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Contents

Need for Open-Science Policies

Osman HAYRAN[1] ⓘ

ABSTRACT

Publishing, sharing, and disseminating their research results are among scientists' most important objectives. This process, which consists of stages full of intensive labor and care, is very laborious and may not always result in a positive outcome. A review of the scientific literature indicates that some non-academic authors publish more than academics. On the other hand, the presence of a widespread reproducibility problem even in highly cited publications negatively affects the reliability of scientific findings. Open-science policies and public peer review practices are needed to overcome these problems.

Keywords: Meta-science, Open-science, Replication Crisis, Reproducibility

INTRODUCTION

Is there a correlation between the quantity of publications, citations, and scientific rigor? Unfortunately, the answer to this question is "Yes" unless we have stronger standards. Both for the advancement and evaluation of academics as well as for the evaluation and scientific ranking of universities, the quantity of publications and the quantity of citations are among the crucial factors. Although the majority favors this strategy, it is well recognized that being scientific means something entirely different.

To publish, share, and disseminate the results of their research and to be mentioned by others are among the most important objectives of scientists. Publication is a result, a kind of product that contributes to the success and ex-

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1   Istanbul Medipol University, School of Medicine, Istanbul, Türkiye
*   Corresponding author: Osman HAYRAN, ohayran@medipol.edu.tr

istence of the scientist's efforts. The citations received are also a reward and a sign of appreciation. In addition to being a prerequisite for academic advancement, publishing also enhances scientists' job and life satisfaction. However, preparing and publishing articles in reputable scientific journals is a laborious and stressful process.

Starting from the decision about the topic of the article, all processes including the suitability, validity, and repeatability of the research methods; summarization and presentation techniques of the findings; consistency of the conclusions and recommendations with the results are important steps that need careful attention.

Additional processes and filters are needed for the following submission to a journal such as the assessment of the suitability of the submitted article by journal editors for publication and comments of the peer reviewers on its scientific quality. Due to the large number of articles submitted to journals with high impact factors, the acceptance rates are naturally low, and many articles are rejected. This publication adventure is a frequently experienced and well-known process by every scientist and scholar.

However, despite the presence of strict rules, it is seen that the published research articles may not be as perfect as thought, the editor and reviewer filters can be very permeable, and the article evaluation processes might be incredibly fast in some cases.

Findings of meta-science studies indicate the presence of a widespread reproducibility problem, a "replication crisis" in a significant number of scientific publications (Pashler and Wagenmakers, 2012; Munafò et al., 2017). This problem, characterized by selective reporting, statistical fetishism, and non-reproducible workflows, was noticed initially in social science research and then in health sciences, and finally, its existence in epidemiological research has begun to be discussed (Mathur and Fox, 2023).

Quality and replication issues in academic publications are not new and have a long history. It is frequently observed that in situations when the findings of the study did not support the study aims and hypotheses they were tried to be supported with forced interpretations, and the methods were written vaguely that is not clear enough to be repeated by others.

Meta-science, also known as Meta-Research or Evidence-Based Research,

means "the science of science" or "the research of research". In other words, it means "looking at science from a bird's eye view" (Ioannidis et al., 2015). The document titled "Manifesto for repeatable, testable science", prepared by a group of scientists and published in Nature magazine in 2017, is an important step in the development of meta-science (Munafò et al., 2017). Openness, transparency, and reproducibility in scientific research methods and publication principles are among the main interests of meta-science.

In a recently published meta-science analysis, a systematic mapping, and a detailed review of authors with more than 700 publications in journals with high-impact factors were carried out (Ioannidis, 2023). Interestingly these authors were predominantly from outside the scientific community, only 3 of them had a doctorate degree (in the fields of oceanography, pharmacology, and organic chemistry), but their publications were not related to the field in which they are titled. It is noteworthy that all the publications of these authors appeared in almost the same journals, and that they wrote on very different subjects. Nature, Science, and BMJ were the journals where publications by these non-researchers appeared most frequently. Another interesting point is that although it is a standard rule for the journals they publish in, a significant number of them did not include information regarding "conflict of interest" in their publications.

When the articles with more than 100 citations in 2020-2022 were further evaluated, it was understood that 13 of the 25 authors of these publications did not even have a master's degree, and the majority were from the field of science journalism (Ioannidis, 2023). Science journalism is an important and necessary field in terms of communicating scientific issues to ordinary people in an understandable way. However, it is surprising that experts in this field have published and been cited so many times in scientific journals that they are ahead of scientists.

Since these authors focus on hot topics, it is understandable to some extent that their articles can be published in a shorter time than the articles of academics. However, it seems that the scientific content of their articles is often overlooked in this rush.

It is not correct to see scientific research and publishing as a monopolized area of professionals with academic titles. But here the interesting thing is

that, compared to academics, these authors have published more, and received more citations, that is, they have created an impact. If the effects they create positively impact human health, this should be respected. If the effects are like the effects created by social media phenomena, "influencers" and trolls, there is a serious problem.

Why open science?

Information production in the field of health is a public activity by nature. Aside from their efforts to develop products that require patents, scientists trying to publish health-related research results do not have any concerns about making money through these publications. On the other hand, it has become a rule, a known and ordinary practice, for journals that publish these articles to take over the copyright of the articles, block access to others, and sell them for money. The strange thing is that no one objects to this situation. However, openness and transparency in science are essential for the research results to be questionable, debatable, and repeatable, and for the accurate information to be announced and disseminated.

As a matter of fact, the manifesto mentioned above emphasizes the necessity of measures such as standardizing pre-registration for all research, encouraging multicenter study designs, using CONSORT and PRISMA-like reporting standards, diversifying peer evaluations, and conducting pre- and post-publication peer evaluation, for example. It is stated that public evaluation will be more effective and useful than traditional peer evaluation.

With the understanding that pre-registration is a necessary method to prevent selective reporting, especially by preventing "p-hacking" or "data butchery", pre-registration has been mandatory for clinical trials in the USA since 1997. This practice has become a prerequisite for the acceptance of the publication by the ICJME since 2005. As a result of the clarity provided by the pre-registration application, the positive result reporting rate, which was previously 80- 95%, decreased to 40% (Allen and Mehler, 2019).

Evaluation should not only be a pre-publication task. Peer review and evaluation during every phase including post-publication are important for the reliability and dissemination of research results. Open peer review appears to increase publication quality (Walsh et al., 2000).

Openness is also an important tool to overcome the reproducibility problem.

CONCLUSION

The causes, dynamics, and consequences of reproducibility and openness issues in scientific studies are undoubtedly not as brief as mentioned here. Scientific studies and research must be the product of free thought. In this sense, it is the basic principle of every sane scientist to argue that there should be no restrictive limits or meaninglessly strict rules for research.

However, it is necessary to seek answers to the following questions, keeping in mind that the guidance caused by false information produced by methods that are far from control and cannot be repeated can in a sense turn into a new type of colonialism:

-Does appearing in many publications mean being scientific?

-Is there or should there be an "influencer" or troll role in scientific publishing?

-Are there criteria for the competence of journal editors and reviewers? Should there be?

-Are there any mechanisms to prevent journal editors or reviewers from stealing the author's ideas? Should there be any?

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Evaluation of Perspectives Among Elderly Patients and Their Relatives in Palliative Care Centers of Istanbul

Vildan Kandemir BÜTÜN[1]
Haydar SUR[2]

ABSTRACT

In Turkey, there is a dearth of research on palliative care, particularly concerning the elderly population. This study aims to evaluate the perspectives of elderly patients and their relatives regarding palliative care centers. The findings are expected to offer guidance for palliative care centers, specifically those catering to the elderly, and contribute to the enhancement of palliative care practices. The research utilized a questionnaire-based methodology, comprising inquiries pertaining to demographic information and the evaluation of perspectives regarding palliative care centers. These aspects encompassed patient care and treatment, communication with patients' relatives, perceptions, familial interest, emotional impact on relatives, the palliative care unit's waiting environment, and decision-making processes. A Palliative Care Satisfaction Scale, comprising seven sub-dimensions, was employed for assessment. The research population encompassed elderly patients receiving palliative care in Istanbul and their relatives, with the sample drawn from both public and private sectors. Data collection occurred during 2020-2021, with a total of 333 participants, including elderly patients and their relatives, being included in the study. The analysis revealed a positive palliative care satisfaction rate of

1   Üsküdar University, Institute of Health Sciences, Istanbul, Türkiye
2   Üsküdar University, Faculty of Health Sciences, Istanbul, Türkiye
*   Corresponding author: Vildan Kandemir BÜTÜN, vildankan@hotmail.com

78.75%. The highest mean value, at 3.52 (88%), was associated with the dimension concerning the care of patients' relatives, followed by patient care and treatment at 3.30 (82.5%), perception at 3.26 (81.5%), provision of information to patients' relatives at 3.19 (79.75%), emotional impact on patients' relatives at 3.00 (75%), and the decision-making process at 2.94 (73.5%), with the lowest score attributed to the palliative care waiting environment. The findings underscore the importance of improving the waiting environments in palliative care centers and involving patients and their relatives more actively in decision-making processes.

Keywords: Elderly, Palliative, Palliative Care

INTRODUCTION

As per the World Health Organization (WHO), individuals aged 60 and above are categorized as elderly. Demographic data suggest a consistent increase in this elderly population, with this trend anticipated to persist (Wagiman et al., 2016). Healthy aging is defined as the process of developing and sustaining functional and physical capacities that contribute to well-being in old age. Functional capacity is a combination of an individual's internal capacity, related environmental characteristics, and interactions between the individual and these characteristics (Tavares et al., 2017). Challenges experienced by elderly patients can significantly impact their quality of life and overall satisfaction (Kurt et al., 2010).

The delivery of care services occurs through two primary ways. The first of these is formal care provided by private and public institutions. The second is informal care provided by family members, neighbors, close relatives or friends. Palliative care and home care services are at the forefront of formal care services. In the past, it was thought that palliative care should be applied to patients in the last phase of the diseases, but today, the opinion that it should be carried out together with therapeutic approaches since the diagnosis of life-threatening diseases has prevailed (Ezgici et al., 2019).

Palliative care is interdisciplinary care (medicine, nursing, social work, religion, and other specialties as appropriate) that focuses on improving the quality of life of people of all ages living with any serious illness. Palliative care provides patients with additional support by treating pain, other symptoms,

psychological and mental distress, utilizing advanced communication skills to identify care goals and assisting treatments in a personalized way, and providing sophisticated care coordination. Palliative care is provided either for the disease or in accordance with curative treatments (Campion, 2015).

In this study, the perspectives of elderly patients and their relatives on palliative care centers in Turkey were evaluated. It is thought that this study will be a guide for palliative care centers especially for the elderly and will be beneficial in terms of the effectiveness of palliative care practices.

