



VOLUME 1 | 2009

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# International Journal of Collaborative Research on Internal Medicine & Public Health



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# A Versatile Protein Scaffold for Biotherapeutics is Ferritin

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**Received:** 31-August-2022, Manuscript No. IJCRIMPH-22-76606; **Editor assigned:** 02-September-2022, PreQC No. IJCRIMPH-22-76606 (PQ); **Reviewed:** 10-September-2022, QC No. IJCRIMPH-22-76606(Q); **Revised:** 19-September-2022, Manuscript No. IJCRIMPH-22-76606(R); **Published:** 30-September-2022 doi: 10.35248/1840-4529.22.14.9.385

## Abstract

In almost all animals, there is an endogenous protein called the ferritin nanocage. The hollow spherical structure's capacity to naturally store iron ions has been used in a variety of bio-therapeutic research projects. The nanosized ferritin particles show controlled/sustained release pharmacokinetics and have outstanding biosafety characteristics. Additionally, the huge surface-to-volume ratio and the behaviour of the 24 monomer subunits breaking down and reassembling into a sphere allow for a variety of chemical and genetic alterations on the ferritin surface and inner cage. Here, we offer a critical analysis of ferritin and its uses. We offer an (i) overview of the use of ferritin in imaging and diagnosis for biomedical reasons, (ii) explore ferritin-based vaccinations, and (iii) examine ferritin-based agents now in clinical trials. We also introduce the application of ferritin in drug delivery. Ferritin is a versatile protein scaffold that exhibits enormous potential for drug development across a variety of categories, despite the fact that no pharmaceuticals based on it are currently approved, and ferritin-based medications have just recently begun phase I clinical trials. Researchers looking into ferritin and other protein-based biotherapeutics can profit and be interested right away from this rich shortlist of recent advancements.

**Keywords:** Biotherapeutic • Ferritin • Scaffold • Drug

## Introduction

The use of protein nanocarriers has significantly advanced both illness diagnosis and treatment. Their excellent qualities allow for a variety of alterations, such as surface functionalization, and they enable the quick dispersion of loaded pharmaceuticals because of their nanoscale size range. Additionally, protein nanocarriers have enhanced the pharmacokinetic characteristics and targeted distribution of therapeutic cargo. Additionally, because they leave the bloodstream somewhat slowly, controlled/sustained drug release is possible at specific locations. Diverse protein nanocarrier types have been highlighted for their inherent biodegradability and simplicity of genetic alteration in comparison to other forms of nanocarriers because of these benefits. Ferritin nanocages are highlighted in this review. Almost all living things include ferritin, which helps maintain the balance of iron in the body by storing and releasing iron ions. The nanosized ferritin particles show controlled/sustained release pharmacokinetics and have outstanding biosafety characteristics. Additionally, the huge surface-to-volume ratio and the ability of the 24 monomer subunits to disassemble and reassemble into a sphere allow for a variety of chemical and genetic alterations to the ferritin surface and inner cage. Researchers working on biotherapeutics have used its naturally occurring hollow spherical structure to store iron ions in a variety of ways.

Chemotherapeutic agents, genes, fluorescent compounds, and different peptides that have been exhibited on ferritin's surface are a few examples of medications and substances that have been loaded onto it. All delivery vehicles must continually work to improve the effectiveness of their medication loading, although different attempts have been made to load different, poorly soluble medicines into ferritin. Additionally, a distinguishing characteristic of ferritin in comparison to other particles is that the threefold symmetry axis of the ferritin structure has also permitted antigenic presentation in its proper conformation. The effectiveness of ferritin in numerous medical domains is summarised in this review. The main objective is to summarise the most intriguing recent and ongoing uses of ferritin in nanomedicine. Here, we provide a comprehensive assessment of ferritin and its uses, including (i) the therapeutic use of ferritin, (ii) its use in imaging and diagnosis, (iii) the use of ferritin-based vaccines in immunotherapy, and (iv) ongoing and upcoming clinical trials of ferritin-based medicines. Researchers looking into ferritin and other protein-based biotherapeutics can gain immediate benefit from and be interested in this summary of current advancements.

## Ferritins in biotherapeutics

Ferritin's hollow spherical core enables the loading of a variety of goods. Usually, the nanocage's disintegration and reassembly are mediated by pH or the mineral pores on the surface. The targeted delivery of chemotherapeutic drugs to tumours employing ferritin as a delivery vehicle has been the subject of numerous studies, mostly in anticancer therapy. *In vitro* and *in vivo* tumour growth suppression, better pharmacokinetic profiles, and fewer side effects were observed in the majority of these trials when compared to the free medication. The development of ferritin nanocages for application in medication delivery for cancer therapy has advanced significantly. In many mouse cancer models, doxorubicin-loaded ferritins have successfully inhibited tumour growth. In one instance, Transferrin Receptor 1 (TfR1)-overexpressing tumour cells targeted and internalised Dox-loaded ferritin to produce 10-fold greater intracellular amounts of doxorubicin than free doxorubicin. Additionally, in *in vivo* models, the paclitaxel encapsulation demonstrated strong induction of apoptosis in MDA-MB-231 breast cancer cells. This is an illustration of the delivery of an insoluble medication via ferritin, with the targeted treatment of tumour cells reducing the side effects of the chemotherapeutic agent. Gemcitabine was also loaded onto ferritin and delivered in conjunction with photothermal therapy, demonstrating the efficacy of this adjuvant treatment for breast cancer animals. Ferritin also successfully delivered cisplatin, which increased the therapeutic index of antitubercular therapy in an advanced, refractory melanoma animal. With some promising *in vivo* outcomes so far, ferritin's targeted delivery of chemotherapeutic drugs to cancer cells has improved therapeutic benefits for a variety of cancer types.

This has made it possible to use a variety of methods to display different immune-stimulating peptides on the ferritin surface for the creation of efficient immunotherapeutic drugs. This distinguishing feature of ferritin nanocages enables the one-step modification and distribution of a variety of peptides. For instance, the surface of ferritin's trimeric peptide display configuration enables the best delivery of TRAIL peptides. This apoptosis-inducing signal has been successfully delivered to ferritin nanocages' surface more than once. Through the constant proliferation of antitumour T cells, which was made possible by this study's attempt to stimulate the presentation of cancer cell neoantigens to the host immune system, an extremely intriguing and potent treatment strategy was produced. In addition to the experiments listed above, there are other intriguing ways to use ferritin. For instance, one study suggested co-administrating chemotherapy with thrombolytic ferritin that expresses multivalent clot-targeting peptides and fibrin degradation enzymes.

Similar to this, a study<sup>16</sup> employed Thrombin Receptor Agonist Peptide (TRAP) and PC-Gla to treat acute inflammatory sepsis *in vivo* mice models.

Another intriguing study used doxorubicin-loaded ferritin to show the phagocytosis-inducing peptide SIRP in order to produce an intrinsic vaccination effect. The simultaneous infusion of SIRP and doxorubicin, an Immunogenic Cell Death (ICD) inducer, achieved substantial tumour growth inhibition in a melanoma model and even against tumour rechallenge in a colon cancer model. This was made possible by the cross-priming of effector CD8<sup>+</sup> T cells.

### Ferritins in imaging and diagnosis

To create diagnostic agents for different imaging techniques, ferritin nanocages have been easily changed. When peptides on the ferritin surface are being targeted as disease indicators, fluorescent molecules can be added or loaded as cargo. The developed ferritin-based agents are listed below, and this would allow multimodal imaging approaches for ferritin-based agents with improved diagnostic accuracy. For the multimodal imaging of malignancies, magneto-ferritin probes with iron oxide and <sup>125</sup>I radionuclides on the ferritin surface were created. In addition, Huang et al. created a high imaging contrast near-infrared dye IR820-loaded ferritin for fluorescence and photoacoustic photothermal therapy. Gadolinium-loaded ferritin was created for contrast MRI in a different work by Crich et al., enabling the imaging of tumoral endothelial cells. A work by Lin et al., which created hybrid ferritin probes for tumour cell-targeted Near-Infrared Fluorescence (NIRF) imaging, is another illustration. Similar to this, Sitia et al. produced Indocyanine Green (ICG)-loaded ferritin for tumour-specific imaging that showed therapeutic value for fluorescence imaging-guided cancer surgery. In order to image *in vivo* inflammation, fluorescent Cy5.5 was also loaded onto magnetic ferritin and targeted vascular macrophages. These illustrations demonstrate that ferritin is a versatile platform with the ability to target particular cells and indicators.

### Ferritin-based vaccines in immunotherapy

Due to their effectiveness and safety, ferritin-based vaccinations have generated a lot of interest. Conventional vaccinations made from inactivated viruses or other organisms have the potential to cause reversion, therefore efforts to create more immunogenic but secure vaccines are ongoing. Numerous advantageous characteristics of antigen display on the ferritin surface include monodispersity, the ferritin nanocage's temperature and pH stability, and the uniform presentation of 24 epitopes. Additionally, it has been demonstrated that particle-mediated transport of peptides results in a more powerful stimulation than soluble peptides. Due to the size of ferritin nanocages, Dendritic Cells (DCs) may

easily take them up and move them to the lymph node to boost cellular and humoral immune responses. Ferritin-based vaccinations have shown very effectively and can be used not just for infectious diseases but also for cancer vaccines and vaccines for autoimmune diseases because of their multiple benefits. Representative ferritin-based vaccines have entered phase I clinical trials and target influenza, SARS-CoV-2, and Epstein-Barr viruses. Ferritin-based vaccines have demonstrated biocompatibility while remaining immunogenic with no obvious side effects. The difficult aspects of developing a ferritin-based vaccination, however, are the heterogeneity of nanoparticles, improper antigen folding, and intersubunit interactions that interfere with antigens. The self-assembled expression and purification of ferritin-based vaccines still require careful tuning because antigens are encoded onto the ferritin protein scaffold. The list below includes the ferritin nanocage clinical studies that have been chosen for the next vaccine.

### Ferritins in clinical trials

Ferritin-based vaccines are still in the early phases of clinical studies. One illustration is the work of Kanekiyo, which involved fusing trimeric Hemagglutinin (HA) to ferritin's 3-fold axis to produce the appearance of eight trimeric viral spikes. In comparison to an inactivated vaccine, the ferritin-HA had a robust immunological effect (10-fold greater antibody titers).

## Conclusion

The field of illness detection and treatment development benefits greatly from protein nanocarriers, and there is no question that current methods used in a variety of biotherapeutic, immunotherapeutic, and vaccination categories will be beneficial therapeutically. Excellent biocompatibility and biodegradability, as well as a wide range of customization options, characterise ferritin. Ferritin's subunit structure enables the uniform display of 24 peptides on its surface, which can be accomplished through direct chemical conjugation or one-step genetic alteration. In addition, the particle-mediated distribution of peptides is known to trigger immunomodulatory reactions, which is another well-known feature in peptide delivery. Additionally, the hollow cage structure enables the mineralization through surface pores or disassembly/reassembly of many hazardous or weakly soluble medicines. A complete, multifunctional protein scaffold is ferritin. The creation of vaccines is ferritin nanocages' main area of advantage in nanomedicine. Three influenza vaccines have started phase I clinical testing, and one of them has shown promising results. Due to the effectiveness of ferritin-based vaccinations, efforts have been made to create alternative ferritin-based vaccines in clinical trials. The detection, prevention, and treatment of diseases all show considerable promise for ferritin.

