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The Effect of Lifestyle Measures on Pandemic Disease Prevention among Older Adults

El efecto de las medidas de estilo de vida en la prevención de enfermedades pandémicas entre adultos mayores

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ABSTRACT

Introduction: the COVID-19 pandemic has highlighted the vulnerability of older adults, who are the most susceptible population group. Promoting healthier habits like diet, exercise, sleep, and reducing smoking and alcohol consumption can reduce infection risks and prevent severe cases. Public authorities are focusing on elderly adults, but attitudes and compliance with these measures remain largely unknown. The study aims to evaluate older adults' lifestyle measures toward the prevention of COVID-19.
Method: a study involving 350 older adults was conducted at El Fayoum General Hospital and Abshway Central Hospital. A descriptive design was used, and data was collected using a structured interviewing questionnaire. The questionnaire assessed personal characteristics, health status, and self-reported lifestyle practices. The study aimed to understand the health status and lifestyle practices of older adults in El Fayoum.
Results: the main results of the study revealed that 30 % of the studied group had good personal hygiene, 45,1 % had moderate physical activity, 23,1 % had good nutrition, 17,1 % did not smoke, 30,6 % of the studied group did not manage their stress levels, 50,7 % had poor social relations. Also,91,7 % of them practiced moderate safety lifestyles, while 9 % of them had undesirable lifestyles. Additionally, 61,7 % of older adults had poor health status.
Conclusions: the COVID-19 pandemic has significantly impacted older adults, especially those with chronic illnesses. Implementing preventive measures and managing chronic conditions is crucial to reduce infection risk and improve health outcomes, especially through targeted interventions.

Keywords: COVID-19; Elderly; Preventive Measures; Lifestyle Measures.

RESUMEN

Introducción: la pandemia de COVID-19 ha puesto de manifiesto la vulnerabilidad de los adultos mayores, quienes constituyen el grupo poblacional más susceptible. Promover hábitos más saludables, como una dieta adecuada, ejercicio, sueño suficiente y la reducción del consumo de tabaco y alcohol, puede disminuir el riesgo de infecciones y prevenir casos graves. Las autoridades públicas se están enfocando en los adultos

mayores, pero las actitudes y el cumplimiento de estas medidas siguen siendo en gran parte desconocidos. El estudio tiene como objetivo Evaluar las medidas de estilo de vida adoptadas por los adultos mayores para la prevención del COVID-19.

Método: se realizó un estudio con 350 adultos mayores en el Hospital General de El Fayoum y el Hospital Central de Abshway. Se utilizó un diseño descriptivo, y los datos se recolectaron mediante un cuestionario estructurado de entrevista. El cuestionario evaluó las características personales, el estado de salud y las prácticas de estilo de vida autoinformadas. El estudio buscó comprender el estado de salud y las prácticas de estilo de vida de los adultos mayores en El Fayoum.

Resultados: los principales resultados del estudio revelaron que el 30 % del grupo estudiado tenía una buena higiene personal, el 45,1 % realizaba actividad física moderada, el 23,1 % mantenía una buena nutrición, el 17,1 % no fumaba, el 30,6 % no gestionaba adecuadamente sus niveles de estrés y el 50,7 % tenía relaciones sociales deficientes. Además, el 91,7 % practicaba estilos de vida de seguridad moderados, mientras que el 9 % tenía estilos de vida no deseables. Asimismo, el 61,7 % de los adultos mayores presentaba un estado de salud deficiente.

Conclusiones: la pandemia de COVID-19 ha impactado significativamente a los adultos mayores, especialmente a aquellos con enfermedades crónicas. La implementación de medidas preventivas y el manejo de condiciones crónicas son cruciales para reducir el riesgo de infección y mejorar los resultados de salud, especialmente mediante intervenciones dirigidas.

Palabras clave: COVID-19; Adultos Mayores; Medidas Preventivas; Medidas de Estilo de Vida.

