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"Reevaluating Hygiene Best Practices During the COVID-19 Crisis: Systematic review"

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CONTEXT:
The article delves into the impact of the COVID-19 pandemic, with a specific focus on preventive measures and mitigation strategies.
OBJECTIVES:
The primary aim of this articleis to assess the effectiveness of key preventive measures such as mask-wearing, hand hygiene, and social distancing in combating the spread of COVID-19.
METHOD:
To acquire pertinent information, we conducted an extensive electronic search across reputable databases including Google Scholar, Scopus, Medline, and PubMed, spanning from January 2024 to April 2023.
RESULTS:
The results indicate that consistent adherence to preventive measures significantly reduces the risk of COVID-19 transmission. Insights into the dynamics of virus spread and survival on different surfaces were also obtained.
CONCLUSION:
This study underscores the vital importance of maintaining strict adherence to recommended preventive measures to curb the spread of COVID-19. It emphasizes the need for continued vigilance and collective efforts in combating the ongoing pandemic.
KEYWORDS:
- COVID-19
- Preventive measures
- Mask-wearing
- Hand hygiene
- Social distancing
- Virus transmission
- Pandemic management

❖ THE EMERGENCE AND GLOBAL IMPACT OF COVID-19 :

The COVID-19 pandemic began with the emergence of the virus in Wuhan, China, rapidly escalating into a worldwide public health crisis. Key preventive measures include basic hygiene practices such as consistent mask-wearing, meticulous handwashing with soap or antiseptic solutions, and maintaining social distancing. These critical hygiene protocols must remain in place even after the development and rollout of COVID-19 vaccines and the commencement of mass vaccination campaigns, as herd immunity is still being established.

Research efforts have focused on evaluating the effectiveness of these hygiene measures and examining the diverse transmission pathways of the virus, particularly its interaction with food networks. Studies have investigated the virus's pathophysiology and its ability to survive on droplets of varying sizes, which influence disease dispersion dynamics. While respiratory transmission remains the predominant route, the potential for oral-fecal transmission should not be discounted.

Concerns have arisen about food serving as a potential viral vector, with uncertainties regarding the virus's survivability and the possibility of indirect contamination of consumers. A meticulous and comprehensive hygienic strategy, encompassing both personal and environmental measures, remains paramount in the collective efforts to combat this ongoing pandemic.

KEYWORDS:
- COVID-19
- SARS-CoV-2 infection
- Handwashing
- Hand sanitization
- Atmosphere
- Ambient air
- Fecal-oral transmission
- Food

Viruses are capable of causing a wide range of illnesses in humans, targeting various tissues and organ systems. Some of the most significant global public health challenges have been associated with viral infections, such as HIV leading to severe immunodeficiency, and hepatitis B and C viruses causing liver damage. Viruses that infect the

gastrointestinal tract, nervous system, or respiratory system are known to produce digestive, neurological, and pulmonary symptoms, respectively. Additionally, certain viruses have been linked to the development of various types of cancer, including human T-cell lymphotropic virus, human papillomavirus, and Merkel cell polyomavirus.

The full spectrum of viruses capable of infecting human cells, known as the human virome, and their comprehensive impact on health remains an area requiring further research and understanding.

The COVID-19 pandemic, caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), represents a recent and highly significant viral threat to global public health. This novel coronavirus exhibits distinct characteristics compared to previously known coronaviruses, and its rapid global dissemination has led the World Health Organization to classify COVID-19 as a severe pandemic, with the potential to impact millions of lives worldwide.

Pandemics of the past, such as the devastating Spanish Flu outbreak in the early 20th century, have served as cautionary examples, highlighting the ever-present risk of emerging infectious diseases. Most emerging infectious diseases that affect or threaten human health originate from wildlife, known as zoonotic diseases. Wild animals can serve as reservoirs for viruses, and when they come into close contact with domestic species, the virus can be transmitted, subsequently increasing the risk of transmission to humans.

The factors contributing to the increased risk of zoonotic disease emergence include expanded international travel and trade, the expansion of agricultural lands leading to habitat fragmentation, and the encroachment of human populations into previously natural environments. These factors create an "epidemiological bridge" that facilitates the spillover of viral agents from animals to humans.

❖ A TIMELINE OF KEY COVID-19 PANDEMIC MILESTONES

2020:

- January 30: WHO declares COVID-19 a Public Health Emergency of International Concern (PHEIC).
- March 11: WHO declares COVID-19 a pandemic as it spreads to over 100 countries.
- April 24: WHO issues guidance on the use of masks for the prevention of transmission in community settings.

