Original Article :

Studying the behaviors and habits of individuals in order to find the most appropriate preventive strategies for the Saudi society.

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Abstract

Background and Aims:

Preventive interventions require comprehensive policies that combine several dimensions: health, economic, and social, and above all, educational and cultural. The effectiveness of these preventive measures lies in the extent to which measures are applied at the individual and collective level in order to enhance the health culture and build an integrated hospital system. In this context, the education sector plays a major role in implementing preventive habits in a world where disease is spreading greatly and very quickly. In addition to emerging infectious diseases, future health challenges also relate to chronic diseases: cardiovascular diseases, cancers, accident consequences and their risk factors, and these factors are mostly related to the lifestyle and behavior of individuals.

The aim of research in health sciences is to expand knowledge of health challenges and to improve and evaluate health policies and practices. This research paper aims to identify the types of prevention strategies based on studying the behaviors and habits of citizens of the Saudi society in order to find the most appropriate prevention strategies for the Kingdom. The research also aims to identify challenges within the health care system in the Kingdom with a focus on primary health care services, and analyze the interrelated factors in order to propose remedial reforms to further strengthen and improve the health care system. This study aims to improve the quality of individuals' health and reduce the costs of care and hospitalization. This study also seeks to define strategies that can be considered to achieve the two goals (improving the quality of individuals' health and reducing the costs of care and hospitalization).

Methods:

To understand the phenomenon of health awareness and to explain the behavior of participants by exploring their natural environment and their interaction with each other and to identify appropriate prevention strategies against diseases and epidemics, an empirical approach is adopted that focuses on studying the habits of individuals. The study was conducted using the inductive method, which included a survey of a sample of (764) individuals representing the entire population of the Kingdom. The questionnaire was distributed on various social networks, and the sample was chosen by simple random drawing in a probabilistic manner in which the probability of leaving the sample is equal to

all members of the community. The survey was conducted during June 2021.

Results:

The conclusion is that the two hypotheses of the study are correct because preventive

The pilot study showed two main groups of variables. The first group represents the individual prevention measures and the second group the collective prevention measures. These two types are actually complementary.

The conclusion is that the two measures of the study are correct because preventive measures should be individual initiatives but also that the health system should be guided by national and local actions. With regard to the Kaiser-Mayer-Olkin test (KMO), which is a general measure of partial correlation between study variables, it is equal to 0.761, which indicates an average validity. According to the Bartlett test, the hypothesis H0 must be rejected (the test result must be equal to or less than 0.05 in our case the value is 0.00). Therefore, the search for components is justified.

Conclusion:

All of these measures have one goal: to reduce the costs of care, also called the costs of non-prevention, because the cost of implementing these measures is much lower than the cost of care or hospitalization in the event of complications, the principle is simple, and that is to implement preventive strategies that are based first and foremost on educating individuals.

Key words:

appropriate preventive strategies, collective prevention strategy, behaviors, habits.

Introduction

The evaluation of health phenomena is a fixed necessity all over the worldwide[1]. Achieving and maintaining healthy status in Kingdom is a collective and context-specific endeavor[2]. There are substantial studies and research on Saudi health risk factors to guide health intervention plans[3]. While these previous research offer valuable insight, it is limited to quantitative findings without the concern of the consideration to the context in which health attitude and behavior occur. The healthcare system in the Kingdom is undergoing rapid changes to confront the new health issues and challenges. The government increased the health sector budget to support the development of healthcare facilities for its citizens[4] . The government planned and implemented a variety of strategies that's: (1) provided health education campaigns to promote public awareness, (2) increased the number of screening clinics to detect a diagnosis early and (3) controlled risk factors to reduce the incidence of chronic disease.

The main causes of diseases and disabilities are mostly preventable. Their prevention is largely based on interventions targeting health determinants in some major areas: diet, physical exercise, protection of moral health to which can be added the early detection of certain diseases[5] .