INTRODUCTION

The global demographic landscape is profoundly transforming, marked by a rapidly aging population. By 2030, 1 in 6 individuals worldwide will be aged 60 or older, and by 2050, the number of people aged 80 or older is projected to triple, reaching 426 million.[1] This unprecedented demographic shift poses significant challenges for public health systems, particularly in managing pandemic risks and chronic disease burdens. Older adults are disproportionately vulnerable to severe outcomes from infectious diseases such as COVID-19 due to age-related physiological declines, immunosenescence, and comorbidities like diabetes, cardiovascular diseases, and chronic respiratory conditions.[2] The COVID-19 pandemic starkly illustrated this vulnerability: As of July 2021, over 161 million global cases and 3 million deaths were reported, with case fatality rates exceeding 15 % among those aged 80+ compared to <1 % in younger populations.[3] In Egypt, where older adults comprise 7 % of the population, the pandemic's impact was severe, with 515 970 confirmed cases and 24 826 deaths recorded by December 2022.[4] Notably, individuals aged 65+ accounted for over 80 % of COVID-19-related fatalities globally,[5] underscoring the urgent need for targeted preventive strategies to protect this demographic.

Lifestyle factors including physical activity, nutrition, tobacco avoidance, and social engagement are critical determinants of healthy aging and infection resilience. Evidence suggests that 60 % of health-related quality of life in older adults is influenced by modifiable lifestyle behaviors.[6] However, the COVID-19 pandemic disrupted these protective habits. Lockdowns and social distancing measures led to reduced physical activity, increased sedentary behavior, and poorer global dietary choices among older adults.[7,8] These challenges were amplified in Egypt, where socioeconomic disparities and limited healthcare access exacerbate vulnerabilities. For instance, older adults in low-income communities face barriers to accessing nutritious food, telehealth services, and reliable health information.[9] Furthermore, pandemic-related isolation intensified mental health declines, with studies reporting heightened anxiety, depression, and loneliness among older populations.[10,11] These psychosocial stressors diminish quality of life and weaken immune responses, compounding infection risks.[12]

Non-pharmaceutical interventions (NPIs), such as hand hygiene, mask-wearing, and physical distancing, emerged as cornerstone strategies to control COVID-19 transmission. However, health literacy, cultural norms, and socioeconomic constraints influence older adults' adherence to these measures. For example, in Egypt, misconceptions about mask efficacy, limited access to sanitization supplies, and public living arrangements hindered compliance with WHO guidelines.[13,14] Nurses are pivotal in bridging these gaps by delivering culturally tailored health education, promoting preventive practices, and advocating for policy changes to address systemic inequities.[15] Despite these efforts, there remains a lack of research on how older adults in low-resource settings like Egypt perceive and adopt lifestyle measures for pandemic prevention. Existing studies predominantly focus on high-income countries, neglecting contextual factors such as poverty, limited digital literacy, and reliance on informal care networks that shape health behaviors in regions like the Middle East and North Africa.[16]

This study addresses this critical gap by examining the interplay between lifestyle behaviors, preventive

practices, and sociocultural determinants among older adults in Egypt. Therefore, the objectives of the study were to assess the reported practice use of lifestyle measures for COVID-19 prevention among older individuals and examine the relationships between comorbidities, lifestyle practices, and previous COVID-19 infections.

Research question

1. What are reported practice use of lifestyle measures for COVID-19 prevention among older individuals?
2. Is there a relationship between comorbidities, lifestyle practices, and previous COVID-19 infections?

METHOD

Research Design & Setting

This descriptive cross-sectional study was conducted at the outpatient clinics of El Fayoum General Hospital and Abshway Central Hospital in El Fayoum governorate.

Sample inclusion/exclusion criteria

A convenient sample was used for this study. was conducted at outpatient clinics in El Fayoum General Hospital. It is the largest hospital in El Fayoum governorate and serves a large sector all over the governorate (the medical clinic serves 5430 every six months) (and chronic disease serves 7 200 every six months) Also in Abshway Central Hospital. It serves the largest and farthest three centres. (medical clinic serves 3 520 every six months) (chronic disease serves 4300 every six months) affiliated with the Ministry of Health at Fayoum Governate.

The study's sample size was determined through a power analysis, which used a significance level of 0,05, a power of 0,95, and an effect size of 0,3. This analysis estimated that 350 older adults would be needed. Consequently, we recruited 150 older adults from Abshway Central Hospital and 200 from El Fayoum General Hospital.

Inclusion criteria

Older adults aged 60 years old or over, from both sexes and older adults can communicate.