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# Relationship Between Anxiety/Depression Mood Disorders and Insomnia in Patients with Pain Syndromes in Primary Health Care: A Cohort Study

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**Received:** 07-Sep-2022, Manuscript No. IJCRIMPH-22-74020; **Editor assigned:** 10-Sep-2022, PreQC No. IJCRIMPH-22-74020(PQ); **Reviewed:** 15-Sep-2022, QC No. IJCRIMPH-22-74020(Q); **Revised:** 19-Sep-2022, Manuscript No. IJCRIMPH-22-74020(R); **Published:** 30-Sep-2022; doi: 10.35248/1840-4529.22.14.9.383

## Abstract

**Introduction:** Chronic pain and mental health disorders are common in the general population, the prevalence of chronic pain ranges from 2% to 40%, and the prevalence of mental health disorders ranges from 17% to 29%. Chronic pain is associated with irritability, depression, anxiety, and sleep problems such as insomnia. However, the appearance of both has been described as a consequence of the characteristics of this pathology.

**Aim:** Determine the sociodemographic characteristics and the association between pain syndromes and mood disorders in individuals treated in primary care.

**Materials and methods:** A prospective cohort study was performed in a primary care medical center where patients with painful symptoms like reasons for consultation were taken for four months, to who scales such as DN4, VAS, Beck's criteria, DSM- V, and determined the sociodemographic characteristics of these individuals.

**Results:** A total of 132 patients were recruited who met the inclusion criteria, of which 81.81% (108) were women, 18.18% were men (24), the mean age in years for both sexes was 37.9, the mean Duration in hours of each painful episode is 14.35 hours, in terms of proportion the appearance of the disorders that we determined to evaluate obtaining: insomnia in 0.303, anxiety 0.265, depression 0.090, which co-occurred with anxiety or depression at the time with a type disorder mixed 0.053, patients who did not develop any of the diseases of interest in this study 0.185.

**Discussion:** The coexistence and overlap of mood disorders and insomnia in patients suffering from pain syndromes, which have little or no importance when assessing patients in primary health care centers, are underdiagnosed. However, broadening the clinic history, and correctly using diagnostic tools for mood disorders increases their diagnosis rate, ignoring the positive relationship that exists between these disorders.

**Conclusions:** Pain disorders trigger neuropsychiatric complications, depression, anxiety, and insomnia worsen episodes of pain. However, the correct diagnostic approach and the application of adequate management greatly reduce the complications of these types of disorders.

**Keywords:** Chronic pain • Depression • Sleep disruption • Diagnostic

## Introduction

Pain syndromes currently represent a very important reason for consultation in medical settings, from primary practices to higher level hospital departments, often with the coexistence of mood disorders such as anxiety/depression, or sleep disorders such as insomnia, overlapping their symptoms, demonstrating the importance of understanding between these disorders, which in many cases are overlooked by physicians [1, 2]. Previous studies on chronic pain and its association with mental disorders have shown generally consistent findings, but they have some limitations, as they cannot establish the components as a whole from neurobiology [3-6].

Pain is a subjective experience influenced by different biopsychosocial factors, defined as a multidimensional and subjective experience, the International Association for the Study of Pain defines pain as "an unpleasant subjective sensation and an emotional experience associated

with actual or potential tissue damage", and is considered a debilitating disease when it becomes chronic [7, 8]. Chronic pain defined by the International Association for the Study of Pain and the International Classification of Diseases (ICD 11) is considered as pain that lasts more than 3 months or as persistent or intermittent pain for more than three months, leading to serious consequences, such as the impact on the patient's quality of life, including mood, sleep, and cognitive processes [9,10]. Anxiety is described as increased expectations and increased feelings of fear, worry, apprehension, and dread, while depression is described as feelings of sadness, grief, hopelessness, worthlessness, and pessimism [11,12]. The link between chronic pain and its affective components (i.e., depression and anxiety) has been known since the time of the ancient Greeks [13,14]. There is evidence of synchronicity between painful symptoms and symptoms of mood disorders; depression/anxiety, pain, and insomnia are positively correlated. Chronic pain and mental health disorders are common in the general population; the prevalence of chronic pain ranges from 2% to 40%, and the prevalence of mental health disorders ranges from 17% to 29% [15-17]. Chronic pain is associated with many other symptoms in about 1/3 of patients, including a combination of irritability, depression, anxiety, and sleep problems such as insomnia. It is also associated with cognitive dysfunctions, such as attention, learning, memory, and decision-making problems, as well as cardiovascular diseases [18,19].

The majority of people living with chronic pain, and overlapping symptoms of mood disorders, experience episodes of poor-quality sleep and it has been estimated that people with these factors are 18 times more likely to meet the criteria for a diagnosis of insomnia [20-22]. Although a bidirectional relationship between these symptoms and the coexistence of these conditions has been observed, it may presage common biological and, in some cases, psychological mechanisms. There is increasing evidence of pathophysiological, and neurophysiological similarity demonstrating that these conditions are associated with dysregulation of modulatory neurotransmitters along shared neuroanatomical pathways. Therefore, the decrease or dysregulation of the neurotransmitters involved can increase peripheral pain signals, which can contribute to the frequent presence of painful symptoms [23, 24].

This inferred direction of causality has important clinical implications; whether improvements in sleep and symptom presentation of mental disorders lead to reductions in pain, and how antidepressants that increase neurotransmitters involved in pain pathways reduce pain signals [25-27]. So sleep and mood disorders, as potentially modifiable factors, may be a viable target for interventions that can lead to significant improvements in treatments and outcomes that aim to reduce the intensity of chronic pain presentation if also associated mental disorders are treated [28-31]. On the other hand, it should be noted that as progress has been made in the study and understanding of the treatment of pain, a large number of epidemiological studies have described the association that may exist between this pathology and mood disorders. However, in the context of Colombia and Latin America, there are few studies carried out to date regarding this problem, which is why the generation of updated data according to our health environment is of great importance.

## Materials and Methods

A prospective cohort study with retrospective analysis was proposed to determine the association between pain syndromes and mental disorders such as anxiety, depression, or insomnia from primary care, since these are the most frequently described in the current literature, so it was carried out in a primary health care center in the south of the city of Bogota-Colombia, where a population with low socioeconomic resources is characterized. For which the recruitment of patients attending the consultation was proposed and as inclusion criteria, a painful symptom was determined as a reason for consultation and that during the consultation they presented

symptoms of anxious characteristics, negative depressive symptoms or that also manifested sleep compromise, A total of 464 patients attended by two doctors per month were taken during the interval from April to July of the year 2022, of which the reasons for consultation of interest were filtered, obtaining 132 individuals (28.45%) of the total number of patients attended, in who through the anamnesis were applied scales endorsed for the diagnosis of mental disorders in the spectrum of anxiety, depression or insomnia such as Beck criteria, DSM-V criteria, for these disorders and the DN4 test was applied and VAS (Visual Analog Pain Scale) for each type of pain, as they were diagnosed during the consultation, they were included in a database data. The locations and associated pain syndromes, the coexistence of comorbidities, and the time of evolution of painful symptoms and insomnia, depression, or anxiety were also described, in addition, the periods of duration of each painful episode and whether they worsened were also inquired recorded the history of pharmacological management for some of these syndromes.

After collecting the data, the analysis of these was carried out with the statistical program R version 4.1.3, evaluating the distribution by sex, age, and the prevalence of each pain syndrome in the sample taken. The data record was crossed with the simultaneous appearance of insomnia, anxiety, or depression, determining the cumulative incidence CI of the same, the statistical determination of the relative risk RR of anxious, depressive disorders, or insomnia associated with pain was also carried out, the mean was determined for the duration of the episodes of pain at the same as for the time of evolution of the same, however, in this item, it was not possible to determine the time of appearance of the disorders of interest with the pain syndromes given the moment in which the patients consulted it was difficult to determine exactly within the assessment the interval of appearance of symptoms of insomnia, anxiety or depression. Finally, the response to the proposed treatment was evaluated per the recommendations in the clinical practice guidelines and the recent publications in two months in this group for some of these disorders as adjuvant or treatment of some of these associated disorders after treatment. the query.

## Results

A total of 132 patients were recruited who met the inclusion criteria, of which 81.81% (108) correspond to women and 18.18% to men (24), the mean age in years for both sexes is 37.9, the mean duration in hours of each painful episode is 14.35 hours, the average evolution in months for the sample taken is 16.17, on the other hand, all manifestations of painful symptoms such as headaches, migraines, and even facial dysesthesias, finding that 35.6% (47) of the individuals presented with some of these manifestations. In the back pain group, patients with lumbar pain only or with pain at this level and at higher levels such as dorsal pain were included. or cervical, finding that 35.6% (47) of the patients also presented with this symptomatology, we made a separate group of joint pain for the different types of pain at the level of the shoulders, whether it was syndrome rotator cuff, shoulder abduction pain, tendinopathies or impingement in the group of muscle pain syndrome since we determined in this disorder a large percentage for the total sample of 11.36% (15), in the group of joint pain we included patients with knee pain, or arthralgia due to arthritis or osteoarthritis in different anatomical locations with a total of 6.81% (9) and in the group of others we included different subjects who had a variety of painful entities such as an individual who had chronic pain in the lower left limb after a fracture of the tibia and fibula who underwent surgical management presenting chronic pain and subsequent development of insomnia secondary to pain, also patients with epicondylitis or carpal tunnel syndrome for a total of 10.60% ( 14).

We calculated in terms of proportion the appearance of the disorders that we evaluated, obtaining: insomnia at 0.303, anxiety at 0.265, depression at 0.090, individuals who had anxiety or depression at the same time as a mixed-type disorder at 0.053, patients who had other previous mental pathologies such as bipolar affective disorder, schizoaffective disorder, schizophrenia or post-traumatic stress disorder showing 0.098 and finally the patients who did not develop any of the disorders of interest in this study 0.185 (Figure 1).

The accumulated incidence was determined according to what was evidenced in the sample and since we did not know the total population that could be consulted in our medical center, 0.82 was obtained for the collected sample, according to this we also determined the calculation of the Relative Risk (RR) adjusted for the sample, which is 2.82 for the development of anxiety, depression or insomnia or mood disorders. Finally,

after one month of treatment, we evaluated the improvement in pain levels according to the recommendations of the international guidelines for the management of insomnia, anxiety, or depression, including tricyclic antidepressants such as amitriptyline, serotonin reuptake inhibitors such as trazodone. or sertraline or double receptors of serotonin and norepinephrine such as paroxetine, however, given the initial objective of this study, we did not compare the results between these, but rather, whether they improved anxious, depressive or insomnia symptoms, with evidence of a reduction in headache. At least 4 points on the visual analog pain scale in 89% of the patients who simultaneously had these pathologies (Figure 2).

## Discussion

The appearance of mood state disorders in primary care consultation is usually underdiagnosed if it is evaluated as the main reason for patient consultation, however, as has been described in the literature to date, these figures increase when an extension is made in the anamnesis. The coexistence and overlap of mood disorders and insomnia in patients suffering from pain syndromes, which have little or no importance when assessing patients in primary health care centers, is demonstrated. being underdiagnosed as well as expanding the anamnesis, and correctly using diagnostic tools for the disorders of interest in this study, which the current literature describes, increases their diagnosis rate by ignoring the positive relationship that exists between these disorders, and ignoring a fundamental pillar in the comprehensive treatment for these patients, in which there is more scientific evidence every day [32-37].