CONCEPTUAL FRAMEWORK

Care Service and Elderly Care

In general, the concept of care can be expressed as providing support and assistance to people who are unable to independently perform daily life activities. Since the need for supervision and care of the elderly persists throughout their lives, it brings a long-term caregiving into focus and is primarily undertaken by family members and relatives free of charge. Nevertheless, it is also provided by professionals specializing in long-term elderly care for a certain fee (Oğlak, 2017).

As age increases, functional abilities gradually decrease. From a completely independent life to simple activities, dependence on others begins. Aging varies from person to person, often influenced by factors such as physical and mental illnesses. Dependency on others arises when daily activity skills become inadequate. Along with the decreasing abilities, the care needs of the elderly are also increasing. These needs are not only related to health, they also need friendship, security, social belonging and many other things (Kar, 2015).

Elderly care is mostly tried to be solved with the family in developing countries. However, to achieve the desired effectiveness in elderly care, family-based care at home should also be professionally organized and supported. From this point of view, in order to ensure that the care and treatment of the elderly in their homes or other care institutions can be at the desired level, it is necessary to create the social infrastructure and the trained manpower and make future plans (Doğanay and Güven, 2019).

Different care options are on the agenda to solve the care-related problems of the elderly who need support and care in Turkey. Nursing homes, nursing

homes, elderly apartments, elderly villages, etc. In addition to institutional elderly care, home-based care services have gained prominence in recent years. With home care services, it is aimed to strengthen and support the relations of people with their environment in cases such as old age and chronic diseases, enabling them to continue living freely in their surroundings, meet expectations and wishes, increase social functionality and reduce the costs of institutional care services (Tamer, 2017).

Palliative Care

Palliative care is a relatively new specialty that has evolved over the past two decades. The initial aim of this specialty was to provide end-of-life care for advanced cancer patients and their families. It developed as a result of growing public concern and dissatisfaction with the care of dying patients in the 1960s and 1970s. The focus of this specialization is to relieve pain, control symptoms and improve the quality of care for patients, their families and the healthcare system. It includes not only the physical aspect but also the psychological, social and spiritual dimensions. It offers a support system to help patients live as actively as possible until death. Additionally, it provides a support system to help caregivers and families cope with the patient's illness and grief (Al-Mahrezi and Al-Mandhari, 2016).

The concept of care lies at the heart of the philosophical principles underpinning palliative care and serves as the guiding framework for professionals working in this field, irrespective of the patient's environment. In the context of caring for individuals afflicted by incurable, progressive, and life-threatening diseases, special emphasis must also be placed on the patient's families. Palliative care adopts a holistic approach that encompasses both the individual and their family, a perspective endorsed by the World Health Organization (SilvaI et al., 2018).

Palliative care represents an approach aimed at enhancing the quality of life of patients and their families facing problems related to life-threatening diseases. It includes the early diagnosis, accurate assessment, and treatment of pain and other associated problems, with a focus on both the prevention and alleviation of pain and relieve patients. Palliative care extends to the prevention and mitigation of any physical, psychological, social or spiritual suffering

experienced by those with life-limiting health problems (WHO, 2016). Palliative care (WHO, 2018);

- It requires early diagnosis and evaluation and treatment of problems.
- It improves the quality of life, promotes comfort and can also have a positive impact on the course of the disease.
- It provides support both for the patient and family throughout the illness.
- It is concerned with preventing, diagnosing early, and treating serious or life-limiting health problems.
- It can be administered concurrently with other treatments aimed at prolonging life.
- It can be applied to individuals living with long-term physical, psychological, social or mental challenges resulting from serious or life-threatening diseases or their treatments.
- It offers support to bereaved family members when necessary, following the patient's death.
- It offers any necessary treatments to ensure sufficient comfort for the patient.
- It is delivered by health care professionals at various levels of palliative care training and skill at various levels.
- It encourages the active participation from communities and community members.

In 2017, there were 252 palliative care centers in Turkey, 238 of which are within the Ministry of Health and 14 of which are within universities, with a total of 2.942 beds. In 2018, the number of palliative care centers increased to 294, with 3.730 beds. As of March 2019, the number of palliative care centers had reached 365, and the number of beds had risen to 4.855 (Akçakaya, 2020).

Aim of Palliative Care

Palliative care is defined as an approach for the early diagnosis, evaluation and treatment of physical and psycho-social and mental problems to alleviate or prevent the problems and pain associated with life-threatening diseases. The main purpose of palliative care is to provide a quality of life, relief of patients' pain and other symptoms, psychological and social support, nutritional support and education needs of the patient. However, the main purpose is to

improve the quality of life for patients and their families (Turan et al., 2017).

In addition to treatments targeting the underlying disease, modern palliative care can be provided from the moment of diagnosis, and palliative care may be necessary. However, treatments targeting the control of the disease may be necessary in addition to palliative care until the time of death (Hawley, 2017).

With palliative care, patients and their relatives can be psychologically prepared for death. The main goals of palliative care are to prevent, relieve, reduce or alleviate the symptoms caused by the disease without relying solely on treatment. In addition to these goals, it is aimed at improving the quality of life for the patient and providing support for the patient's relatives. Palliative care is not solely provided in the final stages of life. It is a form of care that begins with the initial diagnosis of the patient, continues with the purpose of treatment until death, and supports the family and members in the mourning process after death. The general aims of palliative care are as follows (Kızıltuğ, 2019);

- Palliative care sees death as a natural process and affirms life.
- Palliative care helps relieve pain and other distressing symptoms.
- Palliative care does not aim to hasten or delay death.
- Palliative care addresses the spiritual and psychological aspects of patient care.
- Palliative care provides support for patients to live as actively as possible until the moment of death.
- Palliative care provides support for the families of patients to cope with the problems during their illness and at the end of their life.
- Palliative care offers a team approach to meet the needs of patients and their families.
- Palliative care can have a positive impact on the course of the disease and contributes to increase the quality of life of patients.
- Palliative care can be initiated early in conjunction with other treatments such as radiotherapy and chemotherapy to extend life, depending on the course of the disease.

METHODOLOGY

Purpose of Research

Palliative care in Turkey is an issue that is not emphasized enough, except for a few palliative care centers that serve mostly for cancer patients. In Turkey, there haven't been many studies on palliative care and its centers especially for the elderly. The purpose of the research is to evaluate the perspectives of elderly patients and their relatives on palliative care centers in Istanbul. It is believed that this study will be a guide for palliative care centers especially for the elderly and will be beneficial in improving the effectiveness of palliative care practices. Enhancing the effectiveness of palliative care centers is crucial for assessing satisfaction, identifying any deficiencies, and taking necessary precautions.

Research Method

This research is a quantitative in nature, and it aimed to assess the perspectives of elderly patients and their relatives on palliative care centers in Istanbul. A questionnaire was utilized as a quantitative data collection tool in the research. The research questions are as follows;

1) Does the perspective towards palliative care centers differ according to gender?

2) Does the perspective towards palliative care centers differ based on whether one is a patient or a patient's relative?

3) Does the point of view towards palliative care centers differ according to the frequency of visits?

4) Does the perspective towards palliative care centers differ from having previous knowledge of palliative care?

5) Does the point of view towards palliative care centers differ according to whether there is a relative in the palliative care center or not?

6) Does the perspective towards palliative care centers differ according to e place of residence?

7) Does the point of view towards palliative care centers differ according to education level?

8) Does the perspective towards palliative care centers differ according to income level?

9) Does the perspective towards palliative care centers differ according to the reason for choosing the palliative care center?

Research Population and Sample

The population of the research consists of elderly patients and their relatives who receive service from the palliative care center in Istanbul. Considering the cost and time constraints, it was decided to use the sampling method since it is very difficult to apply the questionnaire to the whole population. The sample consists of service recipients from the public and private sectors. In Turkey, palliative care services are provided within the Ministry of Health in 396 health institutions in 81 provinces with a total of 5.302 beds (Doğan and Demirtaş, 2020).

According to 2020 data, there are 595 palliative beds in public hospitals in Istanbul. The population of the study consists of 600 patients and their relatives. When the acceptable margin of error was set at 5% and the confidence level was 95%, the recommended sample size was calculated to be 234. The research was carried out in 2020, and a total of 333 people were reached, including elderly patients and their relatives in Istanbul.

Data Collection Technique

In the research, questions measuring demographic information and palliative care satisfaction scale were used. There are nine questions in the scale to obtain demographic information. In one question, they were asked whether they would recommend the palliative center. Palliative care, which consists of 7 sub-dimensions, including the care and treatment of the patient, informing the patient's relatives, perception, interest in the patient's relatives, the effect on the emotionality of the patient's relatives, the waiting environment of the palliative care unit, and the decision-making process regarding the evaluation of the perspectives of elderly patients and their relatives on palliative care centers. satisfaction scale.

Palliative care satisfaction scale: It was taken from the study titled "The evaluation of the service provided in the palliative care process by the relatives of the patients" by Mavi (2017). A 4-point Likert type scale was used. According to this; It was assessed using a scale of Poor (1), Fair (2), Good (3),

Very Good (4) points. There are 30 questions in total in the palliative care satisfaction scale. 4 questions (q19-q22-q28-q30) were excluded from the factor analysis. In this study, the scale consists of 26 questions in total. When all questions were answered very well, it was evaluated as 100% satisfaction out of 104 points.

All the scaler variables were analyzed for the normal distribution and were found to be normally distributed. Thus, parametric tests were used in this study.

RESULTS

Table 1: Findings related to demographic information

		n	%
Gender	Woman	184	55.3
	Male	149	44.7
Patient/Patient Relatives	Patient	69	20.7
	The relatives of the patient	264	79.3
Interview Frequency	Continually	56	16.8
	More than once a week	93	27.9
	Once a week	136	40.8
	Once a month	33	9.9
	Once a year	15	4.5
Palliative Care Information	Yes	135	40.5
	No	198	59.5
Relative Previously in Palliative Care	Yes	88	26.4
	No	245	73.6
Place of Residence	In the city where the hospital is located	305	91.6
	Out of town	28	8.4
Education level	Primary school graduates	49	14.7
	High school graduates	75	22.5
	University graduates	133	39.9
	Master's degree graduates	62	18.6
	Doctorate graduates	14	4.2

Income Level	2.000 TL and less	9	2.7
	Between 2.001-3.000 TL	49	14.7
	Between 3.001-5.000 TL	107	32.1
	Between 5.001-10.000 TL	106	31.8
	10.001 TL and above	62	18.6
Reason for Choosing Palliative Care Center	Unsuitable home	24	7.2
	For better care	150	45.0
	Under doctor's guidance	105	31.5
	Familiar advice	35	10.5
	Other	19	5.7

Among participants %55.7 (184) are women, 79.3% (264) are relatives of the patients and the rest are patients, 14.7% (49) are primary school graduates, 22.5% (75) high school graduates, 39.9% (133) university graduates, 18.6% (62) master's degree graduates and 4.2% (14) doctorate graduates. When we looked at the socioeconomic levels of the group, 17.4% (58) of participants have lower income than 3.000 TL, 32.1% (107) between 3.001-5.000 TL, 31.8% (106) between 5.001-10.000 TL and 18.6% (62) over 10.000 TL (Table 1).

