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Editor's note: Given the international viral crises occurring in late 2014, publication and distribution of this article is a priority; the fact that these viral-infection health crises exist is prima facie evidence of the failure of current systems and the need—not for new treatments within the same model—for a new model better suited for international distribution, disease prevention, and broad-spectrum effectiveness.



Unified Antiviral Strategy published by ICHNFM

Alex Vasquez DC ND DO FACN in Bogota, Colombia

History and Perspectives

What we as doctors learn in medical school about viral infections is summarized within the following course titles: Microbiology, Pathology, and Pharmacology. Following this instruction, the treatments that we use are sanitation, vaccination, and antiviral drugs, respectively. Based on training and my experience with other doctors, I suggest here that most medically-trained doctors are—at least per their formal training—unable to see beyond these blinders and limited options. My intention in writing this article is to broaden those conceptual and therapeutic horizons via the outlining of a structured antiviral strategy that includes the previously mentioned sanitation, vaccination and antiviral drugs but extends well beyond those limited options. Additional citations, support, and clinical details (e.g., dosing and contraindications) for this strategy are available in a digital format constantly updated¹; the purpose of this article is to structure the strategy, to shift the paradigm.

The fact that most doctors learn nothing about the science of Nutrition in medical school is well known publicly

and within medical school academics.² Typically, most medical students read one chapter about pathologies caused by extreme nutritional deficiencies, but they learn essentially nothing about therapeutic nutrition and how it can be applied in the prevention and treatment of disease. Does ignoring Nutrition force doctors *by default* to over-rely on drugs and surgery? Would not public health be better served if information were distributed on the nutritional prevention of viral infections, so that patients and doctors alike would have more options?

What I have noticed through the various doctorate programs I have attended is that clinical training in the management of viral infections remains mostly phenomenalist and enigmatic, rather than deciphered and structured. As an educator, and researcher and writer, I have learned through experience to structure information in such a way that the accessibility and retention of the information is enhanced by students/readers (e.g. the DDIRRT for risk management [e.g., defensive mindset, duration of treatment, interactions, referral, return visit, treatment plan],

