of Ixodes tick-borne borreliosis pathogens in the country, which can be considered endemic for Lyme disease. Regarding the tick activity season, it should be noted that in Ukraine, the duration of the tick activity season has increased annually. In 2011, the season lasted from June to October (5 months); in 2016, it was from April to October

(7 months), peaking in June and July. In 2019, the season lasted from May to October (6 months), with two peaks in May-July and September. By 2021, the tick activity season extended from April to November-December (8 months). Climatic conditions, including early spring and prolonged warm autumn, contribute to the increased duration of the tick activity season. Ticks are most active when the average ambient temperature is between 20–25°C, and the air humidity is 80–90%.

Regarding tick attacks on humans between 2011 and 2021 (with 1,260 total observations), most attacks were recorded in urban forest parks, accounting for 53% of cases. In 28.7% of cases, tick attacks occurred in forests where people were relaxing, picking berries, or mushrooms. In home gardens and while working at country houses, tick attacks were rare, at 8.6% and 9.7%, respectively.

Using a geographic information system for the analysis of the spread of tick-borne infections is very important in epidemiology now. In Ukraine, medical geographic information system (GIS) mapping is widely introduced as a new direction in thematic mapping. Its essence lies in the informational interaction between databases of general geographic and ecological-medical data by constructing relevant cartographic models. Medical GIS allows easy display of the initial information and the use of electronic ecological-geographical car-

tophographic models for conducting scientific research and practically applying the obtained data.

Medical GIS was implemented to study the morphological features of the development stages of Ixodes ticks, establish the frequency of tick attacks depending on the season and weather conditions in different biotopes, and analyze the dynamics of attacks on people at different life stages of ticks. The system also analyzes the most common Ixodes tick species found in the wild and removed from people and animals, registering research data to identify patterns in the spread of Lyme disease vectors, and recording patient blood test results for Lyme disease.

Each tick specimen on the map has its Latin species name, life stage, exact geographic location of the tick attack on a human, the location where it was removed from an animal or caught in nature, data entry date, biotope, tick's morphological characteristics (body length, gnathosoma, thoracic shield, abdomen width), method of capture, epidemiological status, temporary host, and the researcher's name.

Patient data include the patient's ID number, full address, occupation, diagnosis after consulting doctors, infection status after a tick attack, the presence of different antibodies, and dates of analyses conducted via polymerase chain reaction (PCR) and enzyme-linked immunosorbent assay (ELISA).

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By finding any tick specimen on the map, corresponding data can be obtained in the form of a pop-up. These pop-ups also show all entered data in tables and graphs. If necessary, a relevant chart or diagram can be automatically generated based on any data, including the tick's morphological characteristics, the number of tick attacks on humans by month or year, and the geographical area. The data entered into the medical GIS can also generate visual representations that display patient information after a tick bite, main clinical manifestations of the disease, analyzed data, and identified correlations between obtained digital data.

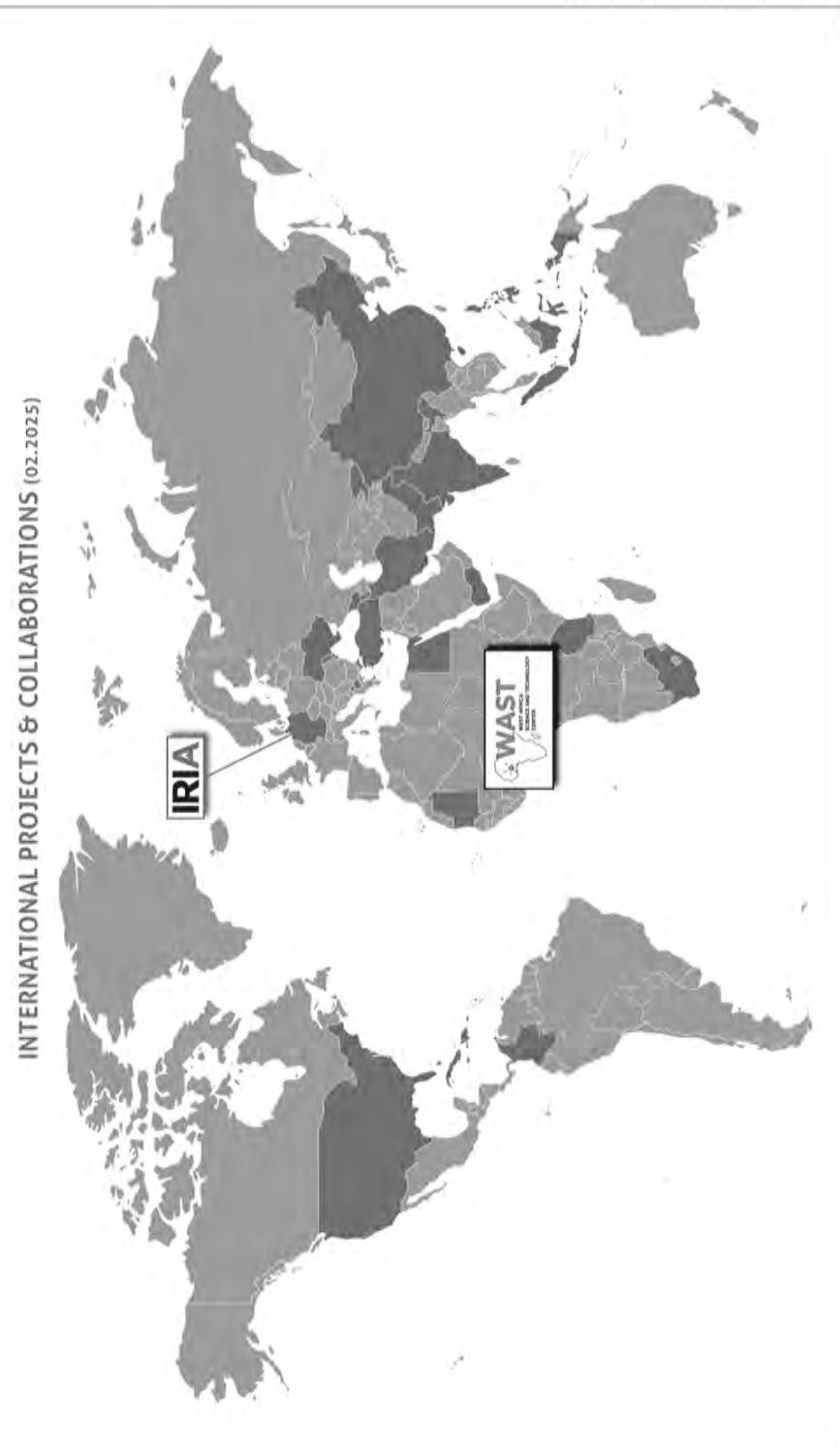
Using GIS, it is possible to search for a tick or patient by identification number. By entering the known number, one can immediately obtain a pop-up with full information about the study object. An important element of medical GIS is the availability of base topographic maps, which are used when necessary to obtain information about the location of

ticks within settlements or patient data. Topographic maps include street names, house numbers, etc.