Only 56 (16.8%) of patients and their relatives are in close contact with each other. 93 persons (27.9%) see each other more than once a week, 136 (40.8%) once a week, 33 (9.9%) once a month and 15 (4.5%) once a year. The ratio of the people who had knowledge about palliative care centers previously was 40.5% (135), 26.4% (88) had a relative previously hospitalized in a palliative care center, 91.6% (305) live in the city where the hospital is located. Due to the limits of the home conditions 2% (24) prefer the palliative care center. A 45% (150) prefer a palliative care center for better care, 31.5% (105) as the result of the doctor's advice, 10.5% (35) on the recommendation of an acquaintance and 5.7% (19) for other various reasons (Table 1). In total, a 46.1% (287) of the group declares that they would recommend/strongly recommend palliative care units to their relatives and friends, 11.1% (37) are undecided and 2.7% (9) do not recommend/strongly do not recommend. Observed differences were compared by t-test and analysis of variance.

Table 2: Results of analysis for observed differences in responses by gender

Factors	Gender	n	Mean	S.D.	t	p
Care and treatment of patients	Woman	184	3.26	0.58	-1.334	0.183
	Man	149	3.34	0.58		
Giving information to the patient's relatives	Woman	184	3.17	0.55	-.538	0.596
	Man	149	3.21	0.63		
Perception	Woman	184	3.27	0.63	0.380	0.704
	Man	149	3.24	0.67		
Caring for the patient's relatives	Woman	184	3.48	0.56	-1.323	0.187
	Man	149	3.56	0.58		
Affect to emotion situation of patient's relatives	Woman	184	2.93	0.62	-2.010	0.049*
	Man	149	3.08	0.71		
Palliative care waiting environment	Woman	184	2.86	0.79	-1.947	0.052
	Man	149	3.04	0.82		
Decision making process	Woman	184	2.87	0.64	-2.160	0.035*
	Man	149	3.03	0.75		
General satisfaction	Woman	184	3.11	0.47	-1.643	0.108
	Man	149	3.20	0.56		

Only affect to emotion situation of patient's relatives and decision-making process item results were found significantly different by gender as male results had higher scores for both items ($p < 0.05$) (Table 2). Accordingly, it appears that men are more satisfied with the attention shown to their feelings than women and feel more included in decision-making processes.

Table 3: Results of analysis for observed differences by patient group

Factors	Patient Patient's relatives	n	Mean	S.D.	t	p
Care and treatment of patients	Patient	69	3.36	0.58	1.016	0.311
	Patient's relatives	264	3.28	0.58		
Giving information to the patient's relatives	Patient	69	3.13	0.61	-1.000	0.318
	Patient's relatives	264	3.21	0.58		
Perception	Patient	69	3.05	0.73	-2.928	0.004*
	Patient's relatives	264	3.31	0.62		
Caring for the patient's relatives	Patient	69	3.62	0.52	1.669	0.096
	Patient's relatives	264	3.49	0.58		
Affect to emotion situation of patient's relatives	Patient	69	3.07	0.60	0.968	0.334
	Patient's relatives	264	2.98	0.68		
Palliative care waiting environment	Patient	69	2.84	0.73	-1.195	0.233
	Patient's relatives	264	2.97	0.83		
Decision making process	Patient	69	2.68	0.66	-3.630	<0.001*
	Patient's relatives	264	3.01	0.68		
General satisfaction	Patient	69	3.10	0.50	-.921	0.347
	Patient's relatives	264	3.16	0.52		

Only affect to decision-making processes item result were found significantly different between the perception and the status of being a patient/patient relative ($p < 0.05$) (Table 3). Accordingly, it is seen that patient relatives are able to perceive issues related to the condition of the disease better than the patients and feel that they are more included in the decision-making processes.

Table 4: Results of analysis for observed differences according to knowledge about palliative care

Factors	Having Knowledge	n	Mean	S.D.	t	p
Care and treatment of patients	Yes	135	3.24	0.63	-1.433	0.164
	No	198	3.33	0.55		
Giving information to the patient's relatives	Yes	135	3.25	0.62	1.435	0.160
	No	198	3.15	0.56		
Perception	Yes	135	3.32	0.66	1.490	0.137
	No	198	3.21	0.64		
Caring for the patient's relatives	Yes	135	3.48	0.60	-.943	0.356
	No	198	3.54	0.54		
Affect to emotion situation of patient's relatives	Yes	135	3.06	0.67	1.335	0.183
	No	198	2.96	0.66		
Palliative care waiting environment	Yes	135	3.02	0.85	1.585	0.114
	No	198	2.88	0.77		
Decision making process	Yes	135	3.13	0.65	4.115	0.001*
	No	198	2.82	0.69		
General satisfaction	Yes	135	3.20	0.56	1.497	0.147
	No	198	3.11	0.48		

Only affect to decision-making processes item result were found significantly different between whether to have prior knowledge of the palliative care center ($p < 0.05$) (Table 4). Accordingly, it seems that those who have previously had information about the palliative care center feel that they are more included in the decision-making processes than those who do not.

Table 5: Results of analysis for observed differences according to relatives previously hospitalized in palliative care

Factors	Previously Inpatient Relative	n	Mean	S.D.	t	p
Care and treatment of patients	Yes	88	3.32	0.65	0.354	0.743
	No	245	3.29	0.55		
Giving information to the patient's relatives	Yes	88	3.27	0.66	1.582	0.115
	No	245	3.16	0.56		
Perception	Yes	88	3.34	0.67	1.395	0.164
	No	245	3.23	0.64		
Caring for the patient's relatives	Yes	88	3.54	0.60	0.466	0.641
	No	245	3.51	0.55		
Affect to emotion situation of patient's relatives	Yes	88	3.12	0.72	2.002	0.061
	No	245	2.95	0.64		
Palliative care waiting environment	Yes	88	3.04	0.91	1.363	0.210
	No	245	2.90	0.77		
Decision making process	Yes	88	3.18	0.72	3.845	0.001*
	No	245	2.86	0.66		
General satisfaction	Yes	88	3.25	0.60	2.116	0.035*
	No	245	3.11	0.47		

Only affect to decision-making processes item result were found significantly different between general satisfaction and whether there is a relative in the palliative care center before ($p<0.05$) (Table 5). Accordingly, those who had relatives previously hospitalized in a palliative care center felt more included in the decision-making process and their general satisfaction was higher than those who did not.

Table 6: Results of analysis for observed differences by place of stay

Factors	Place of Stay	n	Mean	S.D.	t	p
Care and treatment of patients	In the City of the Hospital	305	3.32	0.56	2.117	0.035*
	Out of Town	28	3.07	0.76		
Giving information to the patient's relatives	In the City of the Hospital	305	3.20	0.57	1.613	0.108
	Out of Town	28	3.02	0.72		
Perception	In the City of the Hospital	305	3.29	0.62	3.046	0.030*
	Out of Town	28	2.90	0.88		
Caring for the patient's relatives	In the City of the Hospital	305	3.54	0.54	2.997	0.038*
	Out of Town	28	3.21	0.79		
Affect to emotion situation of patient's relatives	In the City of the Hospital	305	301	0.65	1.206	0.229
	Out of Town	28	2.85	0.83		
Palliative care waiting environment	In the City of the Hospital	305	2.95	0.81	0.838	0.403
	Out of Town	28	2.82	0.81		
Decision making process	In the City of the Hospital	305	2.94	0.69	0.150	0.881
	Out of Town	28	2.92	0.70		
General satisfaction	In the City of the Hospital	305	3.17	0.49	1.941	0.053
	Out of Town	28	2.97	0.70		

Only affect to care and treatment and perception item result were found significantly different of patient's explanation between care and treatment, perception and care for the patient's relatives and the place of residence ($p < 0.05$) (Table 6). Accordingly, it is seen that those living in the city where the hospital is located think that the care and treatment of patients is better than those living outside the city where the hospital is located, they can better perceive the issues related to the condition of the disease, and they are more satisfied with the attention shown to them.

Table 7: Results of analysis for observed differences according to incidence

Factors	Mean	Source of Variance	Mean Square	F	p	Significant Difference
Care and treatment of patients	3.13	Between groups	0.669	1.975	0.098	-
	3.36	Within Groups	0.339			
	3.35	Total				
	3.20					
	3.30					
Giving information to the patient's relatives	3.25	Between groups	0.292	0.829	0.507	-
	3.24	Within Groups	0.352			
	3.12	Total				
	3.22					
	3.22					
Perception	3.35	Between groups	0.234	0.541	0.705	-
	3.27	Within Groups	0.432			
	3.24	Total				
	3.20					
	3.13					
Caring for the patient's relatives	3.40	Between groups	0.855	2.661	0.033*	2-4>1 3>4
	3.62	Within Groups	0.321			
	3.55	Total				
	3.33					
	3.40					
Affect to emotion situation of patient's relatives	3.11	Between groups	0.619	1.388	0.238	-
	3.02	Within Groups	0.446			
	2.91	Total				
	3.04					
	3.18					
Palliative care waiting environment	2.93	Between groups	1.377	2.118	0.078	-
	3.03	Within Groups	0.650			
	2.81	Total				
	3.10					
	3.26					

Decision making process	3.14	Between groups	2.106	4.522	0.001*	1>3
	2.97	Within Groups	0.466			
	2.77	Total				
	3.06					
	3.28					
General satisfaction	3.18	Between groups	0.214	0.793	0.530	-
	3.20	Within Groups	0.269			
	3.09	Total				
	3.15					
	3.24					
1: Continually 2: More than once a week 3: Once a week 4: Once a Month 5: Once a Year						

Only affect to decision-making processes item result were found significantly different between the care and decision-making process of the patient's relatives and the frequency of the interview (p<0.05) (Table 7). Accordingly, those who meet more than once a week and once a month are more satisfied with the attention shown to them than those who meet constantly, and those who meet once a week are more satisfied with the attention shown to them than those who meet once a month. It seems that those who meet regularly feel more included in the decision-making process than those who meet once a week.