Regarding the results, we obtained, we showed how women continue to be the most affected in the development of mental disorders in the course of pain syndromes, with the most affected anatomical areas being the spine and the head. represents an almost 3-fold risk of developing insomnia or anxiety, mainly which, if evaluated according to the descriptions of the anatomical and neurobiological pathways that these syndromes share, we could assert that it is a neuropsychiatric risk factor to have alterations in the pain spectrum; In comparison with what has been described in different studies in our context, the prevalence of depression has been described above or as frequently as anxiety, however, we obtained that in our environment anxiety and insomnia occur more

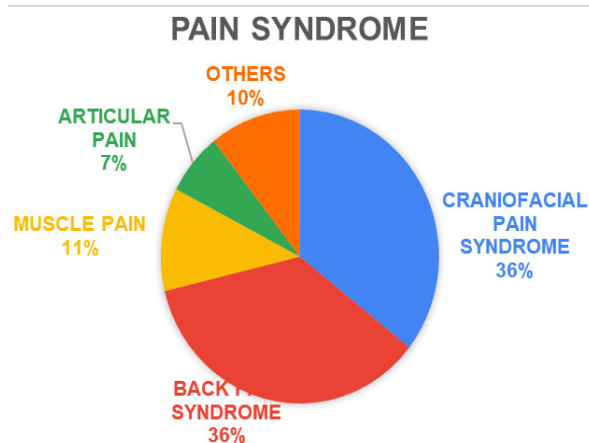


Figure 1. Distribution of pain syndromes.

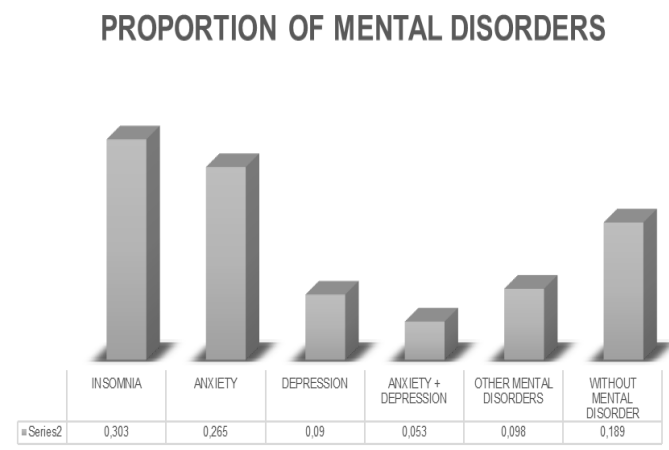


Figure 2. The proportion of mental and mood disorders associated with pain syndromes.

frequently, which we consider represents the alterations that they present more prematurely in pain disorders, in this way we determine that the associated neuropsychiatric disorders present according to the time of evolution. We were also able to evidence anecdotally how subjects who do not receive correct initial management of a pain syndrome, such as the case of the individual who progressed with a tibia fracture, can first develop chronic pain and subsequent insomnia. Although it was not the objective of this study, we were able to show how, by applying the existing recommendations to date for pharmacological therapy, the spectrum of pain syndrome and neuropsychiatric disorders is reduced, and last but not least, we highlight how the application of the tools adequate even by non-specialized medical personnel represents better outcomes for these patients.

## Conclusion

It is noteworthy within the results obtained that, although painful disorders trigger neuropsychiatric complications, depression, anxiety, and insomnia worsen episodes of pain. The application of adequate tools and the correct way of primary health care represents a considerable impact in the management of patients with painful disorders and simultaneously in the management of patients with mental disorders that are usually underdiagnosed in primary care and also develop capacities on the part of this personnel to assume the follow-up and management of these patients when access to medical specialties is limited or tortuous for the affected individuals. In addition to this, interdisciplinary management is recommended in conjunction with the mental health area, to guarantee adequate and timely treatment, and to avoid the development of mental disorders due to pain syndromes.

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# Adolescent Girls' Perception of the Growing Importance of Menstrual Hygiene

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**Received:** 31-Aug-2022, Manuscript No. IJCRIMPH-22-73362; **Editor assigned:** 02-Sep-2022, PreQC No. IJCRIMPH-22-73362(PQ); **Reviewed:** 10-Sep-2022, QC No. IJCRIMPH-22-73362(Q); **Revised:** 19-Sep-2022, Manuscript No. IJCRIMPH-22-73362(R); **Published:** 30-Sep-2022; doi: 10.35248/1840-4529.22.14.9.386

## Abstract

Unless women's basic needs are addressed empowerment discussions are meaningless. An overview of current access to menstrual management is presented in a short research. The substances have been analysed the usage of a thing rating for menarche awareness, the kind of absorbents used, disposal, hygiene, restrict and faculty absenteeism. In addition to metaanalysis, meta-regression was used to take setting, region and time into account when estimating Pooled Prevalence (PP). In Uttarakhand, it is very important for adolescent girls to have good menstrual hygiene. Adolescent girls are the subjects of this research

**Keywords:** Menstrual • Hygiene • Adolescent girls • Health

## Introduction

Women and adolescent ladies throughout the globe recreate duration stories each month [1, 2]. Increasing qualitative studies has highlighted the demanding situations confronted with the aid of using menstruating ladies and adolescent ladies in lower-profits putting and counselled poor outcomes on health, education. Employment and well-being. Several factors contribute to gestations of period, according to these studies, the perfecting of worldwide populace health, attaining the sustainable improvement goals, and figuring out gender equality and mortal rights are all branch on menstrual health [3-5]. Research and exercise have evolved a nuanced knowledge of menstruation, inclusive of its courting with physical, internal, and social health [6,7]. Social enterprises are producing affordable menstrual hygiene results for the low income population in Uttarakhand-Dehradun, especially for girls and women. A number of micro-entrepreneurs in some parts of the world are being trained to manufacture low-cost aseptic pads using indigenous machines [8].

In order to cope with this time of the month, women have developed their own strategies. These strategies differ greatly encyclopaedically as a result of the particular preference, liquidity of the coffers, profitability of the business, artistic traditions and beliefs, educational status, and knowledge of the era. The practice of period hygiene is of great concern because, if neglected, it can cause poisonous infections, fertility problems, and other vaginal problems [9-11].

## Materials and Methods

The choice of aseptic protection material depends on the particular choice, artistic adequacy, profitability, and vacuum in the original request. Cleaning supplies and menstrual absorbents should also be included in introductory sanitization installations. The desire of absorbents varies amongst pastoral and civic girls. In Uttarakhand-Dehradun area, the most favoured absorbents are applicable cloths pads and some areas women select to apply marketable aseptic pads; Chlorine-balanced kraft or sulphate pulp is used by manufactures to deliver fluff pulp as spongy used to make disposable aseptic merchandise. Currently, several deodorised and non-deodorised aseptic merchandise are to be had with inside the request product of artificial fibre rayon.

These deodorised products include chemical like- organochlorides which have antibacterial exertion due to their chemical composition. These products at the same time as buried inside the soil they kill the soil micro plants and do away with the technique of composition [12].

Our training zone performs a critical element in girl's boom and improvement through permitting them to reply to modifications and demanding situations they're going through in day-to- day life [13].

After collecting the data, the analysis of these was carried out with the statistical program R version 4.1.3, evaluating the distribution by sex, age, and the prevalence of each pain syndrome in the sample taken. The data record was crossed with the simultaneous appearance of insomnia, anxiety, or depression, determining the cumulative incidence CI of the same, the statistical determination of the relative risk RR of anxious, depressive disorders, or insomnia associated with pain was also carried out, the mean was determined for the duration of the episodes of pain at the same as for the time of evolution of the same, however, in this item, it was not possible to determine the time of appearance of the disorders of interest with the pain syndromes given the moment in which the patients consulted it was difficult to determine exactly within the assessment the interval of appearance of symptoms of insomnia, anxiety or depression. Finally, the response to the proposed treatment was evaluated per the recommendations in the clinical practice guidelines and the recent publications in the course of two months in this group for some of these disorders as adjuvant or treatment of some of these associated disorders after treatment the query.

## Strategies for the operation of menstrual waste

- Disposal of menstrual waste is of essential challenge because it influences fitness and terrain. There's a want for powerful menstrual accoutrements which wishes decrease and cost-powerful operation.
- Companies managing production aseptic pads or different papers have to disclose the facts at the pads concerning the chemical composition of the pads in order that relevant technology will be used for his or her disposal and treatment.
- Environment-pleasant chemical compounds have to be utilized by manufactures of aseptic merchandise to prevent soil and water pollutants and to lock the composition process.
- Guidance regarding menstrual operation to adolescent girls is a crucial demanded step. Menstrual hygiene operation ought to be a vital part of schooling classes. Distribution of menstrual merchandise ought to be freed from value in seminaries and academic institutes [13].
- The lavatories ought to be designed to be girls / ladies friendly. In Kerala, a few seminaries have mounted aseptic serviette dealing machines in lavatories which can be robot and function via way of means of becoming a coin in it. It incorporates 30-50 aseptic towels to fulfill the exigency necessities of the girls/ladies in seminaries [13]. In Uttarakhand-Dehradun a few seminaries also are mounted that aseptic sanitary napkin dealing machines in lavatories.
- There ought to be a separate collection tool for the menstrual wastes without affecting the sequestration and superb of ladies. Specific aseptic dispenses to collect menstrual waste ought to be mounted.
- There must be sufficient region for washing, drawing private corridor and hands, and for changing or managing stained clothes. To fulfil the ones conditions, there need to be water, restroom paper, tip and a Gomorrah to scrub menstrual products (Figure 1).
- Sties should be protected with the aid of using lid and voided on occasion to maintain the lavatories easy from canvases, mosquitoes and horrific odour.
- Covered holders and sties have blessings of hiding the waste being

visible with the aid of using others. They're mounted in an area that gives sequestrations [13].

- Gloves and right protection gear ought to be exceeded to the cleansers in order that they aren't uncovered to pathogenic organisms and perilous feasts.
- Government and non-authority's institutions ought to come ahead for making the human beings frightened of operation of menstrual wastes. Government ought to deliver the finance to the Municipal Corporation or NGOs for the development of girl's pleasant lavatories. Government must introduce new guidelines for the secure disposal and remedy of menstrual wastes as they've made for stable or biomedical wastes. Applicable coverage and felony body is important for the operation of menstrual wastes.
- Health counter accusations of menstrual wastes ought to be duly delved. Fiscal assist ought to take delivery of to the establishments to perform the exploration with inside the operation of menstrual wastes.
- Scientific exploration has to be encouraged for the most suitable processes of disposal of aseptic pads or distinctive menstrual products.
- Allocation of price range in seminaries to assist menstrual hygiene operation research ought to be conducted.
- Cooperative sweats (trash lockers) ought to be made Incinerators are a higher alternative for disposal however ought to be operated in a managed terrain in order that risky feats emitted won't damage big area.

**Things to be remember**

- Dustbins should be covered by lid and emptied from time to time to

keep the toilets clean from flies, mosquitoes, and bad odour.

- Covered containers and dustbins have advantage of hiding the waste being seen by others. They are installed in a place that offers privacy.
- Gloves and proper safety tools should be provided to the cleaners so that they are not exposed to pathogenic organisms and harmful gases.

**Uttrakhand data: Menstrual hygiene**

The graph is showing the data about the adolescent girls from Joint family & Nuclear Family practicing the disposing habit while there is no place to dispose (Figure 2)

**Results and Discussion**

Menstrual hygiene turned into rated because the 6th maximum general wants and perceived as a direct want through 18.8% of the respondents. More than two-thirds (68.4%) of rural households use superior sanitation facilities. Around 30% of families have inadequate sanitation infrastructure, which means that as a minimum one member of the family defecates with in aspect the open space.

Key findings protected that there has been inadequate get right of entry to secure and personal centres for MHHM coupled with displacement precipitated shifts in menstrual practices with the aid of using girls. There become a slender interpretation of what an MHHM reaction includes, with a focal point on supplies; substantial hobby in information what a progressed MHHM reaction could consist of and acknowledgement of constrained current MHHM steerage throughout diverse sectors; and inadequate session with beneficiaries, associated with pain asking approximately menstruation, and constrained coordination among sectors.