Tools of the study

Structured Interviewing Questionnaire

The research instrument was meticulously developed following an extensive review of relevant literature. The comprehensive tool, written in Arabic, was structured into three distinct components. The initial component gathered demographic and health information of elderly participants, encompassing age, gender, educational attainment, marital status, residential details, employment status, and family income measured in pounds. This section also documented comorbid conditions including hypertension, asthma, diabetes, and cardiac diseases.

The second component examined the participants' COVID-19 history through five carefully crafted questions. These explored previous COVID-19 infections, associated symptoms, preventive measures implemented to protect others, vaccination status against COVID-19, and for those unvaccinated, their reasoning behind the decision.

The third component, adapted from [17], assessed lifestyle measures through self-reported practices. This section examined multiple dimensions, including social interactions, spiritual practices, and various preventive aspects such as personal hygiene, physical activity, exercise patterns, nutritional habits, smoking behavior, stress management strategies, health and safety practices, and sleep patterns. The lifestyle assessment comprised 53 statements distributed across 10 domains: personal hygiene (6 statements), physical activity (3 statements), exercise (3 statements), nutrition (13 statements), stress management (5 statements), social and interpersonal relationships (4 statements), health and safety (10 statements), sleep (3 statements), spiritual practice (3 statements), and smoking (3 statements).

For quantifying elderly adults' lifestyle practices regarding COVID-19 prevention, the assessment tool employed a 125-point scoring system (equivalent to 100 %) across the 53 questions. Responses were evaluated using a standardized key, with "always" receiving 3 points, "sometimes" 2 points, and "never" 1 point. The overall lifestyle practices were then categorized based on total percentage scores: desirable lifestyle (75 % or above, exceeding 85 points), moderate lifestyle (above 50 %, exceeding 65 points), and undesirable lifestyle (below 50 %, less than 65 points).

Validity and Reliability

The research instrument underwent rigorous validation through expert review, specifically by three specialists in community health nursing who evaluated both content and face validity. Their assessment ensured each questionnaire item's appropriateness and relevance. Based on their expertise, necessary adjustments, including corrections, reorganization, and rephrasing of certain items, were implemented. The tool's reliability

was confirmed through the Alpha Cronbach test, yielding a robust coefficient of 0,81, indicating strong internal consistency and optimal reliability.

Pilot Study

A preliminary assessment was conducted with 35 elderly adults, representing 10 % of the total participant pool. This pilot phase evaluated the tools' clarity and estimated completion time requirements and verified their practical applicability and feasibility. The pilot results indicated no necessary modifications, allowing for the inclusion of these participants in the main study sample.

Data Collection Procedure

The research process began with obtaining sequential institutional approvals: first from the Faculty of Nursing /Port Said University on December 5, 2023, followed by El Fayoum General Hospital on December 7, 2023, and Abshway Central Hospital on December 10, 2023. The data collection phase commenced at El Fayoum General Hospital, where researchers initiated contact by introducing themselves and explaining the study's objectives while emphasizing data confidentiality. Data collection sessions were scheduled for three days weekly (Sunday, Monday, and Tuesday) from 9 am to 1 pm, spanning the end of December 2023 to June 2023. Researchers conducted interviews either individually or in small groups of 3-5 elderly participants.

Ethical Considerations

The study adhered to comprehensive ethical research protocols, beginning with approval from the standard of the committee, Faculty of Nursing/Port Said University with Code number NUR (5/12/2023) (32). The research team implemented several ethical safeguards: a detailed explanation of study objectives to participants, maintenance of anonymity and data confidentiality, and obtaining oral consent from all participants. The researchers emphasized participants' rights, including voluntary participation and the freedom to withdraw at any time without consequences. Participants were fully informed about the study's purpose, nature, duration, potential benefits, data collection methods, and expected outcomes. This transparent approach ensured participants' rights were protected throughout the research process.

Statistical analysis

The data were presented using descriptive statistics, including frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. The analysis was conducted using the Statistical Package for Social Science (SPSS) version 26. Appropriate statistical tests were employed to determine the significance of the results. Pearson's correlation was used for correlation analysis, and binomial logistic regression was performed to identify predictors. A p-value of less than 0,05 was considered significant, while a p-value of less than 0,001 was deemed highly significant.