Table 8: Results of analysis for observed differences by education level

Factors	Mean	Source of Variance	Sum of Squares	Df	Mean Square	F	p	Significant Difference
Care and treatment of patients	3.48	Between groups	3.644	4	0.911	2.714	0.030*	1>3-4
	3.34	Within Groups	110.085	328	0.336			
	3.21	Total	113.729	332				
	3.23							
	3.52							
Giving information to the patient's relatives	3.18	Between groups	0.578	4	0.144	0.408	0.803	-
	3.18	Within Groups	116.130	328	0.354			
	3.16	Total	116.708	332				
	3.22							
	3.37							
Perception	2.99	Between groups	4.574	4	1.143	2.719	0.030*	2-3-4-5>1
	3.32	Within Groups	137.919	328	0.420			
	3.32	Total	142.492	332				
	3.23							
	3.38							
Caring for the patient's relatives	3.62	Between groups	2.201	4	0.550	1.693	0.151	-
	3.55	Within Groups	106.651	328	0.325			
	3.42	Total	108.853	332				
	3.58							
	3.60							
Affect to emotion situation of patient's relatives	3.03	Between groups	2.781	4	0.695	1.562	0.184	-
	2.90	Within Groups	145.976	328	0.445			
	2.96	Total	148.757	332				
	3.11							
	3.27							
Palliative care waiting environment	2.82	Between groups	10.607	4	2.652	4.179	0.003*	4>1-2-3
	2.76	Within Groups	208.116	328	0.634			
	2.92	Total	218.722	332				
	3.28							
	3.07							

Decision making process	2.60	Between groups	14.213	4	3.553	7.929	<0.001*	3>1 4-5>1-2
	2.77	Within Groups	146.992	328	0.448			
	3.02	Total	161.205	332				
	3.17							
	3.35							
General satisfaction	3.10	Between groups	1.354	4	0.338	1.263	0.284	-
	3.11	Within Groups	87.876	328	0.268			
	3.13	Total	89.229	332				
	3.23							
	3.37							

1: Primary school graduates 2: High school graduates 3: University graduates 4: Master's degree graduates 5: Doctorate graduates

Only affect to decision-making processes item result were found significantly different university graduates feel more included in compared to primary school graduates, and master's graduate and doctorate graduates compared to primary and high school graduates (p<0.05) (Table 8). Accordingly, it is seen that those who are primary school graduates think that care and treatment of patients is provided better than those who have university and master's degree graduates. It is seen that those whose education level is higher than primary school graduates can perceive the issues related to the disease status better than primary school graduates. It is seen that master's degree graduates view the palliative care waiting environment better than primary school, high school and university graduates. It is seen that university graduates feel more included in decision-making processes than primary school graduates, and master's and doctorate graduates feel more involved in decision-making processes than primary school graduates and high school graduates.

Table 9: Results of analysis for observed differences by income level

Factors	Mean	Source of Variance	Sum of Squares	Df	Mean Square	F	p	Significant Difference
Care and treatment of patients	3.44	Between groups	1.636	4	0.409	1.197	0.312	-
	3.39	Within Groups	112.094	328	0.342			
	3.29	Total	113.729	332				
	3.21							
	3.36							
Giving in-formation to the patient's relatives	3.04	Between groups	1.824	4	0.456	1.302	0.269	-
	3.10	Within Groups	114.883	328	0.350			
	3.20	Total	116.708	332				
	3.15							
	3.32							
Perception	2.81	Between groups	6.221	4	1.555	3.743	0.005*	3-4-5>1-2
	3.00	Within Groups	136.272	328	0.415			
	3.31	Total	142.492	332				
	3.33							
	3.30							
Caring for the patient's relatives	3.50	Between groups	0.842	4	0.210	0.639	0.635	-
	3.56	Within Groups	108.011	328	0.329			
	3.46	Total	108.853	332				
	3.50							
	3.60							
Affect to emotion situation of patient's relatives	3.04	Between groups	6.834	4	1.708	3.948	0.004*	5>1-2-3-4
	2.84	Within Groups	141.923	328	0.433			
	2.90	Total	148.757	332				
	3.01							
	3.27							
Palliative care waiting environment	2.88	Between groups	16.425	4	4.106	6.658	<0.001*	4>2 5>2-3-4
	2.66	Within Groups	202.298	328	0.617			
	2.79	Total	218.722	332				
	2.99							
	3.34							
Decision making process	2.58	Between groups	26.693	4	6.673	16.273	<0.001*	3>2 4>1-2 5>1-2-3-4
	2.40	Within Groups	134.512	328	0.410			
	2.91	Total	161.205	332				
	3.02							
	3.35							

General satisfaction	3.04	Between groups	3.824	4	0.956	3.672	0.006*	5>2-3-4
	2.99	Within Groups	85.405	328	0.260			
	3.12	Total	89.229	332				
	3.15							
	3.34							
1:Income level less than 2.000 TL 2: Income level 2.001-3.000 TL 3: Income level 3.001-5.000 TL 4: Income level 5.001-10.000 TL 5:Income level more than 10.000 TL								

Among the nine items of the scale, responses for four of them showed significant difference ($p<0.05$). These four items were affected to emotional situation of patient's relatives, waiting environment in the palliative care unit, decision making process and general satisfaction. According to this;

It is seen that those with an income of 3.001 TL and above can perceive the issues related to the condition of the disease better than those with an income of 3.000 TL and below.

It seems that those with an income of 10.001 TL and above are more satisfied with the attention shown to their emotions than those with an income of 2.001-10.000 TL.

It is seen that those with an income of 5.001-10.000 TL see the palliative care unit waiting environment better than those with an income of 2.001-3.000 TL, and those with an income of 10.001 TL and above see the palliative care unit waiting environment better than those with an income of 2.001-10.000 TL.

Those with an income between 3.001-5.000 TL have a higher decision-making process than those with an income of 2.001-3.000 TL, those with an income between 5.001-10.000 TL have a higher decision-making process than those with an income of 3.000 TL and below, and those with an income of 10.001 TL and above have a higher decision-making process than those with an income of 10.000 TL and below. It seems that they feel more included.

Those with an income of 10.001 TL and above have higher general satisfaction levels with the palliative care center than those with an income of 2.001-10.000 TL.

Table 10: Results of analysis for observed differences according to the reason for choosing the palliative care center

Factors	Mean	Source of Variance	Sum of Squares	Df	Mean Square	F	p	Significant Difference
Care and treatment of patients	3.36	Between groups	1.602	4	0.401	1.172	0.323	-
	3.28	Within Groups	112.127	328	0.342			
	3.35	Total	113.729	332				
	3.29							
	3.05							
Giving information to the patient's relatives	3.26	Between groups	4.283	4	1.071	3.124	0.015*	2-4>3
	3.26	Within Groups	112.425	328	0.343			
	3.03	Total	116.708	332				
	3.32							
	3.20							
Perception	3.40	Between groups	2.442	4	0.611	1.430	0.224	-
	3.32	Within Groups	140.050	328	0.427			
	3.15	Total	142.492	332				
	3.24							
	3.17							
Caring for the patient's relatives	3.58	Between groups	1.168	4	0.292	0.890	0.470	-
	3.54	Within Groups	107.685	328	0.328			
	3.52	Total	108.853	332				
	3.51							
	3.28							
Affect to emotion situation of patient's relatives	3.9	Between groups	3.766	4	0.942	2.130	0.077	-
	3.07	Within Groups	144.991	328	0.442			
	2.84	Total	148.757	332				
	310							
	3.00							
Palliative care waiting environment	3.06	Between groups	22.914	4	5.728	9.596	<0.001*	1-2-4-5>3
	3.10	Within Groups	195.808	328	0.597			
	2.56	Total	218.722	332				
	3.27							
	3.05							

Decision making process	3.00	Between groups	27.166	4	6.791			
	3.12	Within Groups	134.039	328	0.409			
	2.53	Total	161.205	332		16.619	<0.001*	1-2-4-5>3
	3.27							
	3.13							
General satisfaction	3.23	Between groups	3.997	4	0.999			
	3.22	Within Groups	85.232	328	0.260			
	2.99	Total	89.229	332		3.846	0.005*	1-2-4>3
	3.27							
	3.11							
1: Unsuitable home **2: For better care** **3: Direction of the doctor** **4: Familiar advice** **5: Other**								

Only two affect waiting environment the decision-making process item result were found significantly different general satisfaction, and the reason for choosing the palliative center (p<0.05) (Table 10). According to this;

It is observed that those who prefer a palliative care center for better care and because of the advice of a friend think that they are better informed than those who prefer it with the guidance of a doctor.

It is seen that those who prefer the palliative care center due to unsuitable home, better care, advice from acquaintances and other reasons, see the waiting environment of the palliative care unit better than those who prefer it with the guidance of the doctor.

It is observed that those who prefer a palliative care center due to unsuitable home, better care, advice from acquaintances and other reasons feel that they are more included in the decision-making process than those who prefer it with the guidance of a doctor.

Those who choose a palliative care center due to unsuitable housing, better care and advice from acquaintances have higher general satisfaction levels with the palliative care center than those who choose it with the guidance of a doctor.

DISCUSSIONS and CONCLUSIONS

Aging is a complex process of development and growth, which is an inevitable journey that starts with birth and ends with death. This process encompasses physiological, biological, sociological, psychological and chronological dimensions. As people age, starting in middle age, their bodily functions become increasingly susceptible to wear and tear, resulting in a decline in physical and mental capabilities. Palliative care is a model of care that primarily seeks to predict, prevent, diagnose and treat the symptoms experienced by those with a serious or life-threatening illness, and provide medical support to patients and their families. The goal of palliative care is to improve the quality of life for both patient and family, regardless of diagnosis. It can positively affect the course of the disease. Provides support for the patient and family throughout the illness. It includes the early diagnosis, correct evaluation and treatment of pain and other problems, as well as aiming to prevent pain and relieve patients. Palliative care includes the prevention and relief of any physical, psychological, social or spiritual suffering experienced by those with life-limiting health problems.

According to the research findings, satisfaction with palliative care stands at a positive 78.75%. The highest mean value of 3.52 (88%) belongs to the dimension of concern for the caring for the patient's relatives. The rest follows respectively as; 3.30 (82.5%) care and treatment of patients, 3.26 (81.5%) perception, 3.19 (79.75%) giving information to the patient's relatives 3.00 (75%) affect to emotion situation of patient's relatives 2.95 (73.75%) and the decision-making process was 2.94 (73.5%) and palliative care waiting environment. The highest average belongs to caring for the patient's relatives where the lowest average belongs to palliative care waiting environment category. In the study of Güdeloğlu et. al. (2020), palliative care satisfaction ranking follows as; interest and giving information to the patient's relatives, affect to emotion situation of patient's relatives, care and treatment of patients, decision-making process, affect to emotion situation of patient's relatives, perception and waiting of environment and logistic support. The highest average belongs to interest and giving information to the patient's relatives and lowest average belongs to waiting of environment and logistic support. In the study of Mavi (2017), palliative care satisfaction rate of patient relatives was 85%. Palliative care satisfaction

order from highest to lowest in the study is as follows; decision making evaluation of perspectives among elderly patients and their relatives in palliative care centers of Istanbul process, care and treatment of patients, perception, giving information to the patient's relatives, affect to emotion situation of patient's relatives, waiting of environment and logistic support.

Improving the waiting environments of palliative care centers and involving both patients and their relatives in decision-making processes will further improve the positive perspective on palliative care centers. Analyzing the responses of research participants, we observe the following trends;

- The majority believe that they will definitely receive calls from home when there is a significant change in the condition of their patients. The second most common response is that employees are very kind and very understanding towards them, while the third most common response is that the skills and abilities of the doctors are very good.