CONCLUSION. Thus, the medical GIS interactive map provides several functions that simplify the mechanism of using it and, at the same time, increase efficiency and save time searching for the necessary object. Developed automated spatial analysis methods are characterized by their ability to link spatial and descriptive information about ticks and patients, allowing for joint analysis of the epidemiological spread of Ixodes ticks and Lyme disease incidence. The use of a medical geographic information system makes it possible to conduct systematic monitoring, accounting, control, and spatial analysis of Lyme disease prevalence, as well as to provide online surveillance of the medical-geographical situation in the studied region, forecasting real threats to public health. —

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#10.4 Ukraine

Adherence of Internally Displaced People to the WHO-supported tuberculosis-control program in the Oblast Ternopil of Ukraine

Philipp Endler

BACKGROUND. Tuberculosis (TB) is the second deadliest infectious disease worldwide, causing around 1.4 million deaths every year. Among European countries Ukraine is the most plagued in relative terms with around 70 cases per 100,000 population. This circumstance is amplified by the ongoing invasion war caused by Russia. The war leaves thousands of people internally displaced (IDPs) in often precarious living conditions with reduced access to health care services. Recent evidence suggests that wartime circumstances and the implied violence put health systems under immense stress. This supports disease spread and endangers treatment continuity. As treatment adherence is a key factor of effective treatment, the question arose as to how impactful the wartime conditions are to the adherence of IDPs and how they might influence the adherence behavior.

CURRENT STATE OF EVIDENCE. The author found no evidence that fit the exact scope of this paper. However, this paper displayed four studies that were considered as fitting the closer proximity. These publications showed similarities in multiple aspects of the topic and supported the display of both the complexity of the issue this paper focused on, as well as its global dimension.

METHODOLOGY. Treatment and adherence data provided by the Ternopil National Medical University (Ukraine) was supplemented by a systematic literature research. This research was carried out in various large databases such as Medline's PubMed or Cochrane. It focused on combining medical subject heading terms with their respective entry terms using Boolean operators wherever feasible. While the researched data supported the "Current State of Evidence"-section, the pre-existing data from Ukraine was analyzed using the chi-squared test and Cramer's V. The Health Behavior Model (HBM) and Social Cognitive Theory (SCT) were used to discuss the findings.

RESULTS AND DATA ANALYSIS. In the process of examining the data from Ternopil, the author separated the data into three different groups: 1. Diagnose-related data, 2. IDP-attributable social factors and 3. IDP-non-attributable social factors- the second group was further split into 2a of confidently attributable and 2b of presumably attributable factors. The author solely carried out data analysis on groups 2a and 2b. Group 1 included data that could not be clearly linked to the IDP-status of a patient but appeared to be important information about the health of the cohorts. It was displayed as contextual data. As this did not appear to be

true about the third group, its data did not find consideration in this paper. The data analysis of group 2 found a statistically significant weak to moderate association between the IDP status of a patient and their adherence to treatment. As for further data that was considered attributable to the IDP status, only the difference between urban and rural population resulted to be weakly statistically significant to the IDP population.

DISCUSSION. Both theoretical approaches led to the hypotheses that the social environment and the wartime conditions are sizable influences on the adherence levels of patients. Furthermore, the inner judgement of the severity of a condition and the benefits of treatment were identified as important actors. Through the HBM the social environment was found to be of large influence for adherence. Utilizing its lenses the author focused on general social health aspects and the amounts of private social responsibility a person has. A high amount of private social responsibility, such as due to extensive family, may shift one's priorities towards others' well-being. In-turn, a lower amount of social responsibility likely causes a different perception of a health threat or treatment as a person may be able to focus more on their personal health. The discussion of SCT aspects resulted in the wartime conditions being considered a sizable influence. In this section the author focused on how the constant threat of

violence may impact the views on TB and treatment adherence against the disease. While the impact of these environmental circumstances appeared likely, the specific effect remained unclear. A patient that has witnessed the immense hurdles internal displacement presents people with may be appreciative of health care but may also underestimate the threat TB poses.

CONCLUSION AND OUTLOOK. There is a statistically significant weak to moderate association between the IDP status of a patient and their adherence to treatment. This research paper identified the social circumstances and wartime conditions as possible factors of sizable impact. Using the HBM and SCT, the research displayed a wide variety of details that likely impact a patient's decision to (not) pursue treatment. Furthermore, the author showed the sizable lack of research in the exact scope of the publication, as no fitting prior publication was found despite a systematic search through millions of publications. Hence, there is an imminent need to examine the (treatment) adherence of TB patients and IDPs under wartime circumstances, as these issues affect countless people around the world. The scarcity of resources to fight potent health threats is not only reserved to conflict settings however, which is why improvements on care with the fewest of resources should be of global interest. This paper attempted to take a first step towards such improvements in a tiny section of this global issue. —

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#10.5 Ukraine

Value of Dream Therapy to Reduce PTSD-Induced Substance Abuse in Ukrainian Teen Refugee Girls: A Literature Review