RESULTS

Sample Characteristics

Table 1 shows the demographic characteristics of older adults. Most (86,3 %) were aged between 65 and 74 years, with an average age of 66,99±6,158. More than half (53,4 %) were male and more than a third (35,2 %) had higher education. regarding marital status, (52 %) were not married, more than half (58,6 %) lived in urban areas and nearly all (97,1 %) did not work. Regarding income, most (72,3 %) reported that it was not enough. Regarding comorbidities, (54,3 %) of older adults had diabetes mellitus followed by (33,7 %) having hypertension.

Table 1. Older adults' Demographic characteristics (N=350)		
Items	**No**	**%**
Age/years		
65-74	302	86,3
75-80	48	13,7
Mean and SD of older adults' age	66,99±6,158	
Gender		
Male	187	53,4
Female	163	46,6
Marital status		
Married	168	48,0

Unmarried	182	52
Residence		
Rural	145	41,4
Urban	205	58,6
Educational level		
No read and write	97	27,7
Primary education	62	17,7
Secondary education	68	19,4
University and higher	123	35,2
Work		
Not work	340	97,1
Working	10	2,9
Monthly Income		
Enough	97	27,7
Not enough	253	72,3
Comorbidities		
Hypertension	161	46,0
Asthma	85	24,3
Diabetes	194	55,4
Cardiac diseases	68	19,4

Study hypothesis and research questions results

As regards table 2, most of the older adults (80,6 %) were infected with COVID-19. Most of them also had symptoms such as dyspnea (79,8 %) and dry cough (72,3 %). To prevent the spread of the virus, they followed measures such as hospitalization (72,3 %), mask-wearing (65,2 %) and healthy eating (99,6 %). More than three-quarters of them (77,1 %) received the COVID-19 vaccine, meanwhile, the main reason for not receiving vaccination among the rest was fear of death (66,3 %).

Table 2. Older adults' previous history of COVID-19 infection (N=350)		
Items	**No**	**%**
Previous COVID-19 infections		
Yes	282	80,6
No	68	19,4
Appeared symptoms (n=282)		
Fever	189	67,0
Dyspnea	225	79,8
Loss of smell and test	104	36,9
Headache	186	66,0
Dry cough	204	72,3
Preventive methods to protect others (n=282)		
Hospital isolation	204	72,3
Home isolation	76	27,0
Wear Mask	184	65,2
Healthy Nutrition	281	99,6
Received the vaccination against COVID-19		
Yes	270	77,1
No	80	22,9
Reason or not receiving the vaccination against COVID-19 (n=80)		
The presence of several diseases	27	33,7
Fear of death	53	66,3

Table 3 displays the different lifestyle measures that older adults practice to prevent COVID-19. The table shows that 30 % of them had desirable personal hygiene, 45,1 % had moderate physical activity, 23,1 % had desirable nutrition, and 17,1 % did not smoke. Additionally, nearly one-third of them did not manage their stress levels (30,6 %), and nearly half had undesirable social relations (50,7 %). Also, most of them practiced moderate safety control (91,7 %) followed by moderate spirituality practice (73,7 %).

Table 3. Older Adults' Reported Practice of Lifestyle Measures toward Prevention of COVID-19 (N=350)						
Items	Undesirable lifestyle		Moderate lifestyle		Desirable lifestyle	
	No	%	No	%	No	%
Personal hygiene	8	2,3	237	67,7	105	30
Physical activity	170	48,6	158	45,1	22	6,3
Nutrition	119	34,0	150	42,9	81	23,1
Smoking	254	72,6	36	10,3	60	17,1
Safety control	24	6,9	321	91,7	5	1,4
Stress management	107	30,6	164	46,9	79	22,6
Social relations	178	50,9	144	41,1	28	8
Sleep	223	63,7	120	34,3	7	2,0
Spiritual practices	27	7,7	258	73,7	65	18,6

Table 4 Displays that Hypertension, diabetes, and social relations are positively and significantly associated with previous COVID-19 infections. This means that having hypertension or diabetes or higher social support increases the odds of having a COVID-19 infection. For example, having hypertension increases the odds of having a COVID-19 infection by 3 094 times. Stress management and safety are negatively and significantly associated with previous COVID-19 infections. This means that having better stress management or safety practices decreases the odds of having a COVID-19 infection. For example, having better stress management decreases the odds of having a COVID-19 infection by 0,437 times. Asthma, cardiac, personal hygiene, physical activity, nutrition, smoking, sleep, and spirituality are not significantly associated with chronic disease. This means that there is no evidence that these factors affect the odds of having a chronic disease.