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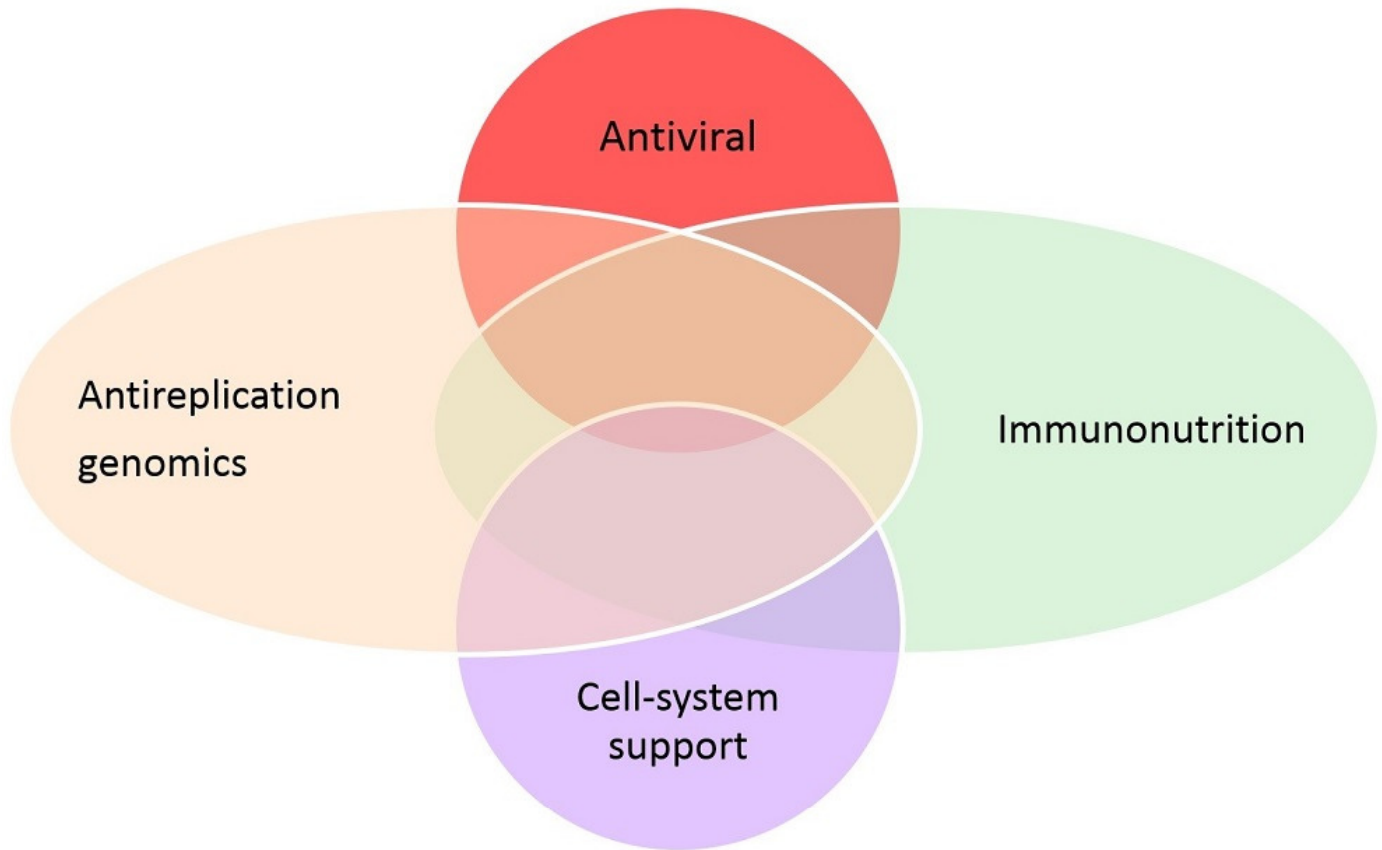
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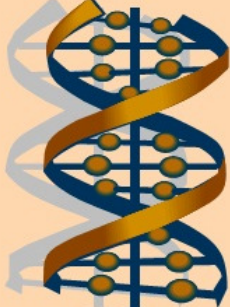
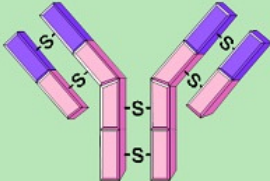

MYBESTPLAIDFIG for nutritional immunomodulation³, and FINDSEX® acronyms⁴). My main purpose in writing this essay is to demonstrate a unique and structured antiviral strategy and to provide representative examples of its practical application.

Rather than viewing viral infections in a manner that is phenomenalistic and enigmatic, and therefore unwieldy, leading to clumsy prevention and treatment strategies, we

should deconstruct the complexity of the infectious process. Doing so – at least in the manner that I have described – gives us four areas upon which we can focus our efforts: 1) targeting the virus directly, 2) blocking viral replication, 3) supporting immune function, and 4) supporting cellular and whole-body health. These are illustrated in the accompanying diagram and briefly described and exemplified in the four respective paragraphs that follow.



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Antiviral	Antireplication	Immunonutrition	Cell-system support
 <p data-bbox="142 1711 446 1890">Direct action against the virus itself, using nutrients and botanicals and drugs, targeting the machinery and blocking viral mutations</p>	 <p data-bbox="487 1711 787 1890">Inhibition of viral use of human DNA and replicative machinery; viruses can only replicate by "hijacking" human genetic process</p>	 <p data-bbox="836 1711 1128 1890">Support and occasional stimulation of humoral (antibody, immunoglobulin) cell-mediated, and cytokine-mediated immunity</p>	 <p data-bbox="1161 1711 1485 1942">Supporting the intracellular systems (mitochondria and endoplasmic reticulum) and whole-body health to optimize immune response, limit damage, promote recovery, prevent recurrence</p>