Tracey Pierog

ABSTRACT. Recent conflicts and political unrest have revealed the weaknesses of accessing effective mental health treatments and programs for victims of such turmoil. This paper explores current research on the value of dream therapy to address PTSD related substance abuse among teenage female Ukrainian refugees. The Ukrainian population has a hesitancy around seeking professional mental health assistance and feelings of shame toward using it. It is important to consider the ancient Slavic and Ukrainian legends and folklore and why this makes this population open to considering dream therapy as a viable mental health option. The Ukrainian refugee population hasn't been able to effectively meet their mental health needs, as they, along with governments and international organizations, have prioritized immediate physical needs like food, water, clothing, and shelter. Drinking alcohol is normalized in Ukrainian culture, and alcohol use and abuse is prevalent, especially among teenage girls. Dream therapy is beneficial in places where PTSD medications may be delayed or not available due to conflict or natural disasters, and focuses on treating a cause, not treating a symptom. Dream therapy is a form of self-analysis and requires a collaborative relationship between dreamer and therapist working to identify significant

themes or symbols within the dream or nightmare. Ideally, to be most effective, it is essential that the dream therapist is well acquainted with Ukrainian culture, customs, history and collective psychology. Presently, treatments for PTSD and its major symptom, nightmares, include psychotherapy techniques such as CBT as well as medications.

Dream therapy for this population has the potential to address long wait times when refugees need mental health. Mental health has a big impact on the general health of a person, yet in SDG 3, mental health is stated as an afterthought, being referred to within the broad term, "wellbeing" along with management of communicable diseases. The numerous healing benefits and efficacy of dream therapy demonstrate its value in providing positive outcomes to Ukrainian teen girl refugees and managing their mental health and illuminates clues to the Value of Dream Therapy to Reduce PTSD-Induced Substance Abuse in Ukrainian Teen Refugee Girls.

INTRODUCTION. Recent conflicts and political unrest have revealed the weaknesses of access to effective mental health treatments and programs to victims of such turmoil. The conflict between Russia and Ukraine has displaced one in four Ukrainians, more than half

of Ukraine's children, and it is predicted that over half the population of Ukraine need some form of psychological support (UNICEF, 2022). As conflicts progress from full-scale wars to devastation of communities, then the rebuilding of those communities, populations experience anxiety, depression and post-traumatic-stress-disorder (PTSD) because in the moment they suppress their emotions. PTSD is not well understood by the general population, and it is complex to treat.

Research has demonstrated that PTSD and other consequences of trauma in civilians, specifically refugees, survivors of torture, and first responders are all severely impacted by such events.

Mental health has a big impact on the general health of a person, yet Sustainable Development.

Goal 3 merely mentions mental health as an afterthought, within the broad term of "wellbeing" along with management of communicable diseases (Dybda, 2017).

The "Russian invasion of Ukraine led to devastating death, injuries and one of the largest refugee crises in modern times" (Javanbakht, 2022). The Russian-Ukrainian conflict has displaced over 6 million Ukrainian refugees, 70.2% of which are female, and the median age is 25 years old. Of the refugees displaced from Ukraine, 1.8 million are children (Piper, 2024). The wave of Ukrainian refugees trying to make new homes for

themselves are more focused on their immediate health needs. Additionally, most governments and aid agencies try to meet the immediate physical needs of refugees as a priority (2023). Despite the rising demand for mental health treatments, there is a shortage of mental health services for refugees, long wait times to access them and this puts the Ukrainian teenage female refugee population at risk for turning to substance abuse to drown out a common symptom: nightmares. Adolescent Ukrainian female refugees are a population at risk of experiencing PTSD, but are often forgotten because of their age, and difference in presentation of symptoms. At the same time, they are influenced by peer pressure to experiment with substances (Vitruk, 2023). Ukrainian teen girl refugees are especially at risk as they may experience short term relief from nightmares by substance use and abuse, but this can lead to harmful addictions. In what follows, literature will be explored on dream therapy as a viable alternate or supplemental intervention in a population hesitant of conventional medicine and for whom there are access issues. Based on the literature, consideration is also given to the ways in which this option aligns with Ukrainian folklore traditions. The paper will conclude with how it can be utilized as a complementary treatment while refugees wait for more formal mental health treatment. Therefore, this paper investigates the

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value of dream therapy to reduce PTSD-induced substance abuse in Ukrainian teen refugee girls.

DISCUSSION. Dream Therapy: Sleep, Dreams and Dream Therapy:

Good, restful sleep is one of the most important necessities for normal human functioning and overall well-being (Verma, 2014, 2023). Despite claims of people saying they never dream or don't recall their dreams, everyone does in fact dream around 3–6 times on average, every night. We forget about 95% of our dreams by the time we wake up, mostly because of shifting hormone levels during REM sleep and upon waking. Most dreams last around 5–20min, and researchers have suggested they play a role in how we learn, retain information and help us to formulate long-term memories. There is an interesting relationship between the "density of brain matter in medial prefrontal cortex and ability to recall dreams" and those with "more white matter density in this brain region tend to have higher levels of dream recall" (Hill & Knox, 2010). This is noteworthy because children exposed to war trauma retain physiological changes in the brain's gray matter, which can affect their mental health for years to come (Cimeša et al, 2023). Following a traumatic event, a person may experience distressing dreams related to the incident as their mind seeks to process the event and heal. Since dreams play a role in memory consolidation, enhance

recall, creativity, and problem solving, something needed as refugees resettle in a new host country, good sleep is essential (Verma, 2023, 2014). If you can't sleep well, it will be more challenging to fit in, and pressures may cause addictions with substances like alcohol, drugs or sleeping pills to stave off nightmares or manage poor sleep.

Dream therapy is a form of self-analysis and requires a collaborative relationship between dreamer and therapist working to identify significant themes or symbols within the dream or nightmare. A vital dream analysis component is free association analysis which is used to uncover repressed feelings that may be hidden in dreams. Together with trained, trauma-informed specialists, dream therapy can potentially bridge the gap of long wait times for more formal treatments and guide the patient through their journey of recovery. Dream therapy can be complementary and even preferable to pharmaceuticals in mild and moderate cases, as it is mental work and doesn't involve swallowing another substance that may become addictive or abused by the patient. Dream therapy techniques are relatively easy to learn, and trauma victims tend to prefer this kind of therapy as it is perceived as less threatening than reality (Cohen, 1999). Furthermore, since "there is typically a delay of around 9 months or more from arrival into a host country to starting to engage in mental health

services" (Vitruk, 2023), dream therapy proposes an alternate or supplemental treatment technique that is effective for treatment of PTSD (Schubert & Punamaki, 2016) and substance abuse (Lea, 2019). Since it is a highly personal and self-directed therapy, it can be utilized as a complementary treatment while refugees wait for more formal mental health treatment.