Figure 1. Facilities for mensuration.

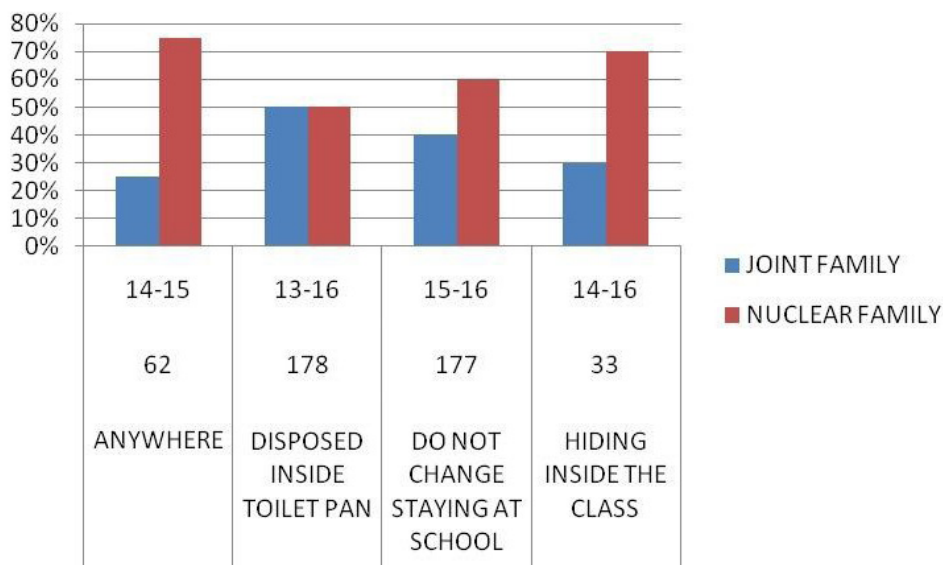


Figure 2. The graph is showing the data about the adolescent girls from joint family & nuclear family practicing the disposing habit while there is no place to dispose.

## Conclusion

There is a huge want for stepped forward steering throughout all applicable sectors for enhancing emergency context, in conjunction with expanded proof on powerful techniques for integrating present responses.

- Changes in menstrual hygiene practices amongst ladies after displacement.
- Inadequate safe, non-public areas for converting menstrual substances and disposal.

The consequences of the look at showed the speculation that if we prepare the schooling on menstrual hygiene and private hygiene amongst students, then this could result in deepen the understanding of this system fabric in fitness care and as an end result will growth the performance of the instructional process.

## Acknowledgement

Author acknowledge the contribution of the girl students of the Uttrakhand- Dehradun schools for their active involvement and willingly participation in this study & for the trust placed on Author allowing for honest and important discussion to take place.

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# Scale of Stress Manifestation, Anxiety, Depression and Professional Burning in Relation to Resilience of Kosovo Healthcare Workers During the Period of Covid - 19 Pandemic

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**Received:** 19-September-2022, Manuscript No. IJCRIMPH-22-75166; **Editor assigned:** 20-September-2022, PreQC No. IJCRIMPH-22-75166(PQ); **Reviewed:** 24-September-2022, QC No. IJCRIMPH-22-75166(Q); **Revised:** 27-September-2022, Manuscript No. IJCRIMPH-22-75166(R); **Published:** 30-September-2022 doi: 10.35248/1840-4529.22.14.9.383

## Abstract

**Objective:** After a period of almost 2 years, our country continues to face the Covid-19 Pandemic. Necessary medical services for the population remain the key profession that connects the wide range of services and the first reaction to a situation like this. This study aims to assess the impact of the Covid-19 pandemic on the level of anxiety, stress, depression and burnout of health professionals, and to determine the relationship between them and coping skills with reference to the development of resilience. To propose appropriate measures to support the mental health advancement of health workers.

**Methods:** The study has a quantitative character, the methods were correlative and descriptive. The DASS questionnaire was used to collect data for stress, anxiety and depression. The MBI questionnaire was used to measure the degree of occupational burnout. The ARM-R questionnaire was used to measure resilience.

**Sample:** Respondents who participated in this research were health care professionals from UCCK, NIPHK, regional hospitals and PCFM from Prishtina, Prizren, Peja, Gilan, Ferizaj and Gjakova. The number of participants was 514, of which 376 were females and 137 were males.

**Results:** The average value of stress is 13.20 with a standard deviation of 11.70, for the anxiety level the average value is 11.74 with a standard deviation of 10.91, for depression the average value is 10.73 and the standard deviation is 11.18. Professional burnout was on an average of 40.54 with a standard deviation of 20.16 and a fairly high level of resilience of 48.14 with a standard deviation of 6.12.

**Conclusions:** Front-line work in Covid-19 clinics, has easily affected the mental health well-being of health care workers by showing the presence of moderate levels of anxiety, stress and depression, while the burnout rate was more present at a younger age, which suggests that with work experience the rate of burnout decreases, which has been proven to us from the results, by finding a negative correlation between burnout and experience. The high development of resilient factors made them very functional during their work.

**Keywords:** Stress • Anxiety • Depression • Burnout • Resilience • Health Workers • Covid 19

## Introduction

### Corona virus (Covid 19) and its appearance

In December 2019, the city of Wuhan in English, and reported unusual cases of patients with pneumonia from the novel Coronavirus virus (COVID-19) and its spread rapidly became a widespread global virus [1].

In January 2020, the World Health Organization (WHO) declared the outbreak of the Coronavirus disease a Public Health Emergency of International Concern. The WHO declared that there is a high risk of the spread of the new coronavirus disease (COVID-19) in other countries of the world and therefore declared a pandemic. WHO and public health authorities around the world, including Kosovo, have taken action to control the outbreak of COVID-19. There have been several viral diseases in the past 20 years including Severe Acute Respiratory Syndrome (SARS) in 2003, H1N1 influenza virus in 2009, Middle East Respiratory Syndrome (MERS) in 2012 and Ebola virus in 2014 [2-4].

Although COVID-19 is a new virus, it is so far known to cause diseases ranging from the common cold to more severe diseases such as SARS and MERS [4]. Symptoms of a Coronavirus infection include fever, chills, cough, sore throat, nausea and vomiting, and diarrhea. Individuals with a history of other diseases are more likely to be infected with the virus and may experience worse outcomes [5]. Severe cases of the disease can lead to respiratory failure, heart failure, acute respiratory syndrome or even death [6].

### Corona virus (Covid 19) in Kosovo

In Kosovo, from the first confirmed case of the Covid 19 virus in March 2020 to June 2021, we have 107,655 positive cases, 105,241 recoveries and 2,252 deaths. After a period of almost 3 months in quarantine, and the rest with concrete bans, the state has continued to face difficulties in managing the virus. Many institutions have been active in their work during the pandemic period, especially during the quarantine. The medical services considered essential remain the key profession that connects the wide range of services and the first response in a situation created like this pandemic where the population feels unsafe and is vulnerable in physical and psychological aspects.

### The psychological state of the population

In addition to physical impacts, COVID-19 can have serious effects on people's mental health. A wide range of psychological outcomes have been observed during the virus outbreak, at individual, community, national and international levels. At the individual level, people are more likely to experience fear of getting sick or dying, feeling powerless and being stereotyped by others [7, 8]. The pandemic has had a detrimental effect on public mental health, which may even lead to psychological crises [9]. Early identification of individuals in the early stages of a psychological disorder makes intervention strategies more effective. A health crisis, such as the COVID-19 pandemic, leads to psychological changes, not only in health workers, but in other individuals who contribute in other fields, and such psychological changes are driven by fear, anxiety, depression or insecurity [10].

Nervousness and anxiety in a society affect everyone to a great extent. Recent evidence suggests that people kept in isolation and quarantine experience significant levels of anxiety, anger, confusion and stress [11]. In general, all studies that have examined psychological disorders during the COVID-19 pandemic have reported that affected individuals to exhibit some symptoms of mental trauma, such as emotional distress, depression, stress, mood swings, irritability, insomnia, attention deficit hyperactivity disorder, post-traumatic stress and anger [12, 13].

Research has also shown that frequent media exposure can cause anxiety [14]. However, in the current situation, it is challenging to accurately predict the psychological and emotional consequences of COVID-19. Studies conducted in China, the first country to be affected by this spread of the virus, show that people's fear of the unknown nature of the virus can lead to mental disorders [15, 16]. Numerous studies show that psychological responses to previous pandemics such as the SARS flu in 2003 have included several psychiatric comorbidities and maladaptive behaviors such as anxiety, depression, panic attacks, and emotional disturbances [17]. People who are prone to psychological problems are especially vulnerable at such times [18]. Surely Covid-19 will be no different from other viruses. It has caused substantial disruption to people's lives, rapid spread and high mortality rates that are already having a major impact on society, the economy and the provision

of health and social care. Preliminary evidence suggests that symptoms of stress, anxiety and depression and later post-traumatic stress disorder are possible reactions [18]. At the individual level the fear of personal infection, or the infection of friends and family members, stands alongside the fear of the possibility of isolation and restricted movement which affect mental health, well-being, social functioning and work.

All of these concerns can be influenced by constant information, and misinformation from the news, the Internet, and social media, coverage of which can blur the lines between home and work. A Chinese study from January and February 2020 found that 54% of respondents rated the psychological impact of Covid-19 as moderate or severe; 29% reported moderate to severe symptoms of anxiety; and 17% reported moderate to severe depressive symptoms [18].

Data from Public Health England show that 4 in 5 adults are worried about the effect it is having on their lives, with more than half saying it has affected their well-being and nearly half reporting high levels of anxiety during this period. More than 45% of Scots feel that the ban/lockout measures have had a negative impact on their mental health [19].

### Health care and mental health of health workers

Topics such as the psychological difficulties that follow an unknown and relatively dangerous situation are being researched globally and in Kosovo. To see how the mental health of health workers has been affected, the resilience they will build after facing a dangerous situation will give us a more detailed insight into the research topic.

Three groups are at particular risk of psychological symptoms:

- Health workers responding to the pandemic and their patients/clients.
- Individuals diagnosed with Covid-19, losing their family and loved ones to the disease, or affected by prolonged social distancing.
- Individuals with existing mental health conditions exacerbated by current circumstances.

Health care workers can often fall into all three of these categories. Health care is already a stressful profession and undoubtedly according to data from Great Britain this category of professionals was facing a health care crisis even before Covid-19.

The Public Policy Research Institute's report, Care Fit for Carers, found that the pandemic is having a severe impact on the mental health of healthcare workers who experience stress, anxiety, adversity, or trauma. In YouGov surveys, half of the staff cited how mental health has been affected by Covid-19, ahead of concerns about family safety and their ability to look after patient or service user safety due to a lack of testing and equipment personal protective equipment.

A survey led by the trade union GMB Scotland investigated the mental health of people working in the healthcare sector. Four in five workers said their mental health had already been damaged by their work. The same number said they had not been offered professional mental health support by their employer (ITV News).

Studies from previous pandemics and from countries recently affected by Covid-19 show similar results - higher prevalence of sleep disorders, anxiety, depression, obsessive-compulsive disorder and post-traumatic stress disorder with emotional distress experienced at the beginning, during and after the outbreak of infection [20].

### Theoretical perspective stress, anxiety, depression, burnout and resilience

Stress is associated with both short-term and long-term health problems. It is therefore important to track the health risks of social work, a profession that coexists with stress, depression and professional burnout. (Community Care).