Multicomponent Antiviral Strategy

1. **Targeting the virus directly:** Targeting the virus directly has been the focus of medical practice and public health efforts through sanitation, vaccination, and –more recently– the use of disease-specific antiviral drugs. Several nutrients and botanicals are also very effective for directly targeting viral infections, and I will provide two examples here. The mineral selenium has a wide margin of safety and provides antiviral benefits through several mechanisms, two of which are blocking viral mutation and also blocking viral replication; anti-infectious clinical benefits are proven in humans with HIV/AIDS.⁵ The botanical medicine and common herbal tea licorice (*Glycyrrhiza glabra*) has demonstrated antiviral effectiveness in experimental studies and human clinical trials against several different pathogenic viruses, including hepatitis B virus (HBV), hepatitis C virus (HCV), herpes simplex virus (HSV), influenza A virus, human immunodeficiency virus (HIV-1), severe acute respiratory syndrome (SARS)-related coronavirus, respiratory syncytial virus, arboviruses, vaccinia virus, and vesicular stomatitis virus⁶; this botanical has an excellent history of safety spanning several thousand years, with adverse/beneficial effects including a pseudoaldosterone effect (sodium retention and potassium depletion) and a testosterone-lowering effect, and mechanism of action including via direct virus binding, inhibition of viral replication, enhancement of immunity, inhibition of inflammation, and blocking the activity of specific enzymes. Antiviral nutrients and botanicals can be used alone, in combination, and alongside medications for additive and synergistic benefits.
2. **Blocking viral replication:** Inhibition of viral replication is the therapeutic goal of many antiviral drugs, while several nutrients can also provide a similar effect. Because viruses are unable to self-replicate and must therefore rely on host/human genetic and synthetic machinery for their replication, nutrients that modulate genetic expression can have therapeutic value here, namely via DNA methylation and blockade of the transcription factor NFκB. The few nutrients which promote DNA methylation and which also have proven clinical effectiveness against viral infections include folic acid⁷ (now used clinically in the forms of folinic acid and methyl-folate), vitamin D3⁸, betaine and S-adenosyl-methionine.⁹ Inhibition of the NFκB pathway for antiviral effectiveness is well-documented, with two examples being with NAC against influenza¹⁰ and lipoic acid against viral hepatitis and HIV.¹¹
3. **Supporting immune function:** The performance and regulation of the immune system is heavily dependent on optimal nutritional status, and without proper nutrition, the immune system is slanted simultaneously toward underactivity (deficiency-induced immunosuppression) and hyperactivity manifesting as inflammation and autoimmunity.¹² Nutritional deficiencies are very common in the general population and thereby contribute to

epidemics of infectious and inflammatory diseases. Human clinical trials using nutrients alone or in combination to support immune function in general have shown outstanding safety and efficacy against infectious diseases, especially use of glutamine, whey protein isolate, vitamin A, vitamin D, fish oil, and zinc.¹³ Nutritional supplementation has been shown in several instances to improve immunological response to vaccinations; for example, cystine and theanine were noted to increase seroconversion of influenza vaccination in elderly persons.¹⁴

4. **Supporting cellular and whole-body health:** Viral infections have numerous adverse effects on cellular and whole-body health. Intracellular consequences of viral infections include mitochondrial dysfunction¹⁵ and endoplasmic reticulum stress¹⁶, manifesting clinically as prolonged inflammation, fatigue and – likely – in the case of herpes simplex infections, Alzheimer's disease.¹⁷ Among the more than 30 interventions to improve mitochondrial function and alleviate endoplasmic reticulum stress, we see that exercise, low-carbohydrate diets, coenzyme Q-10, lipoic acid, and acetyl-L-carnitine are preeminent in their safety, effectiveness, and collateral benefits.¹⁸ Osteopathic manipulative medicine, perhaps via promotion of improved respiration and lymphatic flow and distribution of chemokines, has also shown benefit in the nonpharmacologic amelioration of infectious disease.¹⁹

In summary, via the use of a structured antiviral strategy, pharmacologic and nonpharmacologic interventions can be applied with greater clinical and public health effectiveness, thereby alleviating the clinical, social, financial, and political burdens of these infectious diseases.