- Participants indicate that they receive comprehensive information about their patients most frequently, with the second highest response being that the same information is provided to family members who are informed about the disease, and that the information given about their patients is understandable with the third highest rate.

- Respondents report that they occasionally need to attend to matters outside the palliative care unit the most, followed by occasionally sharing issues that distress them with the palliative care doctors. Furthermore, they occasionally participate in making decisions about their patients' treatment and care. It is evident that they sometimes feel involved in the decision-making process, have varying degrees of control over treatment and care, and occasionally have sufficient time to address concerns and problems during this process.

- It is seen that they definitely feel abandoned and alone in the waiting area with the highest rate, they always encounter a situation that disturbs them when they visit their patients with the second highest rate, and they never think they have control over the treatment and care of their patients with the third highest rate. To enhance the perception of palliative care centers positively, it is imperative to transform the waiting areas into environments that alleviate feelings of loneliness and abandonment, minimize disturbances

during visits, and empower patients to feel in control of their treatment. Additionally, assisting patients' relatives with tasks outside the palliative care unit, creating a supportive environment for them to discuss their concerns with palliative care doctors, and involving them more in decision-making processes will contribute to a more positive perception of palliative care centers. Allocating more time to address concerns and respond to problems during decision-making processes is also essential. Other suggestions for improving palliative care service delivery in institutions are as follows;

• Awareness should be raised regarding the creation of a palliative care environment.

• The need for changes in existing facilities, policies and procedures to support the goals of palliative care should be acknowledged.

• Be familiar with quality improvement tools that support excellence in palliative care.

• Every individual in need should be able to receive palliative care.

• The facility should be thoroughly evaluated and care and services provided to achieve or maintain the highest possible physical, mental and psychosocial well-being in accordance with the care plan.

• The management of the facility should adopt the philosophy of palliative care, and the purpose of maintenance should be integrated into the daily practices and operational philosophy of the facility.

Ethical Approval: This study was initiated after obtaining ethics committee approval from Üsküdar University's Health Sciences Ethics Committee with a decision dated 27.08.2020 and numbered 422.

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Net Profit Margin Forecasting with Machine Learning Methods in Hospital Finance Management

Oğuz CECE[1]
Mehmet GENÇTÜRK[2]

ABSTRACT

Hospital information management systems (HIMS) were managed using paper-based systems with individual efforts during the pre-computer era. Today, parallel to technological developments, tasks are carried out digitally in an electronic environment. HIMS software typically includes modules such as patient registration and appointment follow-up, clinical and medical records, radiology, laboratory, drug management, billing, reporting, and hospital management. Accounting records are processed in the finance management submodule within the hospital management module. Artificial intelligence models used in various sectors for financial estimation in hospital finance management have been found to be worth researching, given the benefits they offer to the hospital's financial management. Financial data from private hospitals traded on the stock exchange between 2009-2023 were used in the study. A total of 97 financial reports from 5 different private hospitals and 776 raw data obtained from these reports constitute the dataset for the study. "Net Profit Margin" has been estimated for the data set. The most reliable and closest-to-reality algorithm was determined by conducting five different algorithm trials in the PHYTON programming language.

1   Süleyman Demirel University, Institute of Social Sciences, Health Institutions Management, Isparta, Türkiye
2   Süleyman Demirel University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Isparta, Türkiye
*   Corresponding author: Oğuz CECE, oguzcece@gmail.com

The most successful result was obtained with the Random Forest algorithm. The correlation coefficient between Random Forest prediction values and actual values was over 0.90 for both training and testing phases. This shows that there is a strong positive relationship between the predicted values and the actual values. It has been observed that hospitals can use Random Forest to make this estimation when they want to predict financial data for future periods.

Keywords: Financial Forecasting, Financial Forecasting Methods, Health Information Management System, Machine Learning

INTRODUCTION

Financial forecasting in the healthcare industry involves utilizing financial data and analysis techniques to anticipate future financial outcomes and trends, specifically for healthcare organizations such as hospitals, clinics, pharmaceutical companies, and health insurance providers. It aims to support decision-making, budgeting, resource allocation, and financial planning in the healthcare industry (Davenport and Kalakota, 2020).

Regulatory factors in the health sector encompass a range of complex dynamics, such as technological advancements, demographic changes, and evolving health policies. These factors may introduce additional uncertainties and challenges to financial forecasts in the health sector. However, financial forecasting can serve as a policy tool for strategic planning, resource management, and financial decision-making in healthcare organizations (Kaya et al., 2019).

Financial forecasting in healthcare involves a systematic approach that combines historical data, industry trends, and relevant factors to predict future financial outcomes.

Data Collection: Relevant financial data is collected from various sources within the healthcare organization. This includes historical financial statements, billing records, patient volumes, reimbursement rates, and other financial metrics. Additionally, it may include external data sources, such as industry reports, government data, and economic indicators (Koçyiğit et al., 2022).

Determining the Main Factors: The main factors that affect the financial performance of the health institution are determined. These factors may include patient volumes, service mix, reimbursement rates, pricing, staffing levels, regulatory changes, and market dynamics.

Define the Forecast Period: The time frame for the forecast is determined, whether it is short-term (e.g., monthly, or quarterly) or long-term (e.g., annual, or multi-year). Estimation time varies depending on the specific needs and goals of the healthcare institution (Özdemir and Bilgin, 2021).

Choosing Forecasting Methods: The appropriate estimation methods are selected based on the available data and the characteristics of the predicted financial variables. Standard forecasting techniques used in healthcare include time series analysis, regression analysis, trend analysis, and predictive modeling. In addition, healthcare-specific models, such as patient volume estimation or reimbursement models, can be used.

Building Models and Analyzing Data: Selected forecasting methods are applied to the collected data. This includes analyzing historical patterns, identifying trends, and building mathematical models that capture relationships between critical factors and financial results. Statistical software and data analysis tools can be used in this process (AbdelSalam et al., 2022).

Validating and Refining Models: Validate forecasting models by comparing predicted results with historical data. Evaluate the accuracy of the predictions and make adjustments or improvements to the models if necessary. This iterative process helps to increase the accuracy and reliability of the estimates.

Sensitivity Analysis: Sensitivity analysis is performed to assess the impact of changes in fundamental assumptions or variables on financial projections.

Interpreting and Reporting Results: The financial results are predicted, analyzed and interpreted for the health institution. Results are communicated to relevant stakeholders, such as management, finance teams, and decision-makers, to provide information on strategic planning, budgeting, and resource allocation (Abdullah, 2021; Ural et al., 2015).

Monitoring and Updating: The financial performance is regularly monitored according to the predicted results. Estimates are revised as new data becomes available or as significant changes occur in healthcare (Abdullah, 2021).

Financial forecasting in healthcare is subject to uncertainties and external factors, such as regulatory changes, patient demographics, and changes in healthcare policies. Therefore, ongoing monitoring and flexibility in the forecasting process are essential for adapting to changing conditions and increasing the accuracy of forecasts.

Financial Forecasting Methods in the Literature

Financial forecasting is a well-studied field in finance and economics, and a substantial body of literature explores various aspects of economic forecasting. Some of the commonly studied topics and techniques in financial forecasting research include:

Time Series Analysis: Time series analysis is a fundamental technique used in financial forecasting. It involves analyzing historical data to identify patterns, trends, and seasonality of economic variables. Techniques such as Autoregressive Integrated Moving Average (ARIMA) models, exponential smoothing, and state space models are widely used in time series analysis (Agirbas et al., 2018).

Machine Learning and Artificial Intelligence: With advancements in machine learning and artificial intelligence, these techniques have gained popularity in financial forecasting research. Methods such as neural networks, support vector machines (SVM), random forests, and ensemble models are applied to predict stock prices, exchange rates, and other financial variables (Anal et al., 2010).

Financial Statement Analysis: Financial statement analysis techniques are used to predict financial performance indicators, such as a company's sales revenues, earnings, and cash flows. These techniques often include ratio analysis, joint dimensional analysis, and regression analysis using financial statement data.

Case Studies: Case studies examine the impact of specific events on financial variables, such as mergers and acquisitions, initial public offerings (IPOs), or regulatory changes. These studies assess the short- and long-term effects of events on stock prices, trading volumes, and other financial outcomes (Akkaya et al., 2009).

Volatility Estimation: Volatility estimation involves estimating the volatility and risk of financial assets. Techniques such as Generalized Autoregressive Conditional Variance Variance (GARCH) and stochastic volatility models are widely used to predict volatility in financial markets (Ural et al., 2015).

Predictive Analytics in Healthcare Finance: In the healthcare industry, predictive analytics is increasingly applied to financial forecasting. This includes analyzing healthcare usage data, reimbursement rates, patient demo-

graphics, and other factors to estimate healthcare costs, revenue streams, and budgetary requirements.

Forecasting in Risk Management: Financial forecasting is an integral part of risk management in multiple industries such as, including insurance, banking, and investment management. Studies often focus on estimating credit risk, default probabilities, market risks, and other financial variables related to risks (Akkaya et al., 2009).

Prediction Combination and Model Selection: Forecast combination techniques involve combining multiple individual predictions to increase accuracy and reduce prediction errors. Model selection methods aim to determine the most appropriate forecasting model or style for a particular financial variable or time series data.

Forecast Evaluation and Accuracy Metrics: Evaluating forecast accuracy is crucial in financial forecasting research. Various metrics such as mean absolute error (MAE), square mean error (MSE), square mean error (RMSE), and estimation-encompassing tests are used to evaluate the performance of forecasting models and compare different forecasting techniques (Fletcher, 2012).

Financial forecasting is an active field of study that constantly explores new techniques, improves existing methods, and addresses the challenges and complexities of estimating financial variables in various contexts (Abdullah, 2021).

The 2013 study by Soyiri et al. provides a comprehensive review of financial forecasting methods used in healthcare institutions. Outlines the approaches and techniques used to forecast financial performance and their strengths and limitations (Soyiri and Reidpath, 2013).

The study by Lee and Miller in 2022 focuses on estimating health expenditures and examines various models and methods used to evaluate health costs. Discusses challenges and opportunities in healthcare expenditure estimation and suggests potential areas for future research (Lee and Miller, 2002).

The 2012 study by Astolfi et al. reviews the literature on financial forecasting in hospitals, highlighting the different approaches and models used to predict economic outcomes (Astolfi et al., 2012).

Regression analysis of methods used to make financial forecasts, time estimates, etc., appears to be. However, it is seen that the methods used to make financial estimations in the field of health are more limited.

METHODOLOGY

Purpose and Importance of the Research

It has been observed that there is mostly no financial forecasting module among the Hospital Information Management Systems (HIMS) modules used by public and private hospitals. It has been evaluated that integrating such a module is into the HIMS, the financial situation of the health business will become predictable, and it will be protected from potential financial losses in various industries such as the literature, banking, manufacturing, construction, defense, etc. Although there are similar studies for different sectors, there are few scientific studies in hospital management.