Anxiety is often a general emotional reaction to stress, it is a fear caused by the demands placed before the person when he does not know what these demands actually are. Depression is a mental health disorder. It is more than a temporary bad feeling for some particular reason; it is a medical disorder that needs professional help and can be treated. Symptoms of depression should not be confused with normal distress or suffering, depression is an illness that involves signs and symptoms that last for weeks, months or years, without recognition or treatment.

In the context of exposure to a significant disaster, resilience is the ability of individuals to find their way to the psychological, social, cultural, and physical resources that support their well-being, as well as their individual and collective ability to negotiate for these resources. be provided in cultural and meaningful ways" [21]. Burnout is characterized by emotional exhaustion,

cynicism and ineffectiveness in the workplace and by chronic negative responses to stressful workplace conditions.

## Research Methodology

In the following part, the methodological aspects of the research on the relationship between stress, anxiety and depression with professional burnout and resilience in health workers will be examined. During the first phase, we paid special attention to defining the main issues on which we carried out the work for the future. At this point, we will describe the research methods, the purpose, the measuring instruments used for the realization of this research, the variables, the hypotheses and the subjects that were presented for this research [22, 23].

Referring to the work difficulties faced by health workers during the pandemic, the idea of studying psychological problems that may have appeared during these difficulties arises, and within this phenomenon, this study focused on the degree of manifestation of stress, anxiety and depression and their appearance in health workers, during the provision of services.

To discover new facts, these phenomena were given scientific importance to achieve the essential objectives and purpose.

- The primary goal of this study is to detect the degree of manifestation of stress, anxiety, depression and resilience in people who provide health services in specialized clinics.
- The second goal of this study is to identify the degree of professional burnout of health workers during the pandemic period.
- The third purpose of this study is to prove the relationship that can be between stress, anxiety, depression and resilience with professional exhaustion or burnout.

### Hypothesis

- It is hypothesized that workers who have developed resilience will more easily cope with stressful situations, anxiety and depression, while workers who for certain reasons and factors have not managed to develop resilience in this situation will be more vulnerable to stress and anxiety and depression.
- Workers who have provided direct services to patients with Covid-19 tend to develop more anxiety and depression compared to workers who have provided services from the office.
- The primary hypothesis of this study presents: "The relationship between the degree of manifestation of stress, anxiety and depression with resilience and professional burnout in health workers.
- H1. Health workers have high levels of stress, anxiety and depression.
- H2. Health workers who have a high degree of manifestation of anxiety, stress and depression do not have developed resilience at a high level.
- H3. There are gender differences in the degree of resilience development among health workers.
- H4 Health workers have suffered a high degree of professional burnout during the pandemic.
- H5. There is a strong relationship between burnout and resilience with stress, anxiety and depression in healthcare workers.

### Presentation and interpretation of results

In this research, the focus has been on finding the arithmetic mean for the degree of manifestation of anxiety, stress and depression during the pandemic period among health workers. On the other hand, the degree of professional burnout and resilience was also requested, which shows the ability to recover from a life-threatening stressor, in our case Covid-19.

Stress is considered the source of many mental health concerns and is also considered a key factor in the manifestation of depression and anxiety, while it has been highlighted in health workers during the pandemic according to the statistical analysis of the findings we have these data the arithmetic mean  $M=13.16$ , standard deviation  $\sigma=11.67$  and measurement error  $\delta=0.52$

As for the degree of manifestation of anxiety among health workers during the pandemic period, the data have resulted in a moderate average degree, where the arithmetic mean is  $M=11.72$ , the standard deviation  $\sigma=10.88$  and the measurement error  $\delta=0.48$ .

As for the degree of manifestation of depression among health workers, the arithmetic mean has resulted in  $M=10.72$ , which means a low degree of

manifestation of depression with a standard deviation of  $\sigma=11.16$  and the measurement error  $\sigma_D=0.49$ .

Resilience, which is considered the coping ability to recover oneself after a difficulty, has been at a fairly high level among health workers, and this has been proven by the findings of statistical analysis, where the average degree of resilience has resulted in a height of  $M=48.15$ , with a standard deviation of  $\sigma=6.10$  and standard error  $\sigma_D=0.27$  (Table 1). From the results found, we realized that over time the burning rate decreases and we have  $r=-0.52$ ;  $p<0.01$ , means a negative correlation between burnout rate and work experience at the 95% confidence level (Figure 1).

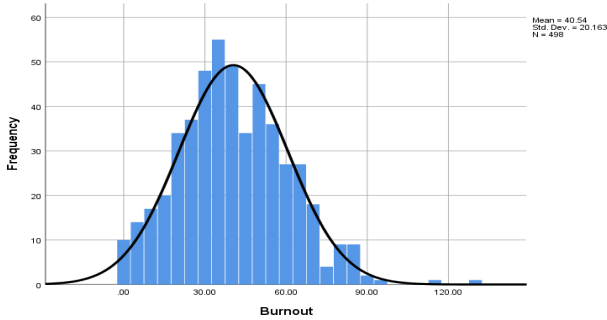


Figure 1. Distributions of averages for occupational burnout.

Table 1. Presents the correlation between professional burnout and years of experience.

Correlations			
		Years of Experience	Burnout
Years of Experience	Pearson Correlation	1	-.52**
	Sig. (2-tailed)		0
	N	514	514
Burnout	Pearson Correlation	-.52**	1
	Sig. (2-tailed)	0	
	N	514	514

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**The truth of the hypothesis**

The validity of the hypotheses was tested through correlative and differential statistical methods, where the Pearson correlation was tested for the correlation between the variables, while the T-test method was tested for the differences between the mean distributions. Mean values and corresponding 95% confidence intervals were calculated for all indicators. In all cases, a value of  $p \leq 0.05$  was considered statistically significant. All statistical analysis was performed in SPSS v.22 (Table 2, 3)

Table 2. Values of distributions of averages for stress, anxiety, depression, burnout and resilience.

	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
Stress	502	13.1614	0.52115
Anxiety	505	11.7248	0.48426
Depression	503	10.7256	0.49774
Resilience	505	48.1505	0.2716
Burnout	501	40.4072	0.9014
Valid N (list)	495		20.17607

Table 3. Presents the correlation between resilience and depression.

		Depression	Resilience
Depression	Pearson Correlation	1	-.303**
	Sig. (2-tailed)		0.003
	N	514	514
Resilience	Pearson Correlation	-.303**	1
	Sig. (2-tailed)	0.003	
	N	514	514

\*\* . Correlation is significant at the 0.01 level (2-tailed).

From the obtained statistical values, we have understood that resilience has a negative relationship with anxiety, which means that the higher the resilience, the lower the anxiety state (Table 4).

Table 4. Presents the correlation between anxiety and resilience.

		Resilience	Anxiety
Resilience	Pearson Correlation	1	-.382*
	Sig. (2-tailed)		0.017
	N	514	514
Anxiety	Pearson Correlation	-.382*	1
	Sig. (2-tailed)	0.017	
	N	514	514

\*. Correlation is significant at the 0.05 level (2-tailed).

**Statistical differences based on occupation**

The results have confirmed that for occupational burnout there are no significant statistical differences based on profession and we have  $t=-1.42$ ;  $p>0.05$  and the significance result  $Sig=0.15$  which is higher than 0.05 within the 95% confidence interval, which has exceeded the limits of statistical significance which means the absence of differences based on the doctor and nurse professions, while the result among the support staff and nurses we have  $t=1.83$ ;  $p \leq 0.05$  with the significance value  $Sig=0.052$  which is equal to 0.05 within the 95% confidence interval, which means the presence of differences for professional burnout based on the profession of nurse and support staff (Table 5-7).

Table 5. Presents the correlation between anxiety and resilience.

	Profession	N	Mean	Std. Deviation	Std. Error Mean
Burnout	Doctor	143	38.93	19.06	1.59
	nurse	322	44.88	20.97	1.19

Table 6. Presents the correlation between anxiety and resilience.

	Profession	N	Mean	Std. Deviation	Std. Error Mean
Burnout	Doctor	322	41.88	20.97	1.19
	nurse	47	32.88	16.92	2.52

Table 7. Levene's Test for Equality of Variances.

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Burnout	Equal variances assumed	3.81	0.052	1.83	352	0.05	5.99	3.27
	Equal variances not assumed			2.14	65.39	0.023	5.99	2.79

**Statistical differences for occupational burnout on an institutional basis**

Regarding the institutional level, the highest levels were in the anesthesiology clinic, followed by the Institute of Public Health and Pulmonology compared to Regional Hospitals and Family Medicine Centers. Statistical data are presented in (Table 8).

Table 8. Presents the average values of the burnout rate based on the institutions.

Burnout	Clinic	Mean	N	Std. Deviation
	NIPHK	45.11	18	15.48
	Pulmonology	44.48	45	20.86
	Regional Hospitals	41.63	174	21.54
	Family Medicine Centers	35.44	207	19.62
	Anesthesiology	46.85	54	16.93
	Total	40.53	498	20.16

The level of resilience was quite high for all ages, genders and professions, where there were no significant differences. What made them functional and did not stop their work was the high resistance to risk factors, from the results found we have a high level of resilience in all ages and genders.  $M=48.14$  (Figure 2).

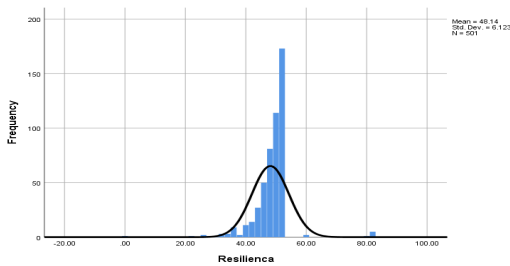


Figure 2. It presents the mean values of the Resilience distributions.

Referring to health workers who have been infected and those who have not been infected by Covid 19, we have used the method of difference between the averages and have the following data (Table 9):

Table 9. Shows the difference between the average levels of anxiety of health workers who have been infected and those who have not been infected.

	Infected	N	Mean	Std. Deviation	Std. Error Mean
Anxiety	YES	352	12.81	10.92	0.58
	NO	150	9.21	10.47	0.85

Referring to the vaccination, we found no differences in the level of stress, anxiety and depression, and the results are as follows (Table 10):

Table 10. Presents the mean values for stress, anxiety and depression based on vaccination.

t	Vaccination	N	Mean	Std. Deviation	Std. Error Mean
Stress	YES	481	13.22	11.64	0.53
	NO	18	12.38	13.53	3.19
Anxiety	YES	484	11.71	10.77	0.48
	NO	18	12.27	14.5	3.4
Depression	YES	482	10.73	11.07	0.5
	NO	18	10.61	14.2	3.34

## Discussion and Conclusion

From all this, we can emphasize that the Covid-19 Pandemic has easily affected the psychological well-being of health care workers, manifesting the risk of burnout. So from all this, we conclude that all our research work has been mostly focused on professional burnout, considering it as an important factor in the functioning of health workers during the Covid 19 period. Emotional exhaustion, which was highlighted in health workers, is usually related to a relationship with work that is perceived as difficult, tiring, and stressful. This is seen differently from depression as it is likely that burnout symptoms will be reduced during rest.

Depersonalization or loss of sensitivity is characterized by a loss of respect for others (clients, colleagues, etc.) and by maintaining a greater emotional distance, which is expressed through cynical, derogatory, and even callous comments. Appreciation of personal achievements is a feeling that acts as a safety valve and contributes to achieving a balance if burnout and depersonalization occur at work. It provides fulfillment in the workplace and a positive outlook on professional achievements.