UKRAINIAN DREAM CONTEXT. Ideally, to be most effective, it is essential that the dream therapist is well acquainted with Ukrainian culture, customs, history and collective psychology. Ukrainian dream content needs to be well understood within the country's political and cultural context, as these are the elements that create the backdrop to dreams. Ukraine's history within the Soviet era was dominated by an overarching communist philosophy (Taitz, Kozmova, Krippner & Tartz, 2021). The Soviet regime imposed "socialist realism, the officially authorized culture of censorship" (Taitz et al, 2021). The goal was to restrict free speech, free thoughts and behaviors in order to re-educate the population to believe a select version of what the government wanted you to do, say or think.

Propaganda at the time was brutally oppressive and totalitarian, and the creation of "the new Soviet man", who was a perfect member of communist society and forgot, completely, their Ukrainian identity. Dissenters were silenced by

cruel imprisonment in isolated gulags, being abandoned to mental institutions or put in jail. The Soviet mentality sent the message that "cruelty is the highest form of humanism because it can force an individual to change and accept the goals of the collective in spite of his own personal will" (Taitz et al., 2021).

Ukrainian identity and Ukrainian psychology are therefore, "powerfully informed by a history of oppression, subjugation and genocide" (Taitz et al, 2021). It can be proposed that dreams are impacted by these prevailing societal ideas, and the battle between the individual versus the collective ideology, and the relationship of philosophy and psychology of life including these dominant, subdominant or opposing belief systems.

Ukrainian identity is also tied to the geography of the homeland: the steppes, the sunlight, and the ideal of "mother earth", "hospitality, agriculture, and respect for a person's dignity and private property" (Taitz et al., 2021). These ideals, treasured by the Ukrainian population, did not mesh with Soviet and then Russian ideologies that valued the collective over the individual. For "individuals living in any culture, dreams can reflect individual and collective "ways of life," a unique approach to life intertwined with past and present cultural and socio-political zeitgeist" (2021).

GENDER DIFFERENCES IN DREAMS. There have been reported differences bet-

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ween the genders when it comes to mental health symptom presentation, and likewise there are differences between the genders when it comes to dreaming. Considering the Ukrainian teenage girl refugee population, and these differences, it is important for future researchers to take special note of them. For example, it has previously been suggested that women and teenage girls are more likely to dream and recall dreams and nightmares more than male counterparts, which is related to the female hormone cycle, making women poor sleepers and more active dreamers than males (Protic et al., 2023). It has been suggested in the past that women are better able to recall dreams, and also reported more dream experiences of physical aggression and bodily harm than males. Women also report more nightmares than men, spanning across numerous geographic and cultural contexts (Gill et al, 2023). More conclusive research needs to confirm these suggestions, as it may be that women are just more likely to share and report their dreaming experiences.

Additionally, the content of dreams has been thought to differ between the sexes; men can be more likely to dream of themselves as befrienders and defenders, they dream more of aggressive interactions with other men as characters and tend to have more amiable interactions with female characters. To contrast, women can dream more often of being friendly, they

are reported to dream equally about male and female dream characters and tend to have more dreams with rejection, anxiety and exclusion themes. This could potentially speak to the social roles of men and women in society, specifically to Ukrainian men being closer to battle action than women, and Ukrainian women needing to rely more on social networks to survive if displaced or making a home in a new country (Taitz [et al.] 2021).

NIGHTMARES, CLINICAL APPROACHES AND TYPES OF DREAM THERAPY.

When clients seek help for mysterious, terrifying, recurrent dreams, therapists need to be open to this sharing to gain trust. Dreams are a valuable tool that illuminate both the conscious and subconscious parts of the mind, while providing a level of distance and sense of safety for the dreamer to feel comfortable sharing. Hill & Knox report that if a client does disclose a dream to a therapist, it is a good sign, as the patient will tend to "engage deeper and for longer than regular Cognitive Behavioral Therapy (CBT) treatments" (2010). It is necessary for therapists to feel both comfortable and competent working with dreams and dream interpretation in psychotherapy sessions. Within clinical approaches to dream therapy, the therapist and client engage in a process of co-creation to determine the meaning for the dream. The therapist does not dictate what

the dream means to the dreamer, but rather supports the client to decide for themselves what significance the dream holds. This is especially emphasized in the dream therapy world by beginning any comment of observation about the dreamer's dream by prefacing it with the statement, "If it were my dream...", as not to imprint the therapist's projections onto the dreamer. Dream therapy is empowering because the dreamer is considered the expert of their own dream, and the therapist is placed in a supporting role. This gives some of the power back to the patient, allowing for gentle cultivation of self-confidence and mastery.

NIGHTMARES. Nightmares are a risk factor for PTSD and can be present even after successful treatment of PTSD. Many therapists are advocating for the screening of nightmares to assist with diagnosis and treatment of PTSD and other mental health problems (Gill et al, 2023). Pathological nightmares are dreamed at least once per week, are clearly remembered, cause rapid awakening and mood, sleep, and behavioral problems (2023). PTSD-related nightmares are a distinct subset of nightmare disorder, with emerging evidence of possible genetic components. There are also associations with neuroticism as well as traumas. Research on nightmare experiences in the general and refugee child and teen populations are limited, even though

children and teens are believed to have a similar prevalence of nightmares as adults. Nightmares have been known to increase the risk of suicide in depressed patients, and risk can be exacerbated in teens experiencing hormonal changes. These are even more profoundly acute in teen refugees who have also experienced trauma of war and of feeling like they don't fit in in the new host country. In children and youths exposed to war traumas, major themes in nightmares are mainly associated with significant suffering (2023). The most regularly reported themes in this populations' nightmares are fear: 77%, grief – 20% and hopelessness 19% (Gill et al, 2023). Compounded with the long wait for mental health resources, and the fact that they may not be able to advocate for themselves, nightmares stemming from PTSD are a serious mental health issue. PTSD-induced nightmares are further associated with interpersonal violence and have the potential to increase the chance of having a psychiatric illness five-fold. With all these psychological risks and the association to PTSD, and further ties of PTSD to Ukrainian refugees, more evidence-based treatment for nightmares especially in teens and children are needed. While there is new and emerging evidence that self-guided and brief treatment techniques like dream therapy can be efficient and effective, there is still an urgent need for clinical trials of

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this kind of treatment to prove efficacious with children and teen cases (Gill et al., 2023). Early findings suggest that holistic, psychosocial modalities like CBT, dream therapy techniques and art therapies, have the potential to be helpful in managing both idiopathic and PTSD-related nightmares, but more research and further trials are needed.