Scope of the Study and Data Set

Private hospitals that are actively or passively involved in the healthcare sector and are members of the Public Disclosure Platform (KAP) are included in the scope of the study. The financial data of the hospitals in question since 2009 constitute dataset for the study. In the study's dataset, the relevant items in the financial reports of the hospitals in Table 1 were used as raw data. These data were first processed by calculating financial ratios and then evaluated as learning data in the financial estimation process using a machine learning method.

Table 1: Data Used in the Study

SHARE CODE	COMPANY TITLE	FINANCIAL REPORT STATEMENT	
		Date Range	Number
ACIBD	ACIBADEM SAĞLIK HİZMETLERİ VE TİCARET A.Ş.	2009-2012	13
LKMNH	LOKMAN HEKİM ENGÜRÜSAĞ SAĞLIK TURİZM EĞİTİM HİZMETLERİ VE İNŞAAT TAAHHÜT A.Ş.	2011-2023	50
MPARK	MLP SAĞLIK HİZMETLERİ A.Ş.	2017-2023	24
EGEPO	NASMED ÖZEL SAĞLIK HİZMETLERİ TİCARET A.Ş.	2021-2023	7
TNZTP	TAPDİ OKSİJEN ÖZEL SAĞLIK VE EĞİTİM HİZMETLERİ SANAYİ TİCARET A.Ş.	2023	2
DNYGZ	DÜNYA GÖZ HASTANESİ SANAYİ VE TİCARET A.Ş.	2015	1

Limitations of the Study

The study utilized financial data shared by private hospitals that are publicly traded in Borsa Istanbul and operate in the health sector through the Public Disclosure Platform.

Variables of the Study

The dependent variables of the research are the "gross profit margin, net profit margin, current ratio, debt-capital ratio, and acid-test ratio," which are the most frequently used financial ratios to evaluate the financial condition of an enterprise. The independent variable of the research is "time," as it allows for the estimation of past values.

Parameters Used in the Research

Table 2: Parameters Used in the Research

Financial Ratios	Income Statement and Balance Sheet Items
	Sales Revenue
Gross Margin	Cost of sales
Net Profit Margin	Net profit
Current rate	Current Assets
Debt-Capital Ratio	Stocks
Acid-Test Ratio	Short Term Debts
	Long Term Debts
	Capital

Methods Used in the Research

Python is widely used in artificial intelligence because of its advantages and features. It supports high-level programming and offers an interpreted language, which makes writing and understanding code easy. Python has pre-built libraries like Numpy and Scipy for scientific calculations and scikit-learn for machine learning tasks. These libraries provide a solid foundation for AI development in Python (Polimis et al., 2017).

Python libraries are pre-written collections of code that provide developers with various functions and tools. These libraries contain modules, functions,

and classes that can be imported into Python programs to perform specific tasks without having to write code from scratch. It covers various fields such as data processing, scientific computing, web development, machine learning, natural language processing, and more (Lakshmi and Scholar, 2016).

Python libraries for financial analysis and forecasting include Pandas, NumPy, and Matplotlib. These libraries offer functions for data manipulation, numerical calculations, and visualization. Additionally, libraries such as Scikit-learn and Stats models provide powerful statistical modeling and machine-learning capabilities that can be applied to financial data (Wasserbacher and Spindler, 2022). In this study, Pandas, NumPy, and Scikit-learn libraries were used.

Stages of Research

1. Data Preprocessing

Hospital data was preprocessed to prepare it for data analysis. PYTHON version 3.11.4 was used for research, and data processing was performed using nodes (Number Filter).

Scanning and Marking (Number Filter): In this step, the text is scanned to remove extra spaces and identify numbers that will not be used.

After this process, the missing five values in the data were determined and filled by taking the average of the relevant columns.

2. Calling Libraries

Pandas (pd), Numpy (Np), and Sklearn libraries are used in Python for financial data analysis and forecasting. Thus, the values are fixed within a range of minimum-maximum, and many useful functions are activated.

3. Processing of Data for Prediction

The data to be estimated is entered as input. The target variable was created by delaying the period in the selected column value. The last period data of each hospital was deleted due to the delay in the target variable. The data has been selected for the feature selection process. The data is partitioned as training and test data. The accuracy and usability of the dataset have been tested. The categorical variables of Hospital and Period information were converted

into numerical data. It was checked whether there were any empty values in the data set, and then the existiopenpty values were filled with the average value of the relevant columns.

4. Feature Selection

Feature selection methods have been applied to improve the algorithm results. The mutual_info_regression algorithm is used in the method. "Mutual_information" is a non-parametric measure revealing two random variables' dependency structure. This value is 0 if and only if these random variables are independent. In other cases, the mutual information value increases with the increase in dependency (Polimis et al., 2017). In the trials conducted with this algorithm, it was observed that eight features yielded the best results. These data are;

- Hospital
- Debt-Capital Ratio
- Net Profit
- Current Assets
- Stocks
- DVB
- UVB

  It is equity.

The selected features divide the data into two training and test data. Here, 0.30 is used as the training data ratio.

5. Machine Learning Algorithms Used in Research

Within the scope of the research, Random Forest, Linear Regression, Multilayer Perception, Nearest Neighbors Regression, and Decision Tree Regression methods were used. Hyperparameter tuning was not performed using k-fold cross-validation because the number of data for each way was small.

It aims to determine the Net Profit Margin of the next period using the data from a specific hospital in the model. For this reason, a new variable with a lag according to the Net Profit Margin column was created in the data structure, and the idle observations were deleted. The number of data points examined is 97 pieces. With the implementation of the delay in the data, the total number of data decreased to 91.

Random Forest Algorithm: Random forest is a method for estimating many community learning tasks. Prediction variability can indicate how effective the training set is in generating the observed random forest and provide additional information about prediction accuracy. Forest-confidence-interval is a Python module for calculating variance and adding confidence intervals to scikit-learn Random forest regression or classification objects (Polimis et al., 2017).

Linear Regression Algorithm: Linear regression is a popular machine learning algorithm that predicts continuous values based on input variables. It is a statistical technique to model the relationship between a dependent variable and one or more independent variables. It aims to find the most appropriate line that represents the linear relationship between the variables. Its primary purpose is to minimize the difference between the estimated and actual values. It is widely used for forecasting and prediction tasks. It is helpful to understand the relationship between variables, identify trends, make predictions, and evaluate the effect of changes in independent variables on the dependent variable (Lakshmi and Scholar, 2016).

Multilayer Perception Algorithm: An artificial neural network commonly used for classification tasks. It consists of many interconnected layers of artificial neurons, where each neuron is a computational unit that processes and transmits information to the next layer. MLP uses a feed-forward mechanism, in which information flows from the input layer to the output layer through hidden layers. It can learn complex patterns and make predictions based on known patterns. MLP is trained using a process called backpropagation, in which the network adjusts its weights and biases to minimize the difference between the predicted and actual outputs (Car et al., 2020).

Nearest Neighbors Regression Algorithm: A machine learning algorithm for classification and regression tasks. It works by finding the closest data points to a test data point in the training dataset. It can be used for both supervised and unsupervised learning. Label the majority the nearest neighbors in the controlled environment to the test data point, in order to find the most similar data points for clustering or anomaly detection purposes in the uncontrolled environment (Samruddhi and Ashok Kumar, 2020).

Decision Tree Regression Algorithm: It is a machine learning algorithm for regression tasks. It works by recursively partitioning the training data based on feature values to create a tree-like model. Each inner node of the tree represents a decision based on a feature, while each leaf node represents the predicted output value. The algorithm selects the best feature and split point that minimizes overall mean square error (MSE) during training. It provides a useful way to capture nonlinear relationships between features and target variables (Pilnenskiy and Smetannikov, 2020).

RESULTS

Correlation coefficient, mean absolute error (MAE), mean square error (RMSE), relative mean errors (RAE), and relative error squares (RRSE), Mean Absolute Percentage Error (MAPE), R² values were used to compare the performances of the methods. The formulas used are given below.

- $MAE = \frac{1}{n}\sum_{i=1}^{n}|y_i - \hat{y}_i|$
- $RMSE = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}$
- $RAE = \sum_{i=1}^{n}\frac{|y_i - \hat{y}_i|}{|y_i - \bar{y}|}$
- $RRSE = \sqrt{\sum_{i=1}^{n}\frac{(y_i - \hat{y}_i)^2}{(y_i - \bar{y})^2}}$
- $MAPE = \frac{100/\%}{n}\sum_{i=1}^{n}\frac{|y_i - \hat{y}_i|}{|y_i|}$
- $R^2 = \sum_{i=1}^{n}\frac{(y_i - \hat{y}_i)^2}{(y_i - \bar{y})^2}$

Here, is the observation value (the target value in the test or training data), does the model predict the target value, and is the mean of the observation values. In machine learning algorithms, MAE, RMSE, RAE, RRSE, MAPE, R² values are expected to be as small as possible.

Machine learning algorithm results are given in Table 3 and Table 4.

Table 3: Prediction Data Test Results

Algorithm	Prediction						
	Correlation Coefficient	Mean Absolute Error (MAE)	Mean Error Squares (RMSE)	Relative Mean Errors (RAE)	Relative Error Squares (RRSE)	Mean Absolute Percentage Error (MAPE)	R²
Random Forest	0.954	22.744.521	75.374.108	0.214	0.299	0.456	0.887
Linear Regression	0.894	82.867.890	112.600.301	0.779	0.447	1.357	0.750
Multilayer Perception	0.998	9.576.807	14.854.148	0.090	0.059	0.827	0.997
Nearest Neighbors	0.843	48.421.537	148.780.191	0.455	0.591	0.838	0.053
Decision Tree Regression	1	0	0	0	0	0	1

Table 4: Test Data Test Results

Algorithm	Test						
	Correlation Coefficient	Mean Absolute Error (MAE)	Mean Error Squares (RMSE)	Relative Mean Errors (RAE)	Relative Error Squares (RRSE)	Mean Absolute Percentage Error (MAPE)	R²
Random Forest	0.935	29.130.646	46.332.685	0.445	0.370	1.050	0.710
Linear Regression	0.894	59.510.417	73.111.997	0.910	0.583	1.945	0.784
Multilayer Perception	0.886	36.499.620	63.937.853	0.558	0.510	2.037	0.606
Nearest Neighbors	0.935	25.482.721	47.434.492	0.390	0.378	1.011	0.861
Decision Tree Regression	0.635	57.374.939	102.752.293	0.877	0.820	1.024	0.935