2021:

- June 5: WHO issues emergency use listing for antigen-based rapid diagnostic tests.
- December 31: WHO includes the vaccine developed by Pfizer-BioNTech in its Emergency Use Listing (EUL).

2022:

- May 10, 2021: FDA expands emergency use authorization for the Pfizer-BioNTech vaccine to adolescents.
- November 26, 2021: WHO announces a new variant called Omicron, found in South Africa.
- October 6, 2022: WHO publishes the first case of long COVID.

❖ APPROACH AND METHODOLOGY

In order to gather relevant data, we carried out a thorough electronic investigation across respected databases such as Google Scholar, Scopus, Medline, and PubMed. This search spanned the period from January 2024 to April 2023 and resulted in the selection of 80 review articles.

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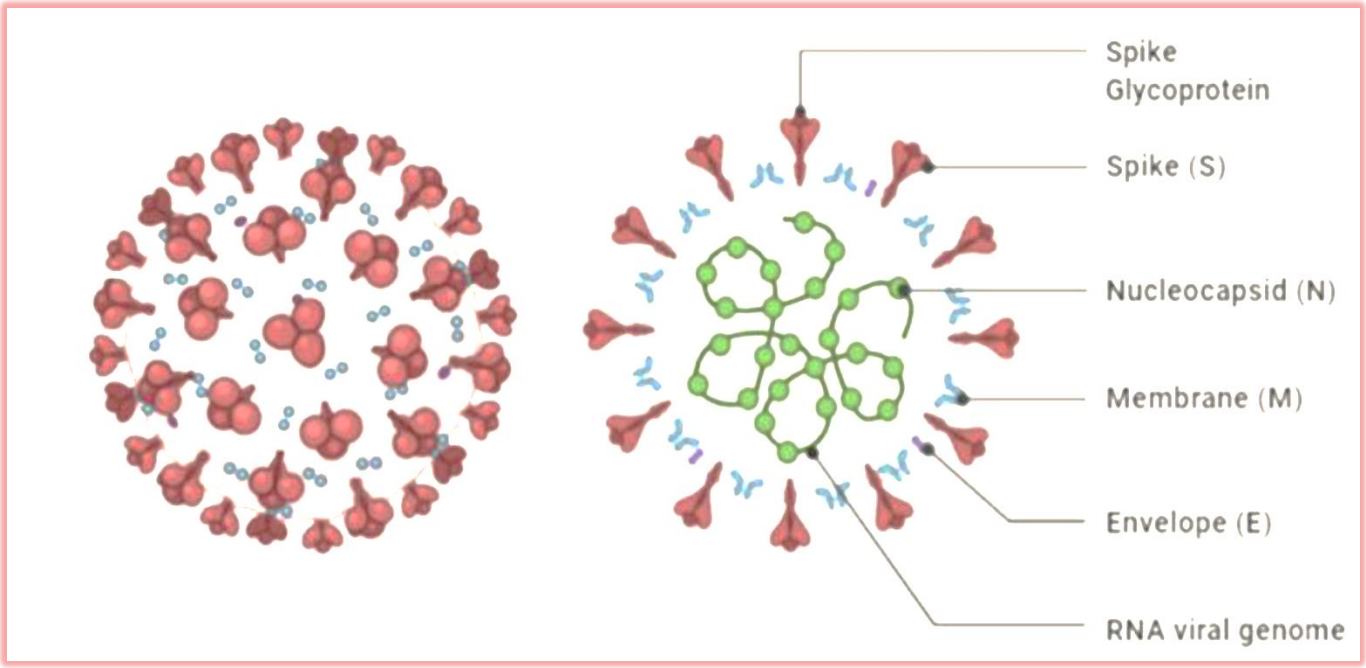
❖ STRUCTURE AND PROPERTIES OF THE SARS-COV-2 VIRUS :

Coronaviruses, including SARS-CoV-2, are characteristically enveloped, single-stranded, positive-sense RNA viruses with a genome size ranging from 27 to 32 kilobases. They are named "coronaviruses" due to their distinctive crown-like appearance under an electron microscope, which is attributed to the spike-like projections on their surface.

The Orthocoronavirinae subfamily of coronaviruses is divided into four genera: alpha, beta, gamma, and delta. The seven known human coronaviruses (HCoVs) belong to two of these genera: the alpha coronaviruses (HCoV-229E and HCoV-NL63) and the beta coronaviruses (HCoV-HKU1, HCoV-OC43, MERS-CoV, SARS-CoV, and SARS-CoV-2).