A very large part of these acts and inter-

ventions are not carried out by the actors of the health care system but by the individuals themselves who, through their behavior and habits, can prevent many probable health problems.

It is from this vision that the concept of prevention is a major axis of any health system it not only guarantees the good state of health of the population but also the reduction of the costs of care resulting from the spread of diseases and epidemics. Prevention concerns in many ways the State and public health and therefore the financing of the health system[6].

In this context Saudi Arabia like any other country in the world must implement prevention strategies against all risks of diseases and epidemics. The question that arises is: what strategies should we adopt? And do these strategies help reduce the costs of care and hospitalization?

It is from there that this study seeks to determine what strategies can be considered to achieve the two objectives: improvements in the quality of health of individuals and minimization of the costs of care and hospitalization[7].

Determining types of strategies must begin with studying the behavior and habits of Kingdom individuals in order to find strategies best suited to our society.

Two measures can be considered:

M1: preventive measures must be initiatives of the individuals themselves.

M2: preventive measures must be guided by the health system through strategies focused mainly on awareness.

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Two hypotheses can be considered:

M1: preventive measures must be initiatives of the individuals themselves.

M2: preventive measures must be guided by the health system through strategies focused mainly on awareness.

A survey was conducted of (764) Kingdom individuals with the objective of determining the types of strategies most suitable for the Saudi Arabia health context.

Theoretical framework of the "economics of prevention" study:

A closely related study in Saudi Arabia reported that COVID-19 curfew has an effect on the eating habits among the population[8]. The social isolation was associated with increased number of meals consumed daily and the consumption of sweets. As a result, COVID-19 curfew led to a rapid weight gain for many Saudis. Furthermore, a number of studies have begun to examine the effect of "stay-at-home" orders on physical activity practices[9]. The curfew has limited access to community services and

therefore enforced a sedentary behavior such as prolonged sitting and watching TV, playing online games, and not participating in physical exercise. [10] Argued health consciousness is an important element to enforce healthy attitudes and behaviors and adopt healthy lifestyles through the pandemic. [11]Prevention is designated by the World Health Organization (WHO) as any act intended to avoid expected phenomena. Economists distinguish two families of prevention: self-protection and self-insurance[12].Self-protection corresponds to the actions taken to reduce the probability of a loss; self-insurance covers actions whose objective is to limit the extension of the loss if it occurs[13].

In this context, prevention is defined as "all the actions carried out with the aim of preparing or preventing the occurrence of certain risks but also of minimizing the negative consequences induced by their occurrence. Prevention therefore has two objectives, either to reduce the occurrence or occurrence of a risk, or to adapt behavior in the presence of the realized risk[14]. From a public health approach, three categories of preventive actions can be distinguished:

- *Primary prevention:* which represents the set of actions that reduce the incidence of a disease (vaccination for example);
- *Secondary prevention:* which represents actions aimed at reducing the consequences of a disease when it has appeared (for example cancer screening);
- *Tertiary prevention:* This represents actions aimed at reducing disability associated with chronic diseases.

Prevention expenditure is by nature difficult to apprehend, the part that can be counted includes the consumption of preventive medicine, collective prevention and health control:

- Preventive medicine covers the cost of the services involved in: occupational medicine, school medicine, maternal and child protection, missions provided by the state such as the fight against infectious diseases and vaccination;
- Collective prevention and health control which cover the cost of preventive actions for: water control, health information and education campaigns, actions and programs of the Ministry of Health, hygiene expenditure and other[15].

But there is part of the prevention expenditure that is difficult to account for, and these are awareness campaigns guided by the state or by other civil society associations or even by private companies as part of their social responsibility. Corporate social responsibility (CSR) can go well beyond the framework of awareness-raising to go further in helping and supporting

various activities related to the prevention of diseases and epidemics[16].