As can be seen in Table 3 and Table 4, the Random Forest method gave the best results.
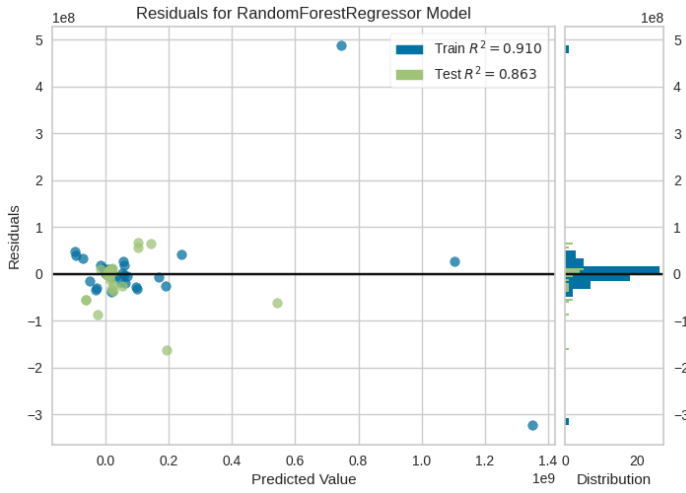
Figure 1. Distribution of residuals of values estimated by Random Forest Regression
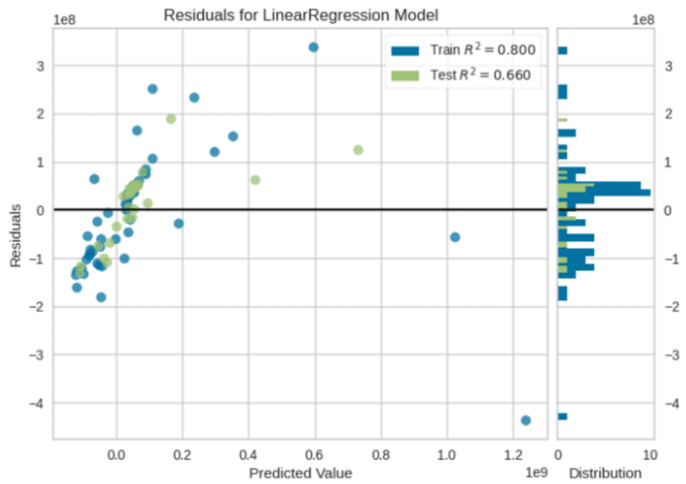

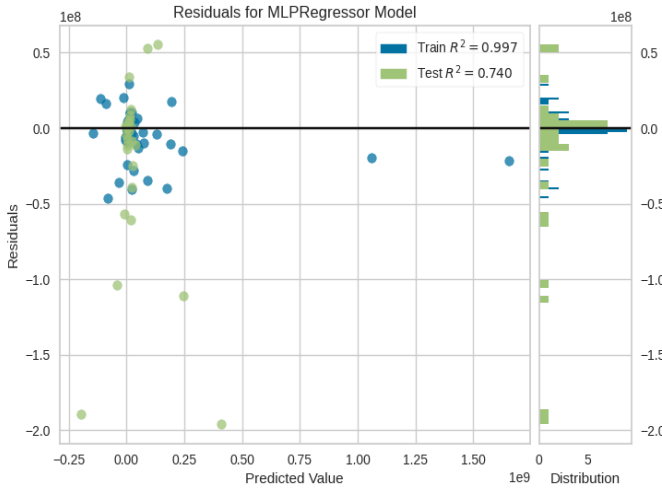**Figure 2.** Distribution of residuals of values estimated by Linear Regression

Figure 3. Distribution of residuals of values estimated by Multilayer Perception Regression
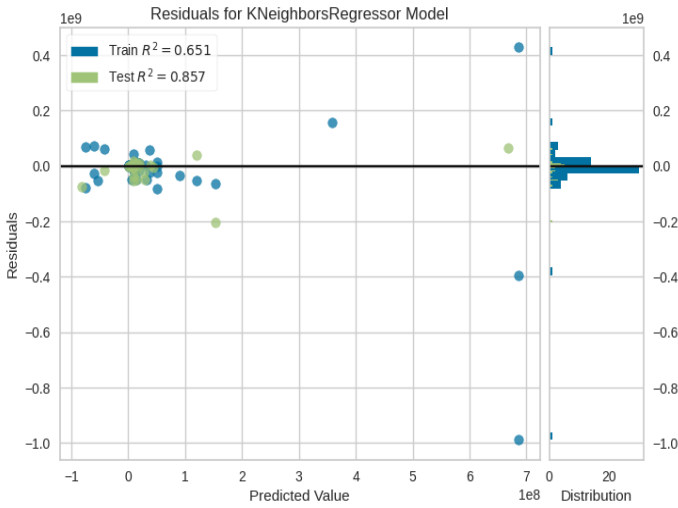
Figure 4. Distribution of residuals of values estimated by K-nearest Regression
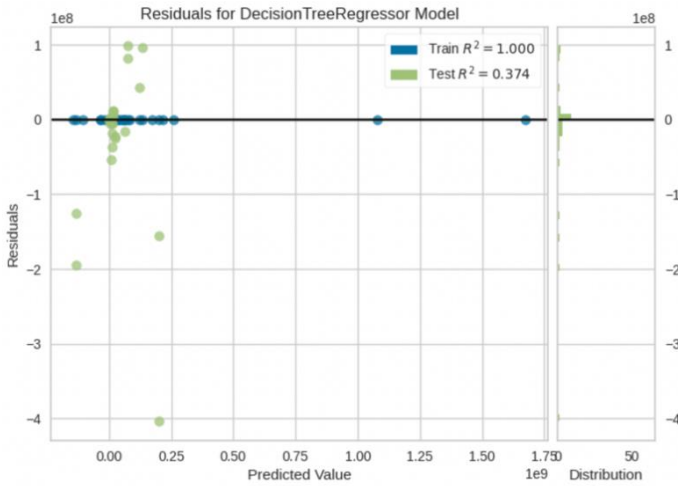
Figure 5. Distribution of residuals of values estimated by Decision Tree Regression

The residuals for all methods exhibit a near-symmetric scatter around zero during both the training and testing phases. This indicates that the machine learning methods used predict the actual value unbiasedly. In cases where the estimated value is too large, it is observed that the residual value is too large for at most two points, and all the residual values are close to each other and remain small.

In this study, the net profit margin of hospitals was determined using machine learning techniques over the data set created from hospital data. Regarding the net profit margin, the estimation of the financial data and ratios in the dataset for the next period is made using some algorithms. The results obtained from five different machine learning algorithms (Random Forest, Linear Regression, Multilayer Perception, Nearest Neighbors, Decision Tree Regression) are shown in Figure 1-5. As can be seen, the most successful results were obtained with the Random Forest algorithm. Since hospitals aim to predict financial data for future periods, this estimation can be made using Random Forest.

DISCUSSIONS AND CONCLUSIONS

A literature review and several studies have been conducted on the utilization of machine learning methods in the field of artificial intelligence. Generally, studies on banking, stocks, the stock market, and the economy have been widely encountered. However, the number of studies in the health field is quite limited.

No analysis has been found that directly estimates profit margins in healthcare institutions. Although health institutions seem like a business, they provide services in a different manner than a typical company and are traded using different accounting items. For this reason, directly comparing an enterprise's data with data from the health institutions will not yield an accurate result.

In this study, an estimation was made only on "net profit," but there are plans to make estimations on other items in future studies. In addition, the study is believed to contribute to literature as it is a rare study in its field.

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HIV-AIDS Stigma in the Workplace: A Qualitative Study in Türkiye

Nevin KORKMAZ[1] ⓘ
Servet ÖZTÜRK[2] ⓘ
Haydar SUR[3] ⓘ

ABSTRACT

HIV/AIDS (Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome) epidemic is one of the most critical global health problems in history. Stigmatizing attitudes towards PLWHA (people living with HIV/AIDS) in the workplace lead to the loss of jobs or not being preferred for new recruitment. This study aims to shed light on the situations related to stigma and stigma fears that they have experienced in their work life. A phenomenological research design was used in the research while volunteer sampling and snowball sampling were used as sampling methods. The study was conducted through face-to-face interviews with 10 male participants living in Türkiye (formerly known as Turkey), who were infected with HIV, between March 10, 2022, and March 17, 2022. Open coding was used in the first stage of the research, and axial and selective coding was achieved after the selection of the core category. While homosexual individuals stated that they had learned about their first diagnosis during routine blood test controls, heterosexual individuals stated that they had learned about their first diagnosis incidentally. They stated that they had felt emotions such as denial, sadness, helplessness, and fear when they had learned it, however, their fears eased later on. While married individ-

1   Fatih Sultan Mehmet Training and Research Hospital, Istanbul, Türkiye
2   Okan University, School of Medicine, Istanbul, Türkiye
3   Üsküdar University, Faculty of Health Sciences, Istanbul, Türkiye
*   Corresponding author: Nevin KORKMAZ, nevinfsm@gmail.com

uals first shared their diagnoses with their spouses, single individuals shared their diagnoses with partners or close friends. Most participants hide their HIV infection from their colleagues or managers. All participants stated that being an HIV/AIDS patient would hurt recruitment and promotion. They stated that if they lost their jobs, they would seek their rights through legal means. They also stated that the first emotion they would feel when they lost a job would be anger, sadness, disappointment, and anxiety. They stated that in order not to be stigmatized, society should be enlightened, and social media should be used to create awareness. It has been found that stigma in the workplace is still significant in Türkiye and harms PLWHA. It was emphasized that it is crucial to inform society to eliminate the stigma.

Keywords: HIV, HIV-related Stigma, Strategies, Türkiye, Workplace

INTRODUCTION

Etymologically, stigma is an Ancient Greek word meaning "to sting, to pierce, to mark." Stigma was also used in Ancient Greek to refer to the tattoo or branding of slaves (Frisk, 1970). According to American sociologist Goffman, who is the pioneer of the theory of stigma, "the behaviour of valuing the stigmatized individual less [is described as] that people who carry this label are less desirable and almost not perceived as human." In other words, according to Goffman, stigma is a concept constructed by society based on differences or deviation and it contains negativity (Goldman, 1999). Stigmatization (labelling or stigmatization) is the behavior that leads society to take a stand against some patient groups and exclude them from society due to prejudices (Kocabaşoğlu and Aliustaoğlu, 2003). Discrimination caused by stigma and prejudice leads to the deprivation of certain rights and benefits of individuals or groups in society. Cancer, tuberculosis, leprosy, sexually transmitted diseases, epilepsy, psychiatric disorders, alcohol and drug addiction, and AIDS (Acquired Immune Deficiency Syndrome) are diseases associated with stigma (Van Brakel, 2006).

The most important factors contributing to the stigma associated with HIV/AIDS (Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome) are the lethal dimensions of the disease and the fear of transmission. The main source of this fear is that many people have insufficient knowledge of the disease or misunderstand the issue of transmission. The main source of

negative attitudes and unwarranted fears about the disease dates back to times when little was known about HIV/AIDS and its causes. However, despite the new knowledge acquired about the disease, the negative attitudes toward patients gained momentum (Oran and Şenuzun, 2008).

One of the most important complications of stigmatization is the internalization of this situation by stigmatized individuals and depression, feelings of loneliness, decrease in social support, and social, communal, and familial isolation caused by such internalized stigmatization (Öztürk et al., 2021).