The SARS-CoV-2 virus, identified in January 2020, is a new form of beta-coronavirus that is genetically more similar to SARS-CoV than other known HCoVs. SARS-CoV-2 utilizes the human angiotensin-converting enzyme 2 (ACE2) receptor as its entry point, similar to SARS-CoV, but with a weaker binding affinity, which may contribute to its milder disease manifestations compared to SARS-CoV.

Overall, the unique structural and genomic properties of SARS-CoV-2, particularly its receptor binding and host cell interactions, play a crucial role in its transmission, pathogenicity, and disease severity.



ODES OF TRANSMISSION FOR SARS-COV-2

The origins of the SARS-CoV-2 virus remain unclear, as there are no definitive scientific reports on the initial "patient zero" or the moment of the virus's emergence. However, several plausible theories have been proposed:

1. Animal-to-Human Transmission: The high genomic similarity (around 96.2%) between human SARS-CoV-2 and bat coronaviruses suggests the virus may have originated in bats and then transferred to humans, potentially through other mammalian hosts such as snakes, turtles, pigs, ferrets, cats, pangolins, or non-human primates. Not all of these theories have been conclusively proven.

2. Direct Person-to-Person Spread: The increasing number of infected individuals with no link to a particular wet market indicates the virus has transitioned to direct human-to-human transmission as the primary mode of spread.

The Virus's Methods of Transmission:

A. **Respiratory Droplets:** SARS-CoV-2 primarily spreads through saliva droplets or nasal discharge from infected individuals when they sneeze, cough, or talk in close proximity to others. These discharges may contain respiratory secretions, gastric acid, food debris, and even blood.

B. **Fomite Transmission:** The virus can also be transmitted through direct contact with contaminated surfaces or objects ("fomites") in the immediate environment of an infected person.

3. Potential Fecal-Oral Transmission: Studies have detected SARS-CoV-2 RNA in fecal samples, raising the hypothesis of possible fecal-oral transmission, especially if viral RNA persists in feces after respiratory clearance. However, the infectious potential of the virus in feces remains unclear.

C. **Possible Intrauterine Transmission:** Limited studies have investigated the potential for intrauterine transmission from infected pregnant women to their newborns.

The persistence of SARS-CoV-2 RNA and the development of immunity after recovery are complex issues still being explored. Factors such as viral mutations, intracellular persistence, and the sensitivity of detection methods may all play a role. Ongoing research aims to provide a more comprehensive understanding of the virus's transmission dynamics and pathogenesis.

THE PIVOTAL ROLE OF HAND HYGIENE IN CURBING THE GLOBAL SPREAD OF COVID-19

The COVID-19 pandemic has propelled hand hygiene into the spotlight as a fundamental disease control strategy. This simple, age-old practice has gained renewed prominence and urgency in the face of the current global health crisis.

- **Tracing the Historical Roots of Hand Hygiene**

Hand hygiene has a long and well-documented history, dating back to ancient civilizations. Significant historical evidence traces the origins and practical applications of hand disinfection, from Homer's writings in 800 BC to Scheele's discovery of chlorine and Semmelweis's pioneering concept of hand hygiene. The acceptance of Louis Pasteur's Germ Theory in the 19th century further solidified hand hygiene as a critical, evidence-based infection control practice.

- **The WHO's Global Hand Hygiene Initiative**

In response to the growing threat of healthcare-associated infections, the World Health Organization (WHO) launched its "SAVE LIVES: Clean Your Hands" campaign in 2009, placing hand hygiene at the heart of infection prevention and control in healthcare settings. The WHO's "Five Moments for Hand Hygiene" approach provides a clear, easy-to-remember framework for healthcare professionals to comply with hand hygiene protocols.

- **The Anatomy and Behavior of SARS-CoV-2**

SARS-CoV-2, the virus responsible for COVID-19, is an enveloped, positive-sense, single-stranded RNA virus. Its lipid bilayer envelope, along with the membrane proteins, facilitates the virus's spread and cellular invasion. The virus's small size (50-200 nm) enables it to interact with various surfaces, including the human skin, which serves as an ideal host due to its organic composition and interactions with the viral particles.