Conclusion and Application

The recent international outbreaks of viral infections have made one thing very clear: we need a new antiviral strategy in modern times to combat ongoing scourges of viral infections; pandemic spread of these infections in late 2014 is proof that the usual medical and public health measures of sanitation, vaccination, and medication are insufficient. The ideal antiviral strategy would be both generally and specifically effective, widely available, low-cost, with few or negligible adverse effects and drug/disease interactions. For most of medical and public health history, the tools used against viral infections have been sanitation and vaccination, with the more recent addition of molecularly-targeted antiviral drugs specific for each virus. My purpose in writing this essay is not to discuss or debate sanitation nor vaccination nor medication, but rather to point out several other intervention strategies that can be used additionally and to great patient and public health benefit. These evidence-based interventions have proven safety, effectiveness, and cost-effectiveness with wide and immediate international availability and generally negligible adverse effects and drug/disease interactions.



Publication history, author disclosures, citation format: The primary goal of this article is to outline a more complete strategy to counter the personal and population-wide impacts of viral infections; representative citations supporting these concepts are provided. This article underwent legitimate peer-review by an international interdisciplinary team of professionals; IJHNF Editorial Board is listed online (ichnfm.org/publications). Dr Vasquez has authored several of the books and articles cited in this article. Dr Vasquez has served as a Lecturer and Researcher for Biotics Research Corporation. Because this is a conceptual essay, citations to literature have been compiled together for efficiency.



Estrategia antiviral unificada para médicos y el público

Alex Vasquez DC ND DO FACN en Bogotá, Colombia

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Historia y perspectivas

Como médicos lo que aprendemos en la escuela de medicina acerca de las infecciones virales se resume en los siguientes títulos de cursos: 1) Microbiología, 2) Patología, y 3) Farmacología. Siguiendo estas instrucciones, los tratamientos que usamos son 1) saneamiento, 2) vacunas y 3) medicamentos antivirales, respectivamente. Basado en la formación médica y mi experiencia con otros médicos, les sugiero aquí que más la mayoría de los médicos capacitados son — al menos por su entrenamiento formal — incapaces de ver más allá de las opciones limitadas a las que fueron expuestos. Lo que me gustaría hacer en el presente artículo es ampliar los horizontes conceptuales y terapéuticos mediante una estrategia estructurada antiviral que incluye el saneamiento, vacunación y medicamentos antivirales previamente mencionados, pero que se extiende más allá de estas opciones limitadas. Los datos clínicos (por ejemplo, dosificación y contraindicaciones) de esta estrategia, apoyo y referencias adicionales están disponibles en

formato digital constantemente actualizado [1]; el propósito de este artículo es proveer una estrategia para cambiar el paradigma actual de la estructura.

El hecho de que la mayoría de médicos no se les enseña acerca de la ciencia de la nutrición en la Facultad de medicina es conocido públicamente.[2] Por lo general, la mayoría de los estudiantes de medicina leen solamente un capítulo sobre patologías causadas por deficiencias nutricionales extremas, pero aprenden esencialmente nada acerca de nutrición terapéutica y cómo puede ser aplicada en la prevención y tratamiento de la enfermedad. ¿Ignorando nutrición obliga a médicos por desconocimiento a confiar demasiado en medicamentos y cirugía? ¿Sería la salud pública mejor servida si se distribuye información sobre la prevención de infecciones virales y beneficios nutricionales para que los pacientes y médicos por igual tengan más opciones terapéuticas? ¿Estamos tratando insuficiencias nutricionales con medicamentos?

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Lo que me he dado cuenta a través de los diversos programas de doctorado que he asistido es que la capacitación clínica en el tratamiento de infecciones virales sigue siendo en su mayoría fenomenalista y enigmática, en lugar de descifrada y estructurada. Como educador, investigador y escritor, he aprendido a través de la experiencia que para estructurar efectivamente la información de tal manera que la accesibilidad y la retención de la información se ve reforzada por los estudiantes/lectores (por ejemplo el acrónimo MYBESTPLAIDFIG para la inmunomodulación nutricional [3] y FINDSEX® por tratamientos integrativos contra inflamación [4]). Mi propósito principal al escribir este ensayo es demostrar

una estrategia única y estructurada antiviral y proporcionar ejemplos representativos de su aplicación práctica.