CLINICAL APPROACHES. Dreams reflect the dreamer's self-concept, worldview and perceptions of the future. The growing interest in the clinical use and management of dreams, along with the increase in research regarding therapeutic use and efficacy of dream work techniques has been integrated in a few different clinical approaches, such as CBT. Cognitive therapists have expressed interest in integrating dream content into their regular practice. CBT as well as dream therapies like Imagery Rehearsal Therapy or IRT are the current standard for effective treatment of nightmares. There is room for discussion of dreams within CBT and can reveal the way they perceive reality.

There are many types of dream therapies as well as many different approaches to dream therapy and this is ideal, as with something as subjective as dreams, there shouldn't be a cookie cutter approach. Cultural relativism and the subjective nature of dreams remind us that everyone is different and should be approached as a unique individual. The bene-

fit of multiple types of dream therapies is the fact that they can work together or separately, and can be combined with art therapy, movement therapy or other alternative, creative interventions. For the most part, each therapy, at its core, encourages the dreamer to participate in self-reflection, and this provides insight from the dream, and then this insight reframes how the dreamer views the dream, and can assist in building tools, techniques and resilience into the waking life of the dreamer.

TYPES OF DREAM THERAPY.***Psychoanalysis***

Derived from Sigmund Freud, psychoanalysis involves discussing the manifestations of the dreamer's unconscious desires. The manifest content refers to the dream remembered, and the latent content refers to the symbolic meaning of the dream. This modality is therapist led, as the therapist explores and deciphers the manifest content. The therapist facilitates this exploration of the dream, or repressed material by utilizing free association (Freud, 1900).

Jungian Analysis

Jungian Analysis also deals with the unconscious symbolism and storytelling of the dream. This method is related to Freud's psychoanalysis; however, the dreamer takes more of an active role in deciphering the dream's meaning. Unique to Jungian analysis are amplifications, which include examining the dream

through the lens of the personal, the cultural and the archetypal (Hill & Knox, 2010).

Gestalt Therapy

In this therapy, dreams are taken as messages sent from ourselves to ourselves. The dream material is fully and actively investigated (Hill & Knox, 2010). Once the message is discovered, it is then fully integrated into the dreamer's real life. The dreamer can pantomime the main events of the dream, which can allow the dreamer to perceive the dream action from different perspectives. Acting out the dream also allows for further clarification of the dream message, as well as more insight into the message.

Existential Art Therapy

In Existential Art Therapy, it is possible to explore the dream through the lens of the dreamer's lived existence and art is used as the medium to do so. Within this therapy, the therapist acts mainly as an engaged audience for the dreamer's engagement with their dream material (Hill & Knox, 2010). This provides an opportunity for self-discovery. The main goal is for the dreamer to focus on their search for meaning, and the therapist again acts as facilitator or engaged bystander. The therapist does not make any direct interpretations.

Imagery Rehearsal Therapy (IRT)

Image Rehearsal Therapy (IRT) has been shown to be especially effective in treating trauma patients who experience nightmares. It has "reduced nightmare

frequency and intensity and improved sleep quality in trauma patients such as those who experienced sexual assault, and adolescent girls in residential facilities, crime victims with PTSD, and nightmare patients" (Hill & Knox, 2010). The beneficial outcomes have been known to lessen symptoms of anxiety, depression and PTSD, and are reported to last longer than 3 months. Furthermore, "70% of clients reported clinically meaningful improvements in nightmare frequency, increasing to 90% when clients regularly used techniques for 2–4 weeks, albeit best for those who do not exhibit major psychiatric distress or disorders" (Krakow and Zadra, 2006).

Lucid Dreaming Therapy (LDT)

LDT trains dreamers on how to make their dreams lucid, or sense that they are dreaming while they are dreaming. This presents the dreamer with the suggestion that they can control the storyline and content of their dreams. As soon as the dreamer is aware they are dreaming, they are trained to change the predictable plot of their nightmare and subsequently are successful in preventing the nightmare from happening. LDT works by activating the "frontal lobe which inhibits the limbic system in the brain; the limbic system is associated with emotions, thus, suppression of the limbic system by frontal lobe activation in LDT could decrease both frequency and intensity of nightmares" (De Mace do et al., 2019). LDT "encourages 'this is

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just a nightmare, there is no real threat' and this plays a role in modification of beliefs, decrease arousal, and prevention of avoidance, developing critical thinking over dream content" (De Macedo et al., 2019). LDT techniques have been found to be so effective that there are currently multiple research studies being done on how to develop technologies or techniques on how to reliably recreate a lucid state while dreaming in lab settings specifically for therapy.

Strengths of Dream Therapy

Dream therapy is beneficial in places where PTSD medications may be delayed or not available due to conflict or natural disasters, and focuses on treating a cause, not treating a symptom. The benefits of dream therapy extend beyond PTSD and substance abuse to include increasing personal insight and resilience, effective and creative problem solving, and can assist with coping with stress, anxiety, and trauma by exploring scenarios in a creative and safe space (Ellis, 2023).