Table 4. Results of the binomial logistic regression analysis					
Items	B	S.E.	Wald	Sig.	Exp(B)
Hypertension	1,130	,333	11,508	,001	3,094
Asthma	,210	,368	,325	,569	1,234
Diabetes	1,388	,312	19,814	,000	4,005
Cardiac diseases	,004	,371	,000	,990	1,004
Personal hygiene	-,264	,475	,309	,578	,768
Physical activity	-,040	,330	,015	,904	,961
Nutrition	,096	,217	,198	,656	1,101
Smoking	,252	,214	1,388	,239	1,287
Stress management	-,828	,240	11,928	,001	,437
Safety	-1,400	,835	2,810	,094	,246
Social relations	,743	,366	4,119	,042	2,103
Sleep	,553	,604	,838	,360	1,739
Spiritual practices	-,066	,353	,035	,851	,936
Constant	2,795	2,514	1,236	,266	16,360

The dependent variable is previous COVID-19 infections. The independent variables are hypertension, asthma, diabetes, cardiac diseases, personal hygiene, physical activity, nutrition, smoking, stress management, safety, social relations, sleep, and spiritual practices.

DISCUSSION
The COVID-19 pandemic has profoundly affected people's lives, triggering a socioeconomic crisis. To

effectively manage and reduce the morbidity and mortality associated with COVID-19, it is essential to adopt multifaceted strategies. These include contact tracing, maintaining safe distances, and enhancing quarantine measures for high-risk individuals. [18]

The lack of knowledge about the disease, especially among high-risk groups, has contributed to the increase in infection rates and fatalities. Therefore, it is necessary to modify public behavior by addressing people's knowledge and perceptions, particularly among high-risk populations. Older individuals, who are more susceptible to various acute diseases, are currently significantly affected by COVID-19 outbreaks. [19]

The present study evaluated the impact of lifestyle measures on coronavirus prevention among older adults. Related to comorbidities, half of the older adults had diabetes mellitus, followed by one-third having hypertension. Chronic illnesses, especially diabetes and high blood pressure, may explain the frequent occurrence of COVID-19 among the study population, as these conditions impair immunity and weaken the body's ability to fight off infections. This finding is consistent with previous studies. [20,21,22]

Moreover, the findings indicated that a significant proportion of older adults were infected with COVID-19, and many of them experienced symptoms such as dyspnea and dry cough. Aging-related system dysfunction, including immune system dysfunction, can contribute to these symptoms. The gradual decline of immune function, known as immune senescence, along with inflammation, plays a significant role in weakening the immune system in older adults. [23,24] Additionally, the higher prevalence of other health conditions in older individuals increases their risk of severe outcomes from COVID-19. [25,26] Common causes of COVID-19-related deaths include respiratory failure, sepsis, heart failure, kidney injury, and blood clotting disorders. [27]

Additionally, older age, male gender, dyspnea, and dementia were found to be associated with a higher risk of death from COVID-19 infection. [28] Men and individuals aged 65 years and older had a significantly higher mortality rate from COVID-19 compared to younger people. [29]

To prevent the spread of the virus, the studied group reported the following measures such as hospitalization, mask-wearing, and healthy eating. The majority of them received the COVID-19 vaccine, while fear of death was the main reason mentioned by those who did not receive the vaccination. These findings align with previous studies. [30] However, vulnerable groups such as the elderly and those with poor socioeconomic levels have reported reduced adoption of preventive measures and self-isolation. [31]

The study also assessed various lifestyle factors among the participants. Results showed that nearly one-third had good personal hygiene, a minority engaged in moderate physical activity and had good nutrition. However, a minority of them smoked, and nearly half had poor social relations. The participants also reported moderate levels of stress management and safety control, as well as moderate engagement in spirituality practices. The advanced age and chronic illnesses among the study group limited their capacity to engage in daily activities and adopt healthy lifestyle habits. The fear and anxiety brought on by the COVID-19 pandemic have also led to a decline in healthy lifestyle habits. [32]