En lugar de ver las infecciones virales de una manera que es fenomenalista y enigmática y por lo tanto, difícil de manejar, llevando a estrategias de prevención y tratamiento inefectivos, nosotros debemos disminuir la complejidad del proceso infeccioso. Hacerlo – al menos en la forma que he descrito – en la cual nos da cuatro áreas en las cuales podemos enfocar nuestros esfuerzos: 1) contra el virus directamente, 2) bloqueando la replicación viral, 3) apoyando la función inmune y 4) apoyando la salud celular y de todo el cuerpo. Estos son ilustrados en el diagrama adjunto y brevemente descritos y ejemplificados en los cuatro apartados respectivos que siguen.

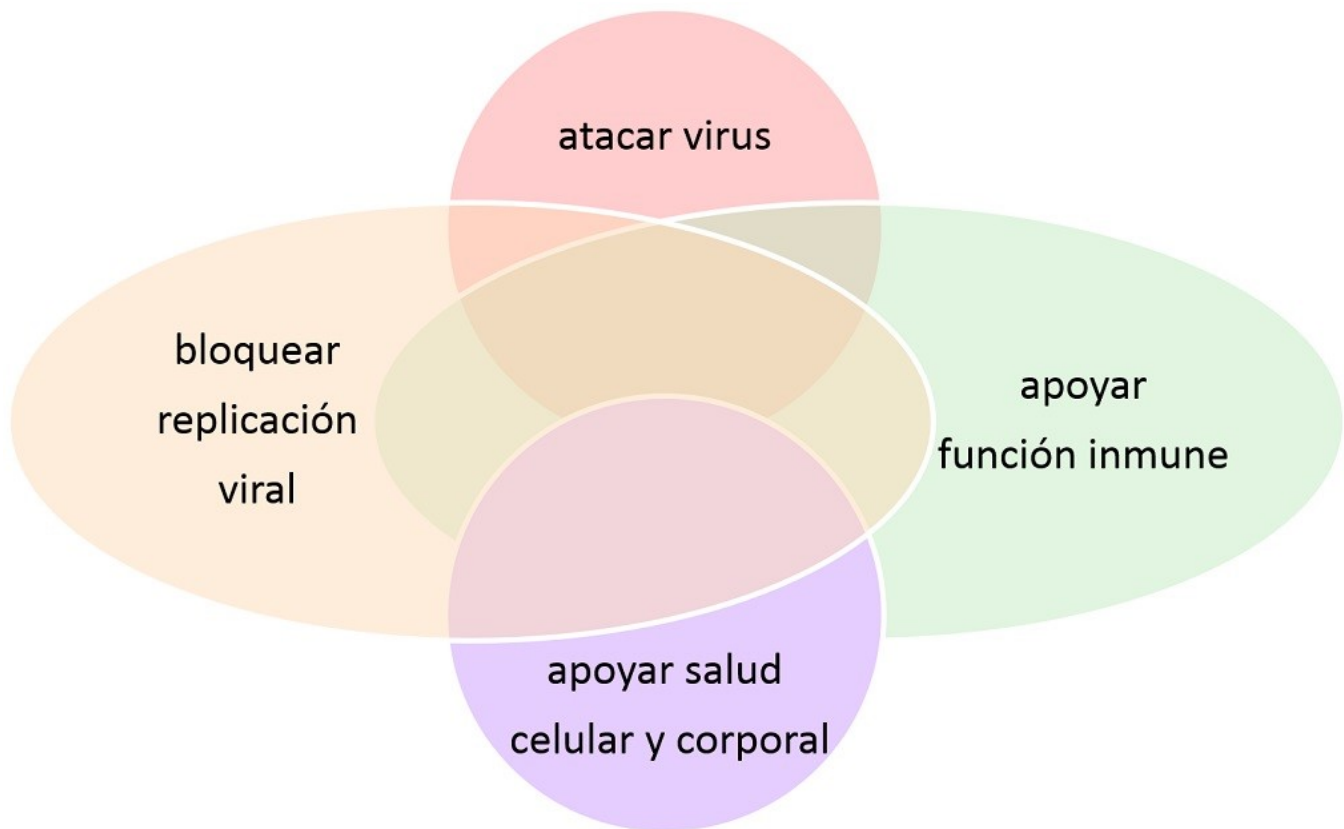


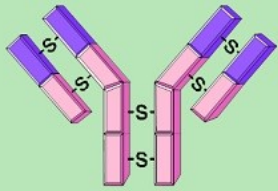



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<p>Directamente contra el virus</p>  <p>El uso de nutrición, medicinas botánicas, y drogas para atacar el virus directamente; bloquear mutaciones</p>	<p>Contra-replicación</p>  <p>Bloquear el uso de sistemas genéticos por reproducir el virus</p>	<p>Nutrición para el sistema inmunológico</p>  <p>Apoyar y estimular el sistema inmunológico con nutrición</p>	<p>Mejorar salud celular y todo el cuerpo</p>  <p>Apoyar los procesos de recuperación y reparación de las células y del cuerpo</p>
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Estrategia Antiviral multicomponente

1. Ataque directo al virus: Atacar directamente el virus ha sido el foco de los esfuerzos de salud pública y la práctica médica a través de saneamiento, vacunación y – más recientemente – el uso de medicamentos antivirales específicos. Varios nutrientes y productos botánicos también son muy efectivos para atacar directamente las infecciones virales, y daré dos ejemplos aquí. El mineral selenio tiene un amplio margen de seguridad y proporciona beneficios antivirales a través de varios mecanismos, dos de los cuales bloquean la replicación viral y también bloquean la mutación viral; beneficios antiinfecciosos clínicos son probados en seres humanos con VIH/SIDA.