Additional benefits of dream therapy include conscious and subconscious balancing, insight into the dreamer's mood, which is key for psychological assessment. Dream therapy assists in addressing themes in common nightmares with the capability to "re-write" nightmares. It is a positive self-care approach, bringing the dreamer a sense of internal conflict awareness, which can help them with dealing with their trauma

(Ouchene, Habchi, Demina, Petit & Trojak, 2023). More reported benefits are marked reduction in PTSD symptoms including increased feelings of empowerment and control, integration of trauma and improved sleep quality (Yount, 2022). An example of positive health outcomes from working with dream therapy, specifically LDT are demonstrated in the six-day online LDT program developed by creator and dream expert, Charley Morely. Participants were guided through a range of "techniques and practices" and after 6 days, 85% of participants were "no longer classified as having post-traumatic stress disorder" and saw a vast improvement in their PTSD symptoms (Ouchene et al., 2023). These improvements continued after three weeks, and the frequency of nightmares and distress decreased as well (2023).

Dreamwork can assist with gaining self-awareness and can improve mood and overall well-being. This therapy could be uniquely attractive to the Ukrainian teenage girl refugee population, as after a few sessions it can be largely self-directed. Teen girls can be taught to do this therapy on their own after a few sessions and are empowered to use the techniques when they need them, wherever they go. These techniques are used with soldiers, and war veterans to "gain insight into emotional factors related to their dreams and may help the soldiers begin to feel less threatened by the sometimes disturbing images and

ideas contained in the dreams" (Carter, 2012). This could also prove beneficial to Ukrainian teen girl refugees for similar reasons.

Limitations of Dream Therapy

Dream therapy assumes that people will find meaning in their dreams, and that symbology will be helpful in dealing with the subconscious. The participants will have to be trained to dream and recall the details of their dreams, which may take a long time. While research in this area is growing and emerging, many gaps remain, especially with children and teens, both generally and the refugee population. For the best efficacy, there will need to be highly skilled, trained professionals that are trauma informed and speak the same language as the dreamer, yet there are currently staffing shortages in psychology and other mental health specialists. There may be extensive costs and long training times to train leaders to guide dream therapy specific to each situation. The dream therapist will also need to be either from the same community as the participant or be very well versed in the cultural context of the participant. Another limitation is that the participants will have to be trained to dream and recall the details. Despite the limitations that this therapy may benefit some and help alleviate stains on an already taxed system, it is enough of a justification to support this intervention as an option.

CURRENT TREATMENT METHODS FOR PTSD IN TEENS.

Presently, treatments for PTSD and its major symptom, nightmares, include psychotherapy techniques such as CBT as well as medications (Danzi et al., 2021). Further, trauma-focused psychotherapy is recommended especially in initial treatments for children and teens, which is preferred over "other forms of psychotherapy or medication management alone" (2021). Medications are recommended for children and teens with severe symptoms, and depending on the case, "pharmacologic management" may serve as "an alternative initial treatment" (2021). Medications also serve to address "comorbidities such as sleep disruptions, intrusive recollections, hyperarousal, or reactive behaviors (eg, aggression, outbursts)" (2021). In areas that are unstable due to conflict, such as war zones in Ukraine, a steady supply of both trauma-informed mental health specialists, mental health specialists and medications are limited, inconsistent or non-existent. Children and teen refugees additionally face access issues to such treatments.

Recent reviews of the existing evidence-base for the treatment of PTSD in children and adolescents identified trauma-focused cognitive behavioral therapy (TF-CBT) and cognitive behavioral therapy (CBT) as well-established treatments. Research in this area, however, remains minimal, despite the importance of research on treatment moderators "for guiding clinical decision-making around selecting treat-

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ments that might be most effective given the characteristics and circumstances of a particular child or adolescent" (Danzi et al., 2021).

Literature on dream therapy proposes an alternate or supplemental treatment technique that is effective for treatment of PTSD (Schubert & Punamaki, 2016) and substance abuse (Aizenstat, 2019), and since it is a highly personal and self-directed therapy, it can be utilized as a complementary treatment while refugees wait for more formal mental health treatment. "...[T]here is typically a delay of around 9 months from arrival into the US to starting to engage in mental health services" (Vitruk, 2023).

Dream therapy, including "Lucid dreaming therapy (LDT) could broaden the existing approaches in nightmare management. Indeed, LDT is suggested by previous studies as an efficient nightmare treatment with an even larger field of action" (Ouchene et al., 2023). Since nightmares are the most common symptom of PTSD, it makes sense to incorporate methods such as LDT which are easily teachable, and effective in treating PTSD related nightmares. The fact that it also comes with several positive effects on other sleep variables such as "sleep quality, daytime sleepiness and quality of life" make this treatment one to consider for this population (Holzinger, Saletu & Klösch, 2020).

OUTLOOK. Dream therapy for this population has the potential to address long

wait times when refugees need mental health. Ukrainian teen girl refugees could start dream therapy right away to help bridge this gap, as it is highly teachable and can be largely self-directed in mild and moderate cases. This may help the barrier to accessing mental health services, as this population hasn't been able to effectively meet their mental health needs because immediate physical needs like food, water, clothing and shelter have been prioritized (Vitruk, 2023).

There are various types of dream therapies, as previously mentioned, and this variety supports tailoring the therapy to the client. Dream therapy can be provided in one-to-one settings, in groups, in person or online. Working with dreams in a clinical setting allows for rapid access to issues that are most pressing to the client, and the dream therapy approach is uniquely designed to be client driven. For a population historically subjected to oppression and control over free speech and thought, dream therapy empowers its participants with exerting control over the session and helps to cultivate self-advocacy (Pesant & Zadra, 2004). Moreover, having one's own dream as the subject of interpretation has a valuable impact on session outcomes - it enhances the client's engagement in therapeutic sessions, often encouraging clients to increase their commitment to, and participation in, therapy. Dream therapy also provides a safe en-

vironment that helps overcome client's defenses, which is especially needed in this population. Using an intersectional lens, using dream therapy feels safer for the PTSD patient to discuss their nightmare versus opening up about their personal trauma, and using dream therapy also feels safer for the teenager, as they can limit how much of themselves, they share with adults, while still feeling as if they can control the situation.