There is a plurality of prevention actors: individuals, doctors, firms, local communities, the state, civil society associations and others, but individuals constitute the most important nucleus of the whole chain [17].

Method:

In this study, the author describes the research approach and design used to achieve the study objectives. The author also described the research methods and tools used for data collection, the process of qualitative data collection and analysis, reliability, challenges and limitations, and issues related to ethical considerations of research study.

In order to determine the appropriate prevention strategies against diseases and pandemics, an empirical approach focusing on the study of the habits of individuals was adopted.

The study was conducted using an inductive methodology involving a survey of a sample of (764) individuals representing the whole Saudi Arabia population.

The questionnaire was distributed on the various social networks and the sample was chosen by simple random drawing under a probabilistic method in which the probability of leaving the sample was equal for all individuals in the population.

Our sample was therefore made up of 764 respondents of different age categories (four categories were made up: less than 30 years old, between 30 and 40 years old, between 41 and 50 years old, 50 years old and over) belonging to the four corners of the country, (East, west, Center and South) and with different educational levels (high school student, bachelor's degree, master, doctorate) which gives this sample a large representative capacity (see table1). The survey was conducted during the month of June 2021.

Table 1: Age category, Scientific level, and Regions of the country

Age category				
	Frequency	Percent	Valid Percent	Cumulative Percent
[0.30 years]	246	32.2	32.2	32.2
[30.40 years]	372	48.7	48.7	80.9
[40.50 years]	114	14.9	14.9	95.8
≥ 50 years	32	4.2	4.2	100.0
Total	764	100.0	100.0	
Scientific level				
High school student	16	2.1	2.1	2.1
Bachelor's degree	52	6.8	6.8	8.9
Master	120	15.7	15.7	24.6
Doctorate	576	75.4	75.4	100.0

Age category				
	Frequency	Percent	Valid Percent	Cumulative Percent
Scientific level				
Total	764	100.0	100.0	
Regions of the country				
West	274	35.9	35.9	35.9
East	256	33.5	33.5	69.4
Center	200	26.2	26.2	95.5
South	34	4.5	4.5	100.0
Total	764	100.0	100.0	

The questionnaire was composed of 08 questions (see Appendix) where each question represented a variable.

RDV: Regular doctor's visit

TCD: Take care of your diet

UPS: Usual practice of sport

KHP: Knowledge of health potential

MPP: Monitoring of prevention programs

ACO: Awareness campaign for the organization

UDP: Use of disinfectant products

MDO: Municipality disinfection operation.

The analysis of the results was done by the segmentation method. The segmentation in our case was based on variables and not observations. It is useful to point out that this method is widely used for data analysis, it allows categorization or taxonomy. That is to say, bring out groups of individuals or variables and the assignment of different variables to different groups[18]. This method makes it possible to simplify the reading of data by grouping them into categories having common characteristics [19]. Segmentation can be defined as follows: "given a set of objects (or individuals) described by a certain number of characteristics (or variables), to constitute groups (or types) of objects such that the objects are the most similar possible within a group and that the groups be as dissimilar as possible; the resemblance or dissimilarity being measured on all the variables describing the objects "[20]. In our case the objective is to determine from these groups suitable prevention strategies against diseases and epidemics.

The construction of the categories (groups) was made by one of the hierarchical classification methods which are the "ascending hierarchical classification" which consists in establishing an ascending tree structure[21].