- **The Mechanics of Hand Hygiene in Combating COVID-19**

Hand hygiene, either through handwashing with soap and water or the use of alcohol-based disinfectants, is the primary line of defense against the transmission of SARS-CoV-2. Soap particles "compete" with the lipids in the viral membrane, effectively disrupting the virus, while alcohol-based products kill the virus through direct contact. Proper hand hygiene is crucial in healthcare settings, workplaces, and communities, as human hands act as a conduit for the intrapersonal and interpersonal transfer of viral loads.

- **Strengthening Hygiene Standards to Combat COVID-19**

In the absence of pathogen-specific treatments, the current SARS-CoV-2 control strategy relies heavily on preventive measures. The CDC and WHO have consistently emphasized the paramount importance of frequent handwashing in their COVID-19 guidelines for the public.

To address this challenge, a multipronged approach is necessary. Enhancing awareness through targeted training and education can foster a positive mindset toward hand hygiene. Ensuring easy access to handwashing facilities and supplies can also bolster compliance. Moreover, engaging diverse stakeholders, from management to frontline staff, in the design of hygiene strategies can cultivate a sense of ownership and shared responsibility.

In conclusion, the COVID-19 pandemic has underscored the pivotal role of hand hygiene in curbing the global spread of the virus. By understanding the historical significance, the WHO's global initiatives, and the underlying mechanisms of hand hygiene, individuals and communities can effectively leverage this simple yet powerful tool to mitigate the impact of the pandemic.

❖ THE SIGNIFICANCE OF AIR HYGIENE

The transmission of SARS-CoV-2, the virus that causes COVID-19, remains a topic of ongoing scientific debate and investigation. While there is consensus that respiratory droplets play a role in viral spread, the relative importance of larger droplets versus smaller aerosolized particles is still being determined.

- **Droplet Dynamics and Viral Transmission**

- Larger droplets (>20 μm) are heavier and tend to fall to the ground within 1-2 meters of the source.
- Smaller droplets (5-10 μm), often referred to as aerosols, can remain suspended in the air for extended periods and travel greater distances.
- An intermediate size range (10-20 μm) may either settle on surfaces or stay airborne depending on environmental conditions.
- The fate of droplets is influenced by factors like speed, density, humidity, and air currents.

- **Factors Affecting Viral Survival**

- Environmental conditions like solar radiation, drying, temperature, and the presence of virucidal substances (e.g., ozone) can degrade viral particles and reduce airborne concentrations.
- The location of respiratory tract inflammation and the clinical presentation can affect droplet size, emission rate, and viral survival.

- **Investigating Airborne Transmission**

- Studies have detected SARS-CoV-2 RNA in air samples from hospital wards and other areas with COVID-19 patients, suggesting possible airborne transmission.
- However, the methods used and the limited number of samples make it difficult to draw firm conclusions about the significance of airborne spread.

- Asymptomatic individuals who do not exhibit symptoms like coughing or sneezing may still expel viral particles through normal activities like speaking, laughing, and singing.

- **Importance of Ventilation**

- Research has shown that improved ventilation can significantly reduce the time that small droplets remain airborne, from around 5 minutes in poorly ventilated spaces to 30 seconds with better air circulation.
- Poorly ventilated indoor environments, such as public transportation and elderly care facilities, may facilitate the spread of SARS-CoV-2 through lingering respiratory droplets.

In conclusion, while the exact mechanisms of SARS-CoV-2 transmission are still being elucidated, the available evidence highlights the importance of maintaining robust air hygiene practices, including proper ventilation, to mitigate the spread of the virus in indoor settings.

❖ The Potential for Fecal-Oral Transmission of SARS-CoV-2 in the Food Supply Chain

The fecal-oral route of transmission describes how microorganisms from the digestive tract of one person can enter the oral cavity of another. This can happen through direct physical contact or indirectly through contaminated materials like food packaging. For SARS-CoV-2 to be transmitted via this route, three key conditions must be met:

A. The virus must be able to replicate or survive in the gastrointestinal tract.
B. The virus's virulence must not be diminished by food processing, or it must be able to persist on food packaging.
C. Food handlers must have poor personal hygiene.

- **Ability of SARS-CoV-2 to Infect the Digestive Tract**

SARS-CoV-2, like SARS-CoV and MERS, uses the ACE2 receptor to enter cells. ACE2 is found in the small intestine, colon, and stomach, allowing the virus to infect the digestive system. Studies have detected viral RNA in the stool of COVID-19 patients, even after respiratory samples tested negative. This suggests the virus can replicate in the gut and be shed through feces for an extended period.