Research has pointed out that trauma victims who are able to work with their dreams are able to "bypass fear of losing control by revealing themselves and thus help them discuss issues, concerns and conflicts that they would normally have avoided" (Pesant & Zadra, 2004). This suggests dreamwork can be beneficial in building trusting relationships even when clients are initially distrustful of the therapeutic process, which is a barrier of the Ukrainian population at large. Trauma victims using dream therapy are more open to discussing painful or distressing issues because "when approached through dreams there is an extra layer of distance and safety," as "dreams are not real, and it creates a distance between the dreamer and the material, and emotions evoked by the dream" (2004). Studies have noted that the negative emotions and social interactions present in dreams are perceived by the dreamer as less threatening than waking life experiences are, again making dream therapy an appropriate and

helpful tool for this population (Pesant & Zadra, 2004).

DREAM THERAPY'S GREATER SIGNIFICANCE IN GLOBAL HEALTH.

Dream therapy to treat PTSD-related substance abuse has world-wide merit. This paper has endeavored to demonstrate dream therapy's contribution to research and value in the therapeutic process of addressing PTSD-related substance abuse in the Ukrainian teen refugee girl population. However, dream therapy delivered in this manner can "potentially be generalizable to other post-soviet or even post-oppression populations" (Taitz et al., 2021). Future and continuous research on the effect of international conflict or disaster on a nation's mental health illuminates both the negative impact of such conflicts and the need to better address the mental health of the populace.

Dream therapy as a mental health intervention addresses SDG 3.4, health and well-being, or mental health (Dybdahn, 2017). Utilizing dream therapy as a tool to address mental health in a global context implies belief that dreams are somehow psychologically meaningful, and thus have clinical value. (Pesant & Zadra, 2004). "Empirical studies have shown that the content of everyday dreams can be related to dreamers' waking concerns and that occurrences of specific types of dreams like nightmares are related to one's psychological well-

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being, which supports the view that dreams are a valid topic of scientific interest for researchers and of clinical interest to clinicians" (2004).

While there are contextual differences between host countries that affect refugees' mental health post migration, dream therapy can be adapted to various refugee groups, and is in its nature, accessible to everyone, as everyone dreams. Cultural symbols and context can be adapted to each group (Schubert & Punamaki, 2016). In addition, this therapeutic intervention can be adapted to adults and other populations that experience PTSD such as those that experience natural disasters, veterans, indigenous groups or those involved with intimate partner violence.

Of note for the healthcare systems of host countries, there is often a "major

burden of inadequate access to trauma experts fluent in the culture and language of refugees" (Taitz et al., 2021). Alternative and more creative group-based interventions have been recommended more and more to be "used especially for those with subthreshold symptoms without the need for a high level of training for providers" and "can be more interesting and welcoming to teens as well" (Pesant & Zadra, 2004). The flexibility and diversity of dream therapy may be able to "overcome logistics, knowledge and cultural barriers and stigma in dealing with various levels of trauma impact, expectations, and needs" (2004). Lastly, approaches like dream therapy can have a transdiagnostic impact by reducing stress and improving coping skills in dealing with post migration stress (Taitz et al., 2021). —

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#10.5 Ukraine

Value of Dream Therapy to Reduce PTSD-Induced Substance Abuse in Ukrainian Teen Refugee Girls: A Literature Review

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6TH INTERNATIONAL YOUNG RESEARCHERS' SYMPOSIUM ON GLOBAL HEALTH

October 12th & 13th, 2024
– Satellite Symposium of the World Health Summit 2024

Venue: Akkon University of Human Sciences
Colditzstr. 34–36, 12099 Berlin, Germany, SR 4/5, 1. floor
& virtual (<https://johanniter-de.zoom.us/j/87625665418>)

INTRODUCTION

The Institute for Research in International Assistance (IRIA) works on various projects for the improvement of health care in different settings. For this, many international collaborative projects have been established. In order to bring together its partners for a scientific exchange, a platform for young researchers has been launched that is now preparing for its 6th symposium. IRIA welcomes young researchers in various fields of global health both on site and virtually connected at the 6th symposium.

It is planned to publish all contributions in Akkon University's Schriftenreihe as a compendium.

PROGRAM OCTOBER 12TH, 2024

12:30 h Registration
(CET)

13:00 h **Introduction & Welcome**
(CET)
Benjamin Kobelt,
CEO Akkon Hochschule gGmbH
Prof. Dr. med. Dr. PH Timo Ulrichs,
Vice President Akkon University,
Director Institute for Research in
International Assistance (RIA),
Head of Study Program Global Health &
Int. Disaster and Emergency Relief
Selamawit Woldai,
Federal Ministry of Health
Fareeha Armughan PHD, Islamabad, Pakistan
Sustainable Development Policy Institute (SDIP)