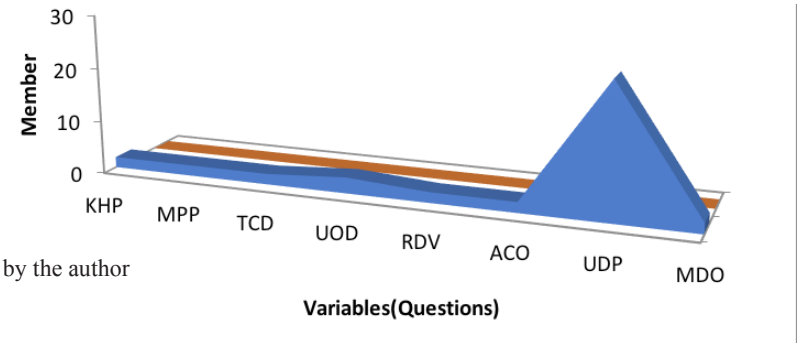
The aggregation algorithm used was Ward's algorithm which calculates the means for all the variables of each group then, for each individual, the square of the Euclidean distance to the center of the class[22]. Since the data are measured on dif-

ferent scales we have standardized them using the standard deviation.

Results

Data processing produced the "dendrogram" shown in Figure1. The "dendrogram" reads as follows: vertical axes represent groupings of segments; horizontal axes represent distances between segments. The goal is to keep the most distant segments and aggregate the closest.

By reading the "dendrogram" from right to left we can define the groups. We see that there is a very important jump between (25) and (5) which separates the variables into two main categories. The first category brings together the variables (KHP, knowledge of health potential, MPP monitoring by prevention programs, TCD Take care of your diet, UDP use of disinfectant products, RDV Regular doctor's visit, UPS usual practice of sport) and the second category brings together the variables (ACO, awareness campaign for the organization, MDO the municipality's disinfection operation). The first category encompasses two subcategories, the first is made up of variables (KHP, MPP, TCD, and UDP) and the second is made up of variables (RDV and UPS). Regarding the chain of aggregation (see table3), the aggregation coefficient makes a very significant jump (more than double) between steps (6 and 7) (from 2003.667 to 5600.637). So two-group segmentation is quite appropriate.



Source: Produced by the author

Fig.1. Dendrogram using Ward's distance (Distance resize combined cluster)

Table 2 : Planning agglomerations

Combined Cluster			Coefficients	Cluster Step of first appearance		
Step	Cluster1	Cluster2		Cluster1	Cluster2	Next Step
1	4	5	250,975	0	0	2
2	2	4	539,591	0	1	5
3	6	8	880,346	0	0	7
4	1	3	1221,823	0	0	6
5	2	7	1578,861	2	0	6
6	1	2	2003,667	4	5	7
7	1	6	5600,637	6	3	0

Regarding the KMO test which is a generalized measure of the partial correlation between the study variables, it is equal to 0.761 (see table2 and table3) which indicates medium validity. Bartlett's test tells us that the measures M1 must be rejected (the test result must be equal to or less than 0.05 in our case the value is 0.00) so the search for the components is justified.

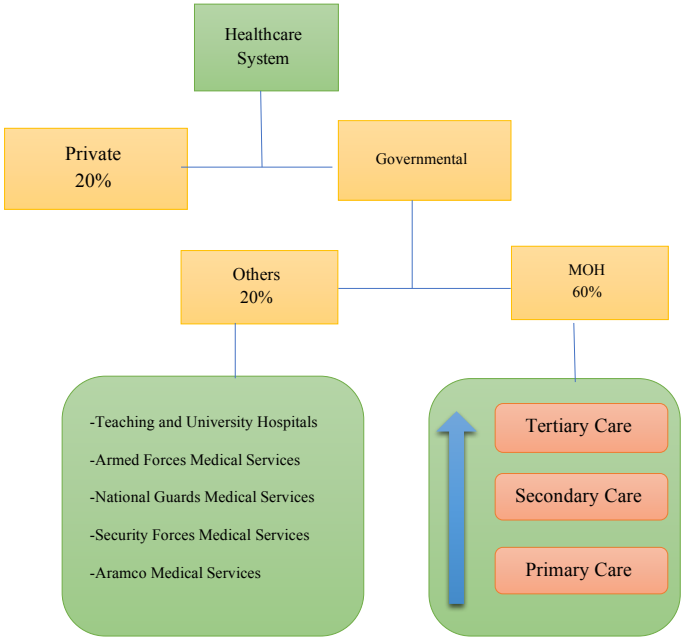
Table 3: Bartlett's Test and KMO

KMO measure of sampling adequacy.	0,761
Bartlett's Test of sphericity approx. Chi-Square	223,353
Deference	28
Significant.	0,000