[5] La medicina botánica y té de hierbas *Glycyrrhiza glabra* ha demostrado eficacia antiviral en estudios experimentales y ensayos clínicos en humanos contra varios patógenos virales diferentes, incluyendo el virus de la hepatitis B (VHB), virus de la hepatitis C (VHC), virus del herpes simple (VHS), un virus de influenza, virus de inmunodeficiencia humana (VIH-1), el síndrome respiratorio agudo severo (SARS)-relacionados con el coronavirus, virus respiratorio sincitial, arbovirus, virus de la vaccinia y virus de la estomatitis vesicular [6]; este botánico tiene una excelente historia de seguridad que abarca varios miles de años, con pocos efectos adversos incluyendo un efecto de pseudoaldosterona (agotamiento de potasio y retención de sodio) y un descenso de testosterona, efecto y mecanismo de acción incluyendo vía la unión del virus, inhibición de la replicación viral, mejora de la inmunidad, la inhibición de la inflamación y el bloqueo de actividad de enzimas específicas. Botánicos y nutrientes antivirales pueden utilizarse solos, en combinación y junto con medicamentos para beneficios aditivos y sinérgicos.

2. Bloqueo de la replicación viral: Inhibición de la replicación viral es el objetivo terapéutico de muchos fármacos antivirales, mientras varios nutrientes también pueden proporcionar un efecto similar. Debido a que los virus son incapaces de replicar por sí solos y por lo tanto deben contar con una maquinaria genética y de síntesis de su anfitrión humano para su replicación, nutrientes que modulan la expresión genética pueden tener valor terapéutico, es decir mediante la metilación del ADN y bloqueo del factor de transcripción NFκB. Los pocos nutrientes que promueven la metilación del ADN y que también han demostrado eficacia clínica contra las infecciones virales incluyen el ácido fólico [7] (ahora utilizado clínicamente en las formas de ácido folínico y metilo y 5 metil folato), vitamina D3 [8], betaína y S-adenosil-metionina.[9] inhibición del NFκB como mecanismo efectivo antiviral ha sido probada, con dos ejemplos: NAC (acetil-l-cisteína) contra gripe [10] y el ácido lipoico contra hepatitis viral y el VIH.[11]