13:30 h (CET)	<p>International Young Researchers' Presentations</p> <p>Facilitators: Mathias Bonk, Omar Sahrai, Gaby Feldmann, Timo Ulrichs, Fiona Morrison, IRIA/Akkon University of Human Sciences [order of contributions may change]</p> <ul style="list-style-type: none"> Canada – McMaster University Tracey Pierog: <i>Value of dream therapy to reduce PTSD-induced substance abuse in Ukrainian teen refugee girls</i> Indonesia – Universitas Indonesia Ardiana Kusumangrum: <i>Indonesian Brain Infection Study: Microbiology Perspective</i> Indonesia – Universitas Indonesia Farida Dwi Handayani: <i>Leptospira spp. Isolated from Patients and Rats in Semarang and Demak, Central Java, Indonesia: Implications for Public Health</i> Indonesia – Universitas Indonesia Isti Anindya: <i>Cytomegalovirus elevates IL-6 and IL-1β levels, affecting sensory profiles and eating behaviors in children with autism</i> Kenia – ISA/IRIA fellow Sally Bahati Masha: <i>The Moran mapping project – Working with Maasai men on HIV prevention</i> Jamaica – Mico University College Shellon Samuels-White: <i>Exploring Post-COVID-19 School Leadership: A Case Study of Five Jamaican Principals' Approaches to Supporting Student and Teachers' Mental Health and Well-Being</i> Jamaica – Mico University College Fabian Miller: <i>Variations in Hormonal Status Among College Athletes in Jamaica: Insights into HGH, DHEA-S, Estradiol, and Testosterone</i> Mexico – Escuela de Estudios Tecnicos de Enfermeria, (online) Perla Lizeth Garcia Morales: <i>Effect of family environments and assertiveness on self-care behavior in older adults</i> Antigua – American University of Antigua, College of Medicine (online) Nathalie Camacho: <i>Polluted Pathways: Unveiling the Role of Pharmaceutical Waste in Antibiotic Resistance – A One Health Perspective</i> 	<ul style="list-style-type: none"> Georgia – European University, Tbilisi Ana Enukidze: <i>A global migration of healthcare workers, the resulting losses and benefit</i> Georgia – European University, Tbilisi Janis Khan: <i>Disordered Eating Pattern and the Spectrum of Eating disorders among medical students (a cross-sectional study)</i> Georgia – Petre Shotadze Tbilisi Medical Academy Nino Gagua, Dr. Maka Maglakelidze: <i>Through the Lens of a Camera: Exploring Health Determinants in Rural Settings with Medical Students</i> Ukraine – Lutsk National Technical University Olha Bukareva, Viktoriia Komarchuk: <i>Mental Health of the Population in the Volyn Region during Wartime</i> Ukraine – Ternopil National Medical University Shandra Yulia-Maria, Fedyshyn Liliya: <i>Emotional burnout of volunteers during the time of the full-scale invasion of Ukraine</i> Ukraine – Ternopil National Medical University (online): Bilyk Yaroslav: <i>Epidemiological characteristic, ecological and biological peculiarities of Lyme borreliosis in Ukraine</i> Yemen – Hadhramout University (online): Abdulla Mohammed Bagahizel: <i>Exploring the efficacy and feasibility of telehealth training for capacity building in area of Yemen</i> Pakistan – University of Lahore (online): Taimoor Riaz ullah: <i>Psychological Impact of Treating Suicide Bombing Victims on Emergency Medical Personnel in Teaching Hospitals of Peshawar: A Focus on Post-Traumatic Stress Disorder</i> Pakistan – University of the Punjab Dr. Muhammed Zeshan Ashraf: <i>Enhancing Public Health and Environmental Sustainability through Cycling Culture: A case study of Mall Road, Lahore</i> Pakistan/Germany – University of Lahore, Superior University, Akkon University/IRIA, University of Bayreuth Sameen Hanif (online), Maryam Khalid, Lena Koch: <i>Raising Awareness for Fighting Cervical Cancer among Adolescents Girls: A Pilot Project in Pakistan</i> Germany – Akkon University for Human Sciences/University of Lahore, Pakistan (online): Clara Dannenberg, Dr. Esther Mönning: <i>Engagement Global ASA-Program 2024: Empower her – Bridging Reproductive Health in Rural Pakistan</i> Germany – University of Applied Sciences Fulda / Unified Health e.V. Philipp Endler: <i>Adherence of Internally Displaced People to the WHO-supported tuberculosis-control program in the Oblast Ternopil of Ukraine</i>
17.00h	Virchow Prize Ceremony	
20.00h (CET)	Great Ceremonial Hall of the Red City Hall Rathausstr. 15, Berlin, 10178 Germany (on invitation), networking	
PROGRAM OCTOBER 13TH, 2024		
9.00h (CET)	<p>International Young Researchers' Presentations</p> <p>Facilitators: Mathias Bonk, Omar Sahrai, Gaby Feldmann, Timo Ulrichs, Fiona Morrison, IRIA/Akkon University</p> <ul style="list-style-type: none"> Armenia – European University Gagik Derkhortyan: <i>The Influence of war on Mental Health Issues in Armenia</i> Azerbaijan – Western Caspian University Orkhan Majnunov: <i>Approaches of protecting the child's psychological health in incomplete families</i> 	

#11 Yemen

Exploring the efficacy and feasibility of telehealth training for capacity building in Yemen

Abdulla Mohammed Bagahizel

INTRODUCTION. Healthcare systems in low-income countries, such as Yemen, are constrained by significant resource limitations, including shortages of medical personnel, insufficient equipment, and limited access to essential healthcare services. This pilot intervention explores the efficacy and feasibility of telehealth-based training programs to enhance healthcare capacity in Yemen.

Material and methods:

Specifically, this intervention introduced Point-of-Care Ultrasound (POCUS) training in two public hospitals in Mukalla, Hadramout, delivered through a structured telehealth curriculum on the GUSI educational platform. The training included online theoretical modules, weekly live practical sessions, and hands-on scanning exercises. Key outcome measures included knowledge improvement, skill acquisition, patient care outcomes, participant satisfaction, and technological challenges.

Results and discussion:

The program successfully graduated 18 trainees, who collectively conducted 620 patient scans. These scans enabled

222 critical diagnoses, including 21 cases of intraabdominal bleeding and 106 cases of bacterial or viral pneumonia, potentially life-saving interventions. Quantitative analysis demonstrated a statistically significant increase in trainee knowledge and skills, with paired t-test results ($p = 0.003$) confirming improved post-training assessment scores. Moreover, 81% of participants reported enhanced patient management practices following the training. These findings suggest that telehealth training effectively supports clinical skill development and improves patient outcomes in resource-limited settings.

Outlook:

This pilot highlights telehealth's capacity to bridge geographical and resource gaps in healthcare access, advocating for broader telehealth implementation as a transformative approach to healthcare capacity building in underserved regions.

KEYWORDS. Telehealth, Capacity Building, Yemen, Point-Of-Care Ultrasound, Healthcare Training —

AUTHOR

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Future minds in global health – The International Young Researchers' Symposium on Global Health 2024

Global health in the network of international research collaborations

The International Young Researchers' Symposium on Global Health (IYRS) is organized annually by Akkon University of Human Sciences with its Institute for Research in International Assistance (IRIA) on the occasion of the World Health Summit in Berlin. It provides a unique platform for emerging global health talents to present their latest research and exchange ideas with experts and peers. At a time when health science and research are becoming increasingly dynamic and interdisciplinary, it is of the utmost importance to promote dialogue internationally. The contributions from young scientists not only reflect the current state of research, but also innovative ideas and fresh perspectives that will significantly shape the global health science of tomorrow. Mental health, telehealth, environmental sustainability, women empowerment, and infectious diseases - these areas are all crucial in today's world. This symposium highlights the importance of collaboration, creativity and critical thinking in science and provides a fascinating insight into the diverse fields of research that young scientists are advancing worldwide.

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