Relying on the results obtained, from the literature of the relevant theories and from the results obtained from the research, regarding the degree of manifestation of stress, anxiety and depression, we can say that the genuine treatment and understanding of the nature of the problems affecting mental health leads to the maximization of positive benefits and the minimization of the deterioration of psychological well-being, which can result in high rates and more severe anxiety states leading to emotional exhaustion and professional burnout. The results we discussed find support in the theoretical framework and relevant research carried out by Carlo Giaomo, Saaverio Sabina, etc. From the Clinical Institute of Physiology, the National Council of

Scientific Research in Lecce of Italy, October 2021 and the Turkish University Clinic-Turkish Psychiatry Dergisi 2021 by Ozen Onen Sertos, Ozlem Kuman Tuncel, etc. Where they had similar results on psychological phenomena in health care professionals.

These results from relevant research support our hypotheses, among other things this research will be at the service of any researcher who wants to study these phenomena in the future. Based on these results, we can declare recommendations and conclusions drawn from the research, which will be profitable and favorable for the population that has been the focus of this study, such recommendations and conclusions will be presented below.

### What do the experts recommend?

Recommended interventions to reduce professional burnout, burnout, loss of compassion, real or perceived stress and ineffective therapeutic techniques include:

- Prioritize individual self-care practices.
- Breathing exercises, "mindfulness" and use of telehealth services (therapy).
- Using social media applications and virtual platforms (eg Twitter and Zoom) to create social activities that promote health and wellness, book clubs, support groups, meditation, yoga, etc., that will encourage the creation of support networks social.
- Participation in social marketing campaigns regarding social distancing, self-care, etc.
- Volunteering in the community (distributing food, helping people in need, contributing to the community and monitoring for needed services).
- Engagement in the social work community to stay connected with other professionals and raise awareness of additional opportunities and individual contributions.
- Review of local, national and global emergency preparedness policies.

### Recommendations are drawn from this study

- Professional burnout occurs when stress and workload become overwhelming, negatively affecting the life and health of the individual.
- Relying on the results obtained, from the literature of the relevant theories and from the results obtained from the research, regarding the degree of manifestation of stress, anxiety and depression, we can say that the genuine treatment and understanding of the nature of the problems that affect health mental health leads to the maximization of positive benefits and the minimization of the deterioration of psychological well-being, which can result in high rates and more severe anxiety states leading to emotional exhaustion and professional burnout.
- To understand the nature of their psychological problem and not judge them without knowing exactly the nature of the problem. In such cases, a possible inappropriate behavior of any health professional that may be a consequence of professional burnout should be understood.
- Burnout is not something that goes away on its own. On the contrary, it can get worse if the underlying issues causing it are not addressed.
- Ignoring the signs of burnout can cause further damage to physical and mental health in the future, as well as loss of ability and energy to effectively meet the demands of the job, which can have negative effects on the other aspects of life.
- Social support can be expected to protect against burnout. Therefore, the urgent implementation of effective psychosocial and organizational interventions to protect the mental health of healthcare workers and prevent burnout is of particular importance.
- Repeating the research after 6 months or eventually after the end of the pandemic and comparing the findings from the different phases of testing among health workers.
- Supervision and team support protect them from professional burnout and are protective factors in maintaining mental health.
- Strengthening support systems and identifying protective factors (internal factors of resilience - being proactive, feeling self-controlled and making decisions about what to do and external ones - children, families, society-cultivating caring relationships, expectations positive and opportunities for meaningful participation in solving a



difficulty).

- By strengthening and developing these factors, the effects of the risk will be reduced and adaptive skills will increase.
- It is important to be aware of the warning signs of occupational burnout so you can recognize when you have them.
- There are several ways to take care, stay healthy and prevent burnout.
- Offer them support - Talking about what they are going through, and getting support from family and friends or a support group helps you process their feelings and emotions. Keeping everything inside can make them depressed and contribute to feeling overwhelmed.
- Offer them professional counseling - if necessary.
- Vacations - help relieve some of the stress and restore energy. Relaxing activities improve mood, and even 10-minute breaks can help
- Talk to work colleagues - This helps you get support and allows you to give support and encouragement to others going through something similar.
- Pay attention to their feelings and needs-While providing services, they can easily forget to take care of their own needs, so it is good to provide them with help so that they can find time for themselves.

### Limitations of the study

In stressful and life-threatening periods, the individual focus can be oriented towards survival/relatively towards finding and developing resilient factors and ignore potential risk factors which tend to appear after the end of the dangerous situation (Covid 19).

Long experience in health care work and dealing with other stressful situations may have influenced health workers have developed a high level of resilience. The nature of working in dangerous situations has made them gain professional immunity and not develop a high degree of stress, anxiety and depression. These values cannot be taken as a basis for the care workers of other KKUK clinics, but only for anesthesiology and pulmonology, because the other clinics were not subjected to the survey.

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# Covid-19 Pandemic: A Systematic Review of Nigeria Situation from the Global Perspective between February to June 2020 of the Outbreak

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**Received:** 08-Sep-2022, Manuscript No. IJCRIMPH-22-72542; **Editor assigned:** 10-Sep-2022, PreQC No. IJCRIMPH-22-72542(PQ); **Reviewed:** 15-Sep-2022, QC No. IJCRIMPH-22-72542(Q); **Revised:** 19-Sep-2022, Manuscript No. IJCRIMPH-22-72542(R); **Published:** 30-Sep-2022; doi: 10.35248/1840-4529.22.14.9.384

## Abstract

COVID-19 Pandemic remains a source of worry to many Nigerians since it's manifestation in the country on 28<sup>th</sup> February 2020. This common enemy was first identified in Wuhan City of China in December 2019 and has continued to be a major public health crisis ravaging the world. This review assessed COVID-19 pandemic situation in Nigeria from the global perspective. The focus of the assessment was on the number of people tested, number of confirmed cases, deaths, and discharged. Data for the study was generated through electronic literature search in PubMed/Medline, Google, Google Scholar, Scopus database, magazines, Newspapers and grey literature focusing on research evidences of COVID-19 pandemic. Data generated was presented in graphs and bar chart to show the trend of occurrence of the disease in Nigeria and other countries in the world. The result of the review indicated among others that as at June 28 2020, Nigeria was among the countries with the smallest number of confirmed cases globally. However, it was observed that the total number of people tested of COVID-19 as at 28 June in Nigeria was 132304 (~0.07%), very small compared to other countries like China 90,410,000(~6.46%), USA 36,191,338 (10.96%), South Africa, 1745153 (~3%) and India 9,297,749(~0.68%). It was also discovered that Nigeria among other countries had a low deaths rate due to COVID-19. The review further revealed that the low testing rate of 0.07% of the Nigerian population compared to other selected countries globally undermines the containment measure adopted by the government to control the novel virus hence the upsurge of COVID-19 in Nigeria. The review recommended among others that the government should improve on the testing capacity and the leadership of the drive should be headed by the professionals at all levels and not politicians to guarantee trust by the implementers.

**Keywords:** Covid-19 pandemic • Nigeria situation • Global perspective

## Introduction

Nigeria as one of the global entities is not exempted from the effects of novel coronavirus disease (COVID-19) which has kept the entire world worrisome. This common enemy was first identified in Wuhan City of China in December 2019 and has continued to be a major public health crisis ravaging besides China all countries around the world, Nigeria inclusive [1]. The novel virus was initially observed to be a global health emergency which was later declared a pandemic by the World Health Organization (WHO) on the 11<sup>th</sup> of March 2020, pointing to over 118,000 cases of the coronavirus illness in over 110 countries and territories around the world and the sustained risk of further global spread [2,3]. The virus has since been on the rising scale and has spread to over 200 countries and territories in every continent including African countries with more than 9843073 confirmed cases of COVID-19, 495760 fatalities and 5100637 recovered from the disease worldwide as of 28 June 2020, and the number of reported COVID-19 cases is rapidly increasing [4,5]

In Africa, the COVID-19 pandemic was first confirmed on 14 February,

2020 in Egypt, and also in Nigeria on 28 February 2020 [6-8]. However, all these confirmed cases were imported from Europe and the United States rather than directly from China where the virus originated [9]. As at 11<sup>th</sup> March 2020, not less than six African countries (Algeria, Nigeria, Senegal, Burkina Faso, Cameroon, Cote d'Ivoire, Democratic Republic of Congo, South Africa and Togo) have been affected with a total confirmed cases of forty-seven 47 patients and all the index cases had travel histories [10]. On 18 March 2020, Tedros Adhanom Ghebreyesus, the director-general of the World Health Organization (WHO), stated that the number of cases in Africa was most likely higher than reported, and urged African countries to "wake up" to the threat posed by the virus and invest in emergency preparedness [11]. The Experts further worried about COVID-19 spreading to Africa, due to obvious inadequacies of the healthcare systems in the continent, having problems such as lack of equipment, lack of funding, insufficient training of healthcare workers, and inefficient data transmission [11-13]. Melinda and Bill Gates maintained that COVID-19 spreading to African countries will be horrible as millions of dead bodies would be littered on the streets [12, 13]. The WHO regional office for Africa also predict that about two hundred thousand deaths might be recorded in Africa if effective measures were not taken by the authorities [14,9]. The experts further observed that the only reason why the reported cases of the coronavirus disease in Africa including Nigeria is low now is most likely because there have not been wide testing of people and maintained that the disease is going to bite hard on the continent [12,13].

The situation in Nigeria as one of the Africans most populous country was not far from the opinion of the experts with the arrival of the index case convened by an Italian business. This Italian who was confirmed as Nigeria's first coronavirus case and the first in sub-Saharan Africa after arriving from Milan, Northern Italy was in Nigeria for almost two full days, traveling through Lagos and visiting another state before being isolated [15]. Lagos, with about 20 million people, is the biggest city in Nigeria, Africa's most populous country with a population of over 200 million people. The identification of the COVID-19 index case in the state actually created panic among the individuals and authorities in the country that the virus could spread quickly due to the Nigerian weak health systems [15]. Though NCDC after identifying and isolating the index case immediately commenced the trace of his contacts where a total of two hundred and seventeen 217 contacts were linked to him. Of the 217, 45 traveled out of Nigeria, and 172 were present in Nigeria. Of the 172 contacts in Nigeria, 69 were in Lagos, 40 in Ogun, and 52 in other States, while 11 were in unknown locations [8]. The NCDC, following best practice, decided to test those traced for the possible presence of COVID-19 in their systems. On 8<sup>th</sup> March 2020, scientists confirmed the presence of COVID-19 in one of the contacts of the index case. This brings the total number of confirmed COVID-19 cases in Nigeria to two cases. By March 9, 2020, 27 more suspected cases had been identified across five states (Edo, Lagos, Ogun, Federal Capital Territory, and Kano) through contact tracing [16]. From this point the spread of novel Coronavirus disease (COVID-19) in Nigeria continue to surge significantly in that the latest statistics provided by NCDC on 28 June 2020 which is four months from the index case, revealed 24567 total number of confirmed cases of COVID-19 with 565 deaths, and discharged 9007 persons out of 132304 total test carried out in the African most populous country (Figure 1).

As the number of cases grew exponentially nationwide in that Nigeria now leads in both infections and death rates in West Africa and local transmission surged relative to the number of imported cases, probably from the 11 cases who disappeared to an unknown location or from the low

testing due to shortage of test kits [8,12,17-19]. These scenarios among others informed the decision to assess COVID-19 pandemic situation in Nigeria from the global perspective. Consequently, due to the adverse implications of COVID-19 on people's health and economy as well as the urgent need for total eradication of the virus, it becomes expedient to assess Nigerian situation from the global perspective owing to the experts view about COVID-19 spreading to Africa, due to obvious inadequacies of the healthcare systems in the continent, also to identify the reason why WHO regional office for Africa predicted that about two hundred thousand deaths might be recorded in Africa if effective measures were not taken by the authorities [14,9]. More so, assessing the situation will help to unveil loop holes of containment measures in the country and more promising means of combating the disease in the future. This paper thus, assessed COVID-19 pandemic situation in Nigeria from the global perspective.