3. Apoyo a la función inmune: El funcionamiento y regulación del sistema inmune es fuertemente dependiente del estado nutricional óptimo y sin una nutrición adecuada, el sistema inmunitario está inclinado simultáneamente hacia hipoactividad (inmunodepresión inducida por deficiencia o insuficiencia) y la hiperactividad que se manifiesta con inflamación y autoinmunidad.[12] Las carencias son muy comunes en la población general y contribuyen a epidemias

de enfermedades infecciosas e inflamatorias. Ensayos clínicos en humanos usando nutrientes solos o en combinación para apoyar la función inmune en general han demostrado eficacia contra las enfermedades infecciosas y con una seguridad excepcional, especialmente el uso de glutamina, proteína, vitamina A, vitamina D, zinc y aceite de pescado.[13] Ha sido demostrado en varios casos que los suplementos nutricionales mejoran la respuesta inmunológica a las vacunas; por ejemplo, fue observado que cistina y teanina aumentan la seroconversión de vacunación contra la influenza en las personas mayores. [14]

4. Apoyo a la salud celular y corporal: Las infecciones virales tienen numerosos efectos adversos sobre la salud celular y todo el cuerpo. Consecuencias intracelulares de infecciones virales incluyen la disfunción mitocondrial [15] y estrés del retículo endoplasmático [16], que se manifiesta clínicamente como inflamación prolongada, la fatiga y – probablemente – en el caso de infecciones por herpes simple, la enfermedad de Alzheimer.[17] Entre las más de 30 intervenciones para mejorar la función mitocondrial y aliviar el estrés del retículo endoplasmático, vemos que el ejercicio, las dietas bajas en carbohidratos, ácido lipoico, coenzima Q-10 y acetil-l-carnitina son preeminentes por su seguridad, eficacia y beneficios colaterales.[18] La manipulación osteopática, quizás mediante la promoción del mejoramiento de la respiración y el flujo linfático y la distribución de las quimiocinas, también ha demostrado beneficio en el mejoramiento no farmacológico de las enfermedades infecciosas.[19]

En resumen, mediante el uso de una estrategia estructurada antiviral, las intervenciones farmacológicas y no farmacológicas pueden aplicarse con mayor eficacia clínica y de salud pública, aliviando las cargas de estas enfermedades infecciosas clínicas, sociales, financieras y políticas.

Conclusión y aplicación

Los brotes recientes internacionales de infecciones virales han hecho una cosa muy clara: necesitamos una nueva estrategia antiviral en los tiempos modernos para combatir estos nuevos flagelos virales en curso; la pandemia de propagación de estas infecciones en 2014 es prueba de que las medidas médicas habituales y las de salud pública de saneamiento, la vacunación y medicación son insuficientes. Para la mayoría de médicos y funcionarios de salud pública, éstas han sido las herramientas utilizadas contra las infecciones virales con la más reciente adición de fármacos antivirales molecularmente orientados específicamente para cada virus. Bajo esta premisa la estrategia antiviral ideal sería tanto en general y específicamente eficaz, ampliamente disponible, de bajo costo y con pocos o insignificantes efectos adversos e interacciones. Mi propósito de escribir este ensayo no es discutir, ni debatir el saneamiento ni vacunas, ni medicamentos, sino señalar otras estrategias de intervención que pueden beneficiar al paciente además de la salud pública. Estas intervenciones basadas en evidencia han demostrado seguridad, eficacia y rentabilidad con amplia e inmediata disponibilidad internacional y generalmente insignificantes efectos adversos e interacciones con medicamentos y enfermedades.



Citations/references:

- ¹ Digital clinical protocol updated regularly: Vasquez A. *Antiviral Nutrition: Against Colds, Flu, Herpes, AIDS, Hepatitis, Ebola, Dengue, and Autoimmunity: A Concept-Based and Evidence-Based Handbook and Research Review for Practical Use*. International College of Human Nutrition and Functional Medicine, 2014. (ASIN: B00OPDQG4W) <http://www.amazon.com/dp/B00OPDQG4W>. Printed in book format: Vasquez A. *Antiviral Strategies and Immune Nutrition*. CreateSpace Publishing, 2014. (ISBN: 1502894890)
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International Journal of Human Nutrition and Functional Medicine: Introduction, Overview, and Summary of Instructions for Authors

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