Source: Produced by the author

Discussion

The author has identified many challenges in the country's health system that need to be addressed over the next decade. These challenges fit into existing models of care for key patient pathways within the country. There are a number of high-priority pathways with specific challenges, including the maternity pathway, chronic illness, planned care, and urgent care[23]. To address these challenges, the Ministry of Health has developed a program to design, pilot and implement a program of new patient-centered models of care.



Source: Ministry of H ealth, Healthcare-Transformation-Strategy-2022
Figure.2. New Models of Care Program

This study provides an overview of the digital transformation of the health system in the kingdom, setting out the underlying objectives in the clearest and most coherent way possible. Implementing the strategy will be more complex and will only work if we can effectively mobilize and coordinate large numbers of highly educat-

ed and skilled people effectively[24].

The empirical study showed two main groups of variables. The first group represents individual prevention measures and the second group represents collective prevention measures. These two types are actually complementary.

Individual preventive measures represent initiatives made by individuals voluntarily and individually, they are distinguished by primary and secondary preventive measures.

Primary preventive measures are taken before the onset of the disease to prevent its onset. Secondary prevention measures which are used when the disease has already occurred. The aim is to save time in the course of the disease or epidemic, which makes care more effective because it is earlier.

Collective prevention measures are acts carried out by the State or by its bodies or also by civil society associations. These acts aim to propagate a health culture through the organization of disinfection operations and awareness campaigns against various diseases and epidemics[25].

The conclusion is that the two hypotheses of the study are true because preventive measures must be initiatives of individuals but also must be guided by the health system through national and local actions.

All these measures have a single objective: to minimize the costs of care, also called non-prevention costs, because the cost of applying these measures is much lower than the cost of care or hospitalization in the event of complications. The principle is simple; it is to implement prevention strategies based first and foremost on sensitizing individuals.

Awareness can be guided by several means,including:

The introduction of the subject of "prevention" in the teaching programs of primary school pupils as well as the organization of awareness campaigns throughout the year within the various national education establishments. Raise awareness and encourage individuals to follow a healthy diet; enact laws to control the components of food products in order to protect the health of the population.

All this will make it possible to eliminate some bad habits and replace them with healthy practices allowing better prevention against various diseases and epidemics.

Conclusion

Prevention interventions call for comprehensive policies that combine several dimensions: health, economic, social and above all educational. The effectiveness of preventive measures comes from the combination of actions at national level and

local actions as well as individual actions.

Individual actions are strongly requested, it is a question of promoting a health culture. In this context, the role of the national education sector is major; implementing preventive habits seems a requirement in a world where the spread of disease is so great and so rapid.

Beyond emerging infectious diseases, the health challenges of tomorrow also concern chronic diseases: cardiovascular diseases, cancers and the consequences of accidents and their risk factors. These factors are for the most part linked to the lifestyle and behavior of individuals.

Appendix

Appendix: the questionnaire

1. Do you regularly visit a doctor for a check-up or routine check-up? RDV (regular doctor's visit)
2. Are you taking care of your diet? TCD (take care of your diet)
3. Do you usually play sports? UPS (usual practice of sport)
4. Do you know the health potential of the country? KHP (knowledge of health potential)
5. Do you follow programs and documentaries concerning health and prevention? MPP (Monitoring by prevention programs)
6. Does your organization regularly organize awareness and prevention campaigns? OAC (organization's awareness campaign)
7. Do you use disinfectants? UPD (use of disinfectant products)
8. Does the municipality of your residence organize disinfection operations? MDO

(municipal disinfection operation)

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