**Graphical presentation of covid 19 pandemic in Nigeria**

The figure above represents the surge in the reported cases of COVID-19 and death of the patients, across the country such that as of 28 June 2020 which is four months from the index case, Nigeria has recorded 24567 total number of confirmed cases of COVID-19 with 565 deaths and discharged 9007 persons out of 132304 total test carried out in the African most populous country (Figure 1).

**Assessing the trend of covid-19 occurrence within four months outbreak in Nigeria**

COVID-19 outbreak in Nigeria as observed earlier occurred on 28th February, 2020 in Lagos one of the most populous state in Nigeria [16]. As at first one month of the outbreak the number of cases was gradual with one record of death and number of cases, below emergency threshold. However surges of daily increase in the number of new cases began to occur from the 21st April 2020, when the country began to record above 100 cases daily with the number of confirmed cases rising steadily to emergency level. On 28 June 2020, Nigeria recorded its highest daily COVID-19 tally, with the figure 779 cases [4]. The graph were sequentially arranged month-by-month in respectively, beginning from the date of the index case to 28 June being the 4 months of the outbreak of coronavirus in Nigeria (Figures 2-6).

The data in figure 6 above shows the trend of the COVID-19 deaths in the country. The graph indicated the cumulative number of deaths starting from 23 March when Nigeria recorded the first death of COVID-19. However, within three months and seven days i.e. 28 June 2020 as of this writing the total fatality has risen to 566. The surge in the number of daily cases of the novel virus as could be seen in pointed to the possibility of more deaths and these underscores the need to intensify prevention and control efforts in the country (Figures 2-5).

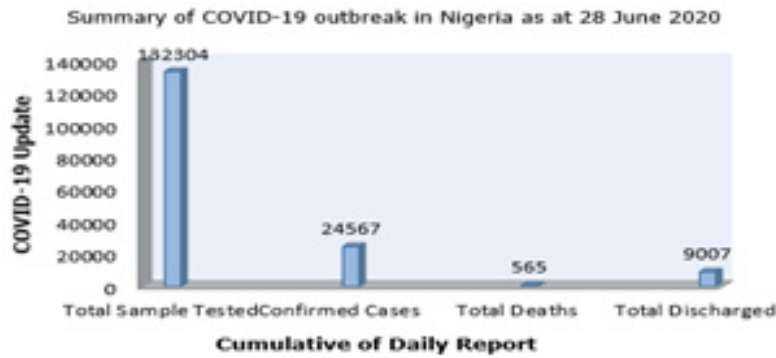


Figure 1. Summary of Coronavirus (COVID-19) Situation in Nigeria as at 28 June 2020.

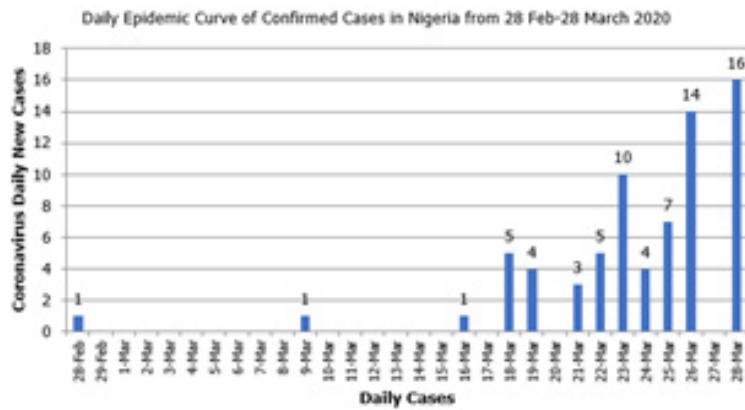


Figure 2. Indicates the cumulative growth of daily COVID-19 confirmed cases in Nigeria from 28 February – 28 March 2020.

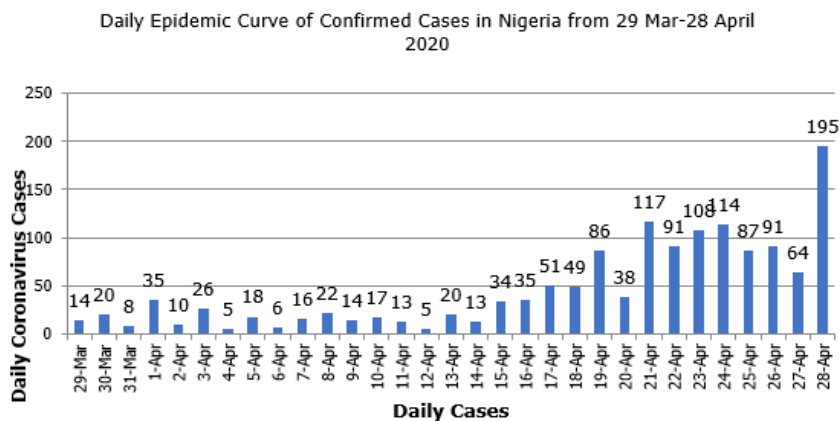


Figure 3. Indicates the daily cumulative growth of COVID-19 confirmed cases in Nigeria from 29 March–28 April 2020.

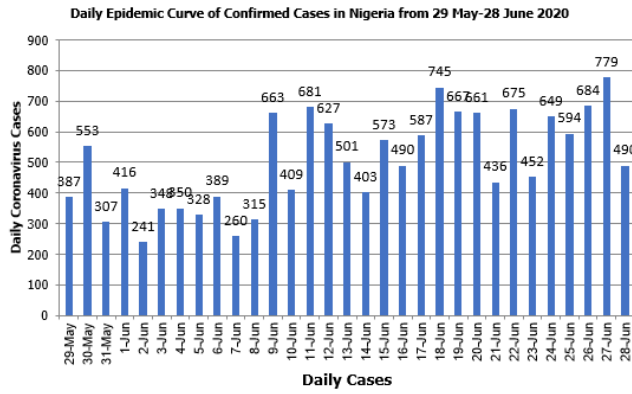


Figure 4. Indicates the daily cumulative growth of COVID-19 confirmed cases in Nigeria from 29 April–28 May 2020.

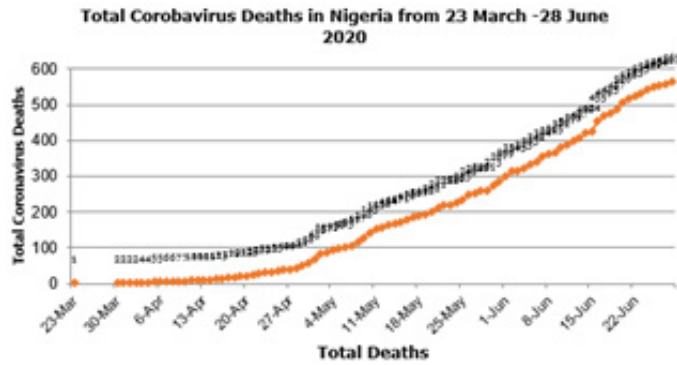


Figure 5. Indicates the daily cumulative growth of COVID-19 confirmed cases in Nigeria from 29 May–28 June 2020.

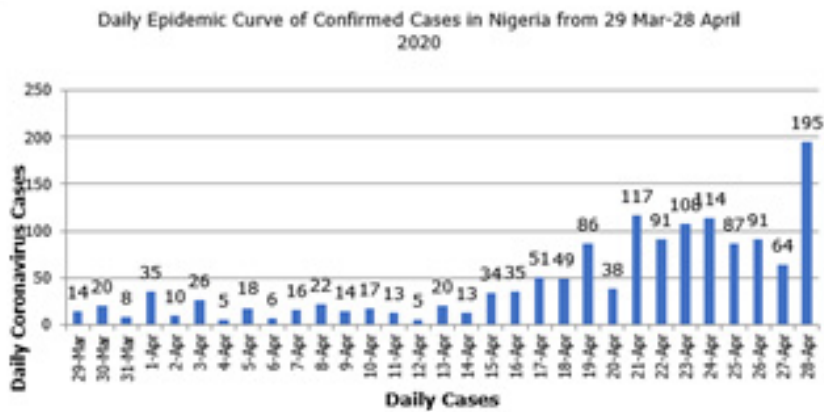


Figure 6. Above indicated the cumulative COVID-19 deaths from 23 March Nigeria recorded first death-28 June 2020 as of this writing.

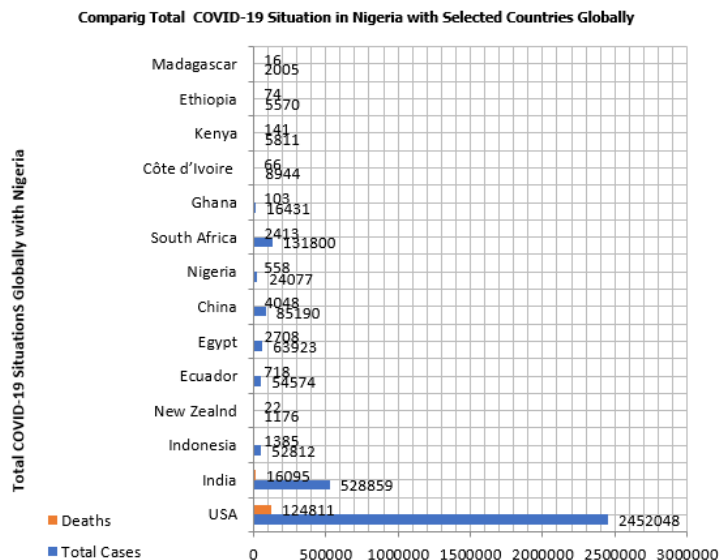


Figure 7. The COVID-19 global Situations by WHO Region as at 28 June 2020.

**Evaluating Nigeria covid-19 situations from the global dimensions**

The COVID-19 pandemic which emerged in the Hubei province of China in December 2019 has become one of the most traumatic pandemics in contemporary times with implications not only on morbidity and mortality of humans but in the overall economic survival of the entire planet [20]. The novel virus has remained a major public health crisis ravaging besides China all countries around the world, Nigeria inclusive [21]. The global COVID-19 situation by WHO region is hereby summarized in Figure 7.

Data in represented total COVID-19 confirmed cases and deaths in the respective WHO regions and the global summary as at 28 June 2020. Globally, a total of 9843073 confirmed cases were reported worldwide with 495760 deaths as at 28 June 2020 (Figure 7). Specifically, the graph indicated that Western Pacific recorded 213032 confirmed cases with 7420 deaths, South-East Asia confirmed a total of 735854 cases with 20621 deaths, Europe recorded 2656437 confirmed cases with 196541, Eastern Pacific confirmed a total of 1024222 cases with 23449 deaths, Americas recorded 4933972 confirmed cases with 241931 deaths while in Africa a total of 278815 confirmed cases with 5785 deaths was reported at the same time.