Studies have shown that older individuals experienced decreased physical activity and worsened eating and sleeping patterns during the pandemic. [33] Unhealthy behaviors such as overeating, sedentary lifestyles, increased alcohol and tobacco use, and more screen time have been linked to non-communicable diseases and can weaken the immune system. [34,35,36] Similar findings have been reported in other studies, with decreased physical activity and worsened eating and sleeping patterns observed among older individuals during the pandemic. [32] Overeating, sedentary behavior, elevated alcohol and tobacco use, and increased screen time have been associated with non-communicable diseases and can negatively impact immunity. [34,35,36] However, older people also exhibit common preventive behaviors against COVID-19, such as increased handwashing and wearing masks. [33,37]

Overall, the results of the study demonstrated a significant relationship between stress management, social life, diabetes mellitus, and hypertension, and the adoption of preventive lifestyle measures during the COVID-19 pandemic. Chronic illnesses, particularly diabetes and hypertension, negatively affect the adoption of preventive measures among older individuals, who have lower immunity and experience physical, social, and psychological changes associated with aging. These factors make it challenging for the elderly to adhere to protective measures. [38,39]

These findings are consistent with previous studies that have shown a moderate association between diabetes mellitus, hypertension, and the severity and fatality of COVID-19. [40,41] The prevalence of diabetes and hypertension among individuals with COVID-19 has been found to increase the risk of severe outcomes and mortality. [42] Addressing the unique needs and challenges faced by older adults during the COVID-19 pandemic is crucial. Interventions should prioritize providing targeted education and support, particularly for those with chronic illnesses. This approach can help enhance their understanding of COVID-19 and the importance of preventive measures.

This can be achieved through communication strategies and community outreach programs. Improved access to healthcare services, and medication, regular monitoring of blood pressure and glucose levels, and promoting healthy lifestyle behaviors are also essential. Strengthening community-based support systems can help

address social isolation and loneliness experienced by older adults during the pandemic. Virtual socialization opportunities, support networks, and mental health services can also be beneficial. Prioritizing vaccination campaigns targeting older adults can help increase vaccine uptake, with equitable access and easily accessible locations.[43]

STRENGTHS AND LIMITATIONS OF THIS STUDY

The study's findings may have been limited by its small sample size and the lack of representativeness of older adults' diverse demographics and socioeconomic backgrounds. Self-reported data from participants may have been subject to recall bias, potentially leading to inaccurate or incomplete information about their behaviors, lifestyle factors, or COVID-19 infection status. The cross-sectional design of the study does not allow for establishing causal relationships or determining the temporal sequence of events, and longitudinal studies would provide more robust evidence on the impact of lifestyle measures on COVID-19 prevention over time. The subjective assessment of lifestyle factors, such as physical activity, nutrition, and stress management, may have relied on subjective measures that are prone to bias. The study's findings may be specific to the specific geographic location or healthcare system, and potential confounding variables, such as socioeconomic status, access to healthcare, and underlying health conditions, could have influenced the outcomes.

Implications for practice

The COVID-19 pandemic has highlighted the need for improved preventive measures, particularly for older adults with chronic illnesses, to reduce infection risks.

The healthcare infrastructure, particularly in geriatric care, is being strengthened to better support these individuals.

Chronic disease management is also being emphasized, with targeted interventions and programs developed to optimize treatment.

Public health efforts are being increased, with targeted health education campaigns, vaccination campaigns, and community-based interventions aimed at promoting healthy behaviors and reducing infectious disease spread.

Social and behavioral changes, such as increased isolation and daily routines, are being addressed through community support programs, mental health services, and social engagement initiatives.

The pandemic has also driven efforts to improve preparedness for future pandemics, including comprehensive response plans, stockpiling medical supplies, enhancing surveillance systems, and ensuring effective coordination between healthcare providers, public health agencies, and government bodies.

CONCLUSIONS

In conclusion, the COVID-19 pandemic has disproportionately affected older adults, particularly those with chronic illnesses. Implementing preventive measures and managing chronic conditions is crucial for reducing the risk of infection and severe outcomes among this population. Targeted interventions that address the unique needs and challenges faced by older adults can help promote the adoption of preventive lifestyle measures and improve overall health outcomes during the pandemic.

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