However, the exact mechanisms by which SARS-CoV-2 overcomes challenges like proteases, low pH, and bile salts in the digestive tract are still unknown. Some research indicates the virus's envelope and spike proteins may be adapted to withstand these conditions. Yet, most studies only detect partial viral RNA in stool, and very few have isolated complete viable virus particles. This suggests the potential for fecal-oral transmission, if it occurs at all, may be quite low.

- **Contamination Pathways in Food Production**

There are several ways SARS-CoV-2 could contaminate food or food packaging:

- Food handlers coughing, sneezing, or talking without a mask
- Touching food or packaging without gloves or proper hand hygiene
- Transferring the virus from contaminated surfaces to food or packaging

Even if cooking kills the virus in the food itself, the potential for cross-contamination before cooking remains. Certain food preparation methods or eating habits (e.g., consuming raw foods) may also allow the virus to survive.

- **Mitigating the Risks**

Health organizations consider the risk of SARS-CoV-2 transmission through food to be "highly unlikely" if proper food safety protocols are followed. Key prevention measures include:

- Strict hand hygiene - Proper handwashing is more effective than just using gloves
- Frequent cleaning and disinfection of high-touch surfaces

- Enforcing mask-wearing and other personal hygiene practices for food handlers
- Thorough cooking to inactivate the virus

- **Conclusion**

While SARS-CoV-2 can infect the digestive system and be shed in feces, the evidence suggests the potential for fecal-oral transmission in the food supply is relatively low. Rigorous implementation of standard food safety practices remains the best defense against this route of COVID-19 spread.

❖ CONCLUSIONS

Examining Hygiene Standards and Measures to Combat COVID-19

This scoping review offers valuable insights into the crucial topic of hygiene standards and measures employed to combat the COVID-19 pandemic. The analysis highlights a compelling need for international and national public health bodies to delve deeper into the relationship between outdoor and indoor air quality, and its nexus with the trajectory of COVID-19.

Environmental factors and pandemic dynamics appear to be critically connected. The review underscores the significance of investigating the interplay between COVID-19 and the food industry. Exploring food packaging materials and the virus's survival in food commodities could yield profound insights into global transmission patterns, enriching our understanding of viral dissemination across geographical borders.

Key Takeaways:

- Comprehensive examination of hygiene standards and measures to combat COVID-19
- Compelling call for research on the connection between air quality and COVID-19 dynamics
- Emphasis on the importance of investigating the COVID-19's impact on the food industry
- Necessity for interdisciplinary collaborations and targeted research to unravel the multifaceted dimensions of the pandemic's effects

This scoping review enhances our comprehension of the multifaceted aspects of hygiene measures in countering the COVID-19 pandemic. It underscores the critical need for a holistic, interdisciplinary approach to address the far-reaching implications of this global health crisis.

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"إعادة تقييم أفضل ممارسات النظافة خلال أزمة :COVID-19 مراجعة منهجية"

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سياق:

يتناول المقال تأثير جائحة كوفيد-19، مع التركيز بشكل خاص على التدابير الوقائية واستراتيجيات التخفيف.

الأهداف:

الهدف الرئيسي من هذا المقال هو تقييم فعالية التدابير الوقائية الأساسية مثل ارتداء الكمامات، نظافة اليدين، والتباعد الاجتماعي في مكافحة انتشار كوفيد-19.

الطريقة:

لاكتساب المعلومات ذات الصلة، قمنا بإجراء بحث إلكتروني شامل عبر قواعد بيانات موثوقة تشمل جوجل سكولار، سكوبس، ميدلاين، وباب ميد، من يناير 2024 إلى أبريل 2023.

النتائج:

تشير النتائج إلى أن الالتزام المنتظم بالتدابير الوقائية يقلل بشكل كبير من خطر انتقال كوفيد-19. كما تم الحصول على معلومات حول ديناميكيات انتشار الفيروس وبقائه على أسطح مختلفة.

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الخلاصة:

تؤكد هذه الدراسة على الأهمية الحيوية للحفاظ على الالتزام الصارم بالتدابير الوقائية الموصى بها للحد من انتشار كوفيد-19. وتبرز الحاجة إلى اليقظة المستمرة والجهود الجماعية في مكافحة الجائحة المستمرة.

الكلمات المفتاحية: كوفيد-19 – تدابير وقائية – ارتداء الكمامات – نظافة اليدين – التباعد الاجتماعي – انتقال الفيروس – إدارة الجائحة.