Data Figure 8 above shows the COVID-19 situations in the selected countries from the respective WHO regions with African countries recording lower cases of COVID-19 as at 28 June 2020. Specifically, USA

with 2452048 confirmed cases had recorded 124811 deaths; India with 528859 confirmed cases recorded 16095 deaths, Indonesia with 52812 confirmed cases recorded 1385, New Zealand with 1176 confirmed cases recorded 22 deaths, Ecuador with 54574 confirmed cases recorded 718 deaths, Egypt with 63923 confirmed cases recorded 2908 deaths, China with 85190 confirmed cases recorded 4048 deaths, Nigeria with 24017 confirmed cases recorded 558 deaths, South African with 131800 confirmed cases recorded 2413 deaths, Ghana with 16431 confirmed cases recorded 103 deaths, Cote d’ivoire with 8944 confirmed cases recorded 66 deaths, Kenya with 5811 confirmed cases recorded 141 deaths, Ethiopia with 5570 confirmed cases recorded 74 deaths. Madagascar with 2005 confirmed cases recorded 16 deaths. However, African countries recording lower cases of COVID 19 might not be unconnected to the number of laboratory tests conducted accordingly, see Figure 9.

The above data in represented the total test situation conducted in the globally selected WHO regional countries as of June 28, 2020. Specifically, USA had conducted 36191338 (~10.96%) tests; India 9297749 (~0.68%) tests; Indonesia 456636 (~0.17%) tests; New Zealand 395510 (~7.91%) tests; Ecuador 111523 (~0.64%) tests; Egypt 135000 (~0.13%) tests; China 90410000 (~6.46%) tests; Nigeria 132304 (~0.07%)tests; South Africa 1745153 (~3%) tests; Ghana 300520 (~0.99%) tests; Cote d’Ivoire 60652 (~0.24%) tests; Kenya 176857 (~0.33%) tests; Ethiopia 250604 (~0.22%) tests and Madagascar 23244(0.09%) tests (Figure 9).

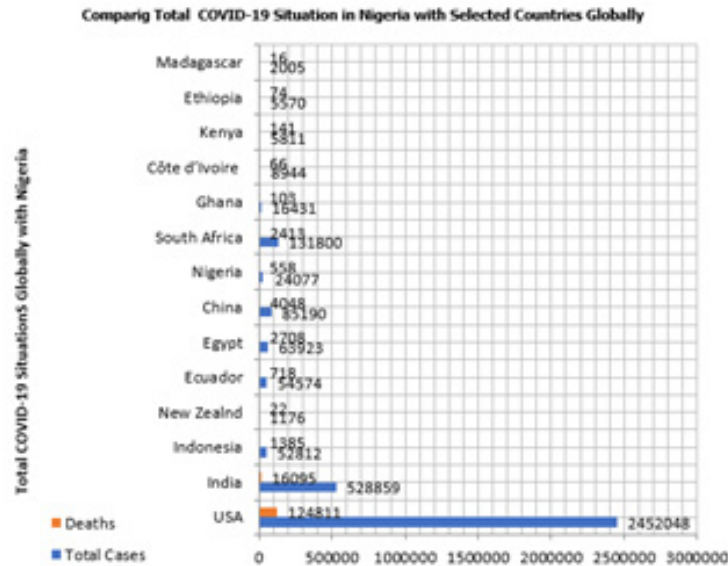


Figure 8. Comparing Total COVID-19 Situations in selected countries by WHO Region with Nigeria as at 28 June 2020.

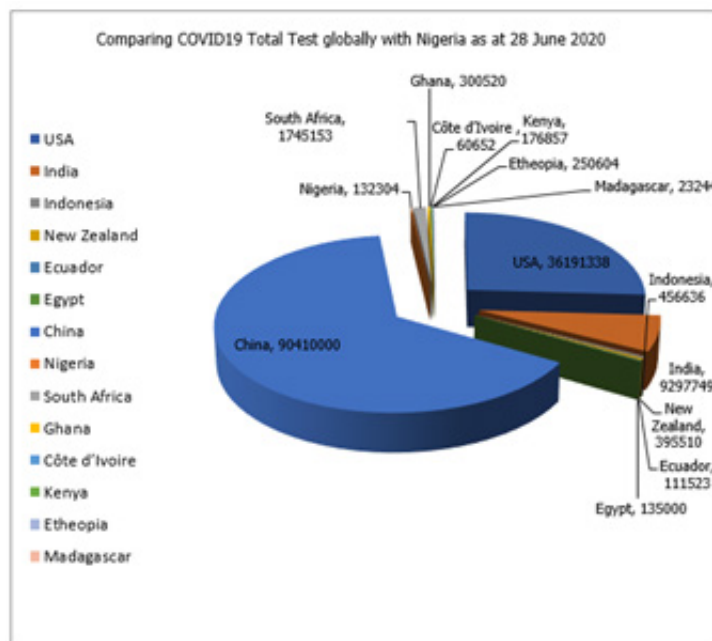


Figure 9. Comparing Total COVID-19 Test Situation in selected countries by WHO Region with Nigeria as at 28 June 2020.

## Discussion

Assessing the Summary of total COVID-19 Test, Confirmed Cases, deaths and the Population of selected countries by WHO Region with Nigeria as at 28 June 2020 as represented in the graph and bar chart above is as follows: India with a population of 1.36 billion had conducted 9297749 (~0.68%) total tests and confirmed 528859 COVID-19 cases with 16095 deaths. USA with a population of 330,237,000 had conducted 36191338 (~10.96%) total tests and confirmed 2452048 COVID-19 cases with 124811 deaths. China with a population of 1.4 billion had conducted 90410000 (~6.46%) tests and confirmed 85190 COVID-19 cases with 4048 deaths. Ghana with a population of 30,281,000 people had conducted 300520 (~0.99%) tests and confirmed 16431 COVID-19 cases with 103 deaths. Egypt with a population of 101.9 million people had conducted 135000 (~0.13%) tests and confirmed 63923 COVID-19 cases with 2908 deaths. Ecuador with a population of 17,336,000 people had conducted 115523 (~0.64%) tests and confirmed 54574 cases with 718 deaths. Kenya with a population of 53.5 million people had conducted 176857 (~0.33%) tests and confirmed 5811 cases with 141 deaths. Ethiopia with a population of 112,000,000 million people had conducted 250604 (~0.22%) tests and confirmed 5570 COVID-19 cases with 74 deaths. Côte d'Ivoire with a population of 25,717,000 people had conducted 60652 (~0.24%) tests and confirmed 8944 COVID-19 cases with 66 deaths. New Zealand with a population of 5,002,000 people had conducted 395510 (~7.91%) tests and confirmed 1176 COVID-19 cases with 22 deaths. Indonesia with a population of 270,000,000 people had conducted 456636 (~0.17%) tests confirmed 52812 COVID-19 cases with 1385 deaths. Madagascar with the population of 26969000 had conducted 23244 (0.16%) tests and confirmed 2005 cases with 16 deaths. South Africa with a population of 59.1 million people had conducted 1745153 (~3%) tests and confirmed 131800 COVID-19 cases with 2413 deaths and Nigeria with a population of 201,000,000 million people had conducted 132304 tests (~0.07%) and confirmed 24077 COVID-19 cases with 558 deaths [4,22].

The assessment of this study show that as of 28<sup>th</sup> June 2020, the four months of the index case in Nigeria, Nigeria amongst the selected countries within the WHO regions under this study recorded the lowest in percentage number of the population tested (~0.07%), far below zero point (0.5%) of the entire population of Nigeria compared to its African counterpart, the Republic of South Africa with 59 million one hundred thousand population size but covered approximately 3% of its entire population let alone the United States of America which ranks the highest with approximately 10.96% of its population covered. The number of total test in Nigeria was far lower than the population of the country compared with other countries globally. This alone has unveiled the worrisome condition of Nigeria preparedness towards tackling emergency health challenges of this nature. The situation also affirmed the expert view which predicted that about two hundred thousand deaths might be recorded in Africa including Nigeria, if effective measures were not taken by the authorities [9,11,14].

Experts have observed that more testing is the key to combating the spread of COVID-19 pandemic [23, 12]. A study published in the Journal of the American Medical Association (JAMA), titled, "Response to COVID-19 in Taiwan Big Data Analytics, New Technology, and Proactive Testing" has identified improving the capacity to test as one of the major secret for their success in containing the virus. Given its proximity to Mainland China and the large number of individuals who frequently travel back and forth between the countries, Taiwan was at risk of having the second-highest number of imported COVID-19 cases, according to a model developed by researchers at Johns Hopkins University and the University of New South Wales Sydney. News reports indicate that each year, about 60,000 flights carry 10 million passengers between Taiwan and China. But after the first reports emerged of the infection in Wuhan, China, "Taiwan quickly mobilized and instituted specific approaches for case identification, containment, and resource allocation to protect the public health". Studies have indicated that the country has managed to contain the outbreak of COVID-19 following their aggressive actions towards speedy response to the recognition of a novel coronavirus in Taiwan, compared to recognition of the same novel coronavirus in Nigeria [23].

There are concerns about the shortage of COVID-19 test Kits in the country which have continued to threaten the chances of the patient's survival and containment of the spread of the virus. The situation has created panic, as most people want to get tested as soon as possible but cannot be tested due to shortage of test kits [18,19]. The situation has become worse as Director-General and Chief Executive Officer of NCDC,

Dr. Chikwelhekweazu, disclosed that most Nigerians are besieging the center asking to get tested where the country cannot do so as they are only focusing on those with the symptoms due to shortage of test kits [18]. Muanya observed that the same fear informed the recent decision of the United States government to commence evacuation of her citizens in Nigeria over a possible escalation of coronavirus (COVID-19) in the country as the exact number of Nigerians exposed to the dreaded virus could not be determined hence possible victims to COVID-19 mingle freely with people [18]. The Kano, Nigeria's second-most-populous state, has recorded a spike in cases of COVID-19 over the past few days and now has the second-highest number of cases in Nigeria with more than 600 deaths within the fortnight, authorities in the city of 5 million denied that COVID-19 was a major issue, calling a surge in deaths "mysterious" and attributing them to other illnesses. But health workers on the ground offer a different story. They observed that the rate at which people are dying is abnormal in a city where many have disregarded social distancing measures [24-26]. Also report released on the 15<sup>th</sup> of March has it that there was a deliberate mass movement of people (Almajiris) from the Northern (more affected areas as it were) parts to the southern part of the country which sparked a lot of media outcries, inferring that the (Almajiris) were used as vectors for spreading the virus to the less affected regions as some of them were reported to have tested positive to the virus [27-30].

## Conclusion

The outbreak of COVID-19 pandemic is an ongoing crisis that is causing global uncertainty in an unprecedented scale. The event of this pandemic has made it a notorious fact that Nigeria's health system is below standard and there is no obvious widespread preparedness for emergency health challenges let alone tackling issues of the pandemic as evidenced by poor testing, poor provision of palliatives, the level of discordances on social distancing guidelines between citizens, some stakeholders at different levels and government. Hence the need that this obvious reckless abandonment of the health sector by various governments should be addressed immediately using the present situation as an eye-opener to averting more health catastrophes in the future; the health sector should be allocated the due budgetary needs instead; health is wealth and prioritizing it is not inadequate! Although the pandemic came unannounced, the role of integrated knowledge translation (carrying people along at all stages of planning to execution) ab-initio on the implementation of the outlined strategies should not be swept under the carpet since people at all levels have different perceptions and play key roles in achieving positive results in the fight against COVID-19, and not just engaging them only at the implementation stage if they have to assume the ownership of the strategy (policy). This is because many (including religious leaders and community leaders) are yet to comprehend the validity and truism of the pandemic. This supports the view that "effective and timely management of infections are greatly dependent on social distancing behavior; perception plays a vital role in the adoption of protective behavioral response", therefore, the failure of people to queue on the implementation strategies is the beginning of the failure in the entire processes. Again, the leadership of the drive to containing this pandemic should be headed by the health professionals at all levels and not the politicians in order to guarantee trust by the implementers who are already biased on the integrity of politicians (Nigeria context)

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