Social stigma is a chronic source of stress for PLWHA (people living with HIV/AIDS). As a result of stigma, which can occur at any stage of the disease and negatively affects the coping and adjustment level of the person, an increase in the level of anxiety, depression, and interpersonal insecurity is observed (Oran and Şenuzun, 2008).

Stigmatizing and discriminatory attitudes and practices towards the PLWHA in the workplace may prevent that person from having a new income source as well as causing them to lose their existing source of income. Considering that working in a job is the essential condition for people with chronic diseases to maintain their income levels and living conditions, stigma and discrimination cases also make it difficult for PLWHA to have a job that will provide them with a regular income (Hong et al., 2004). However, the fact that PLWHA, who can work for many years without losing their productivity and do not pose a danger to others, are discriminated against when they need work the most, is one of the biggest obstructions to HIV/AIDS prevention efforts (T.C. Sağlık Bakanlığı, 2008).

In the "Young People and HIV/AIDS" report prepared by WHO with the contributions of UNAIDS (The Joint United Nations Program on HIV/AIDS), it is reported that most young people in the world do not have any idea about how HIV/AIDS is transmitted or how they can be protected from it. It has been reported that they do not have any ideas. In addition, what countries should do as part of their efforts to prevent the disease was summarized by the report in 10 steps. The first step was determined as "Ending Silence, Exclusion and Embarrassment" and the second as "Providing Information and Counselling to Young People" (İnce et al., 2006). The organization of awareness campaigns, especially among young people at high risk of contracting the disease, and the attitude of this generation will determine the future direction of the AIDS ep-

idemic and the approach to HIV/AIDS patients (Oran and Şenuzun, 2008).

In Türkiye, there are hardly any field studies on the stigmatization of PL-WHA by society and their environment. It can be argued that the main reason for the limited number of studies in this area is that the PLWHA constituted a relatively small group in the past, and it was difficult to reach these individuals. In addition, it is thought that PLWHA did not participate in studies due to fear of their identities being revealed. This study, it aims to illuminate the stigma and fear of stigma experienced at the workplace by individuals living with HIV who are in the dark.

METHODOLOGY

The main axis of the research is the question 'What are the fears of PLWHA about their illnesses and stigmatization in their work life and what are the ways to deal with these fears?' The phenomenological research design was used as the research group is a small and specific group to reveal the common experiences of the participants in the research. Open coding was used in the first stages of the research. Furthermore, axial coding and selective coding were achieved after the selection of the core category.

In the preliminary study, the main studies on PLWHA conducted worldwide and in Türkiye were reviewed. Semi-structured in-depth interviews were conducted during the research process, and a research diary was maintained. The list of questions prepared before the research was changed in parallel with the discourses of the participants during the research process. The sampling methods used are voluntary sampling and snowball sampling. The population of the study consists of individuals living in Türkiye and carrying HIV. Although the findings of the research do not claim to be generalizable to HIV/AIDS patients in Türkiye due to the qualitative nature of the research, the fact that the research participants are in Istanbul, the largest city in Türkiye in terms of population and heavy internal and external migration and that participants living outside of Istanbul are also included in the research allows the study to make meaningful inferences about the panorama of Türkiye. The hospital where the study was conducted provides services to PLWHA and systematically follows up on HIV/AIDS patients. Preliminary information about the study was conveyed to the PLWHA by the study coordinators, and patients who volunteered

to participate in the study were included. Patient consent was obtained for in-depth interviews, and all interviews were recorded using a digital voice recorder. During the interviews, the pseudonyms preferred by the participants were not their real names. All interviews were held at the venues requested by the participants, paying attention to confidentiality criteria. A total of 10 face-to-face interviews were held with 10 male participants between March 10, 2022, and March 17, 2022. The total recording time was 8 h 41 min 13 s. The study was terminated when data saturation was reached. The demographic characteristics of the participants are shown in the table. All participants invited to the study participated in the study.

All data obtained were analysed using the MAXQDA software program. Although the data obtained in the initial stages of the research were coded using the open coding technique, the coding process turned into selective coding in the later stages of the research. The coding was changed or transformed comparatively with the new data. The diversity of the items and sub-items constituting the model was provided with new data, and the study was terminated when data saturation was reached.

The study was evaluated and approved by the Üsküdar University Non-Interventional Research Ethics Board (25.02.2022-61351342), and a signed voluntary consent form was obtained from all individuals participating in the study.

RESULTS
General Information

When participants were asked about their experiences of learning about their first diagnosis, it was observed that homosexual individuals were more knowledgeable about HIV and routinely had blood test controls. It was found that heterosexual participants incidentally learned about their diagnosis.

"I used to have regular tests as I have already had an active sex life and I am aware of the risks, even though I am constantly protected, you know there is no guarantee. I learned that I was positive in the tests I had had at certain periods for the reason I previously mentioned. It has been for approximately seven years. It should have been in the years 2014-2015. It's been 6-7 years." (K1, gay individual)

"When I went to nephrology for kidneys in 2015, they were going to operate, they did a blood test, I learned then." (K9, heterosexual)

It was stated that the first feelings of individuals who had just been diagnosed with HIV were denial, sadness, helplessness, and fear. Afterwards, it was stated that these fears lessened as more information became available about HIV/AIDS. As the education level and cultural qualification of the person increase, the knowledge about the disease and the desire to research increase, and thus, the coping ability becomes easier. It is observed that younger, single, and highly educated individuals can continue their lives as if they have no disease as time passes.

"After those first few days, I went back to my normal life, I didn't mind it at all, there was no problem after that." (K2)

The first relatives with whom they shared their HIV diagnosis were their spouses of married individuals, while singles shared it with their partners or close friends after learning. In the next period, it is observed that married individuals living with HIV do not share it with anyone other than their families, but single individuals share it with their families and close circles. Single individuals shared their diagnoses more easily with other people.

"Most of my close friends know. It's a very special issue of mine, but with some people, when you're not telling the truth, you feel like you're lying when you don't say something without having to be asked. I told my close friends because I absurdly thought my close friends should know about it. My circle of friends, which I call close friends, is not a very narrow. Many of my friends know about this. Many people know about it because of me." (K1, single)

"I have not shared it with anyone, only my wife knows." (K2, married)

When asked about the first reactions of the people around them, they expressed sadness, crying, and bewilderment. After getting over the initial bewilderment, they said that they received positive reactions such as hugging and saying words of compassion. Single individuals living with HIV express their feelings about these reactions as happiness and confidence. On the other hand, married people stated that they felt inferior and shamed despite receiving positive reactions.

"There were those who were upset at first. Some participants tried to understand the subject. What is exactly what is not? They were upset at first, but after I descriptively explained the subject, what kind of process and treatment it was, and after that, like the quality of life, they got used to it in a very short

time, just as I got used to it. Of course, when I talk to my friends that I haven't talked to for a long time, a few examples come to my mind, and they ask, 'How are you; is your health okay; there's nothing wrong, right?' They wondered about this issue. However, after making sure that I was fine, we never even talked about it. Because we know that there is no situation to be discussed with them, there is no problem with this situation." (K1, single)

"In the current reactions, I feel the same thing I felt that day even today: inferiority, inferiority, inferiority. Brief and clear." (K8, married)

As perceived by the participants, the positive effects of being infected with HIV are an increase in the level of knowledge of both them and their environment about the subject, strengthening family and friendship bonds, early diagnosis of other health problems due to regular check-ups and laboratory tests, and starting to pay more attention to personal health and care such as nutrition, sports, regular sleep.

"After HIV, I started to feel very strong. I have been playing sports for a long time, and I pay attention to what I eat. However, I did not attribute this to that. It helped me raise awareness. I also have a long-term relationship. I should have told this to the person I was in a relationship with. When I told him that, I said I don't want you to treat me good or badly because of this. When I told him that I was HIV positive, he was very scared. But the first time I told her/him, s/he said I love you so much, it's not that important to me. I have seen her love. There were times when I felt very strong because of it." (K3)

Workplace Stigmatization Experiences and Fears

When the participants were asked whether their colleagues and/or managers knew about their disease, it was observed that the majority of them had hidden their disease. It has been determined that voluntary sharing is only with close friends at work, while other shares are involuntary sharing. It has been stated that involuntary sharing occurs when they frequently ask for permission to go to the hospital during medical check-ups or at the initial diagnosis stage. However, it is observed that many participants hid their HIV infection from their colleagues or managers.

"There are some of my colleagues who have been informed before, but these friends are also my friends outside the work, so that's why they know about

it. It's not because of work. However, because we are currently working in the same job, I can say yes to this answer. But their number is very limited. Even if you add up, my friends will not exceed 5 people in the company. These are the people I talk to most often. I also shared it with my managers. I shared it before because I had to take a lot of permission to go to the hospital. I was always using my days off." (K1)

"I worked for 3 years like that, no one knew. However, because of this pandemic, our ID numbers were entered into the system to ask what kind of medicine we were using, and then they took us on free leave. However, there is only me in this diagnosis, everyone at work started work, but they did not let me. When the managers asked the occupational physician about who is in the risk group and who is using drugs, s/he said that s/he told a few people such as human resources and managers." (K2)

When asked why they did not share with their colleagues and managers, they said they thought that they would not be understood, and that people would distance themselves because of the lack of information. As the level of education increased, the belief that there was no need to share also increased.

"I don't think everyone has this awareness. I do not like when people pity me. I told my friends too. I never want them to feel pity or humiliation." (K3)

"I think if they knew, maybe they would discriminate because they didn't know about it. For example, they do not share the same toilet and do not share the same computer and desk. They may think that they will pass by just touching or kissing. I do not want them to know because they do not have information about it. However, if there were people who could understand it, I would explain them." (K10)

When the participants were asked how HIV/AIDS would affect their recruitment or promotion, almost all of them stated that it would negatively affect them. It was stated by the participants that such problems would not be experienced in more global and LGBT-friendly companies, but individuals living with HIV would not be preferred in recruitment and promotions in smaller-scale and local companies.

"I was recommended to higher positions in my current company and my manager who recommended me was aware of my situation and there were no problems. I have never encountered such discrimination." (K1, working in an

LGBT-friendly company)

"I think I will create in Türkiye. It may not be a lot in every company, in every sector, or corporate companies, but it can be in many places." (K10)

"I think they probably won't give a promotion. If that person tells or finds out, they will fire him/her just like it happened to my friend before. Many people do not accept this yet, and they are not very few. I think they won't accept it; I see it as a direct reason for dismissal." (K4)

When the participants were asked what they would do if they were stigmatized in the workplace, the common answer was to seek their rights through legal means.

"The conditions of that time, the situation there, it may vary greatly by them, but I would not be silent; I would try to explain the issue. I could try for the biased one, of course, if it's worth it. However, if there was a situation such as an insult, I would plan it by learning the necessary steps, since it is a situation that leads to discrimination. If I were faced with such a situation, I would research what I could do legally. I would not hesitate to convey this to human resources." (K1)

They stated that the first emotions they would feel if they lost a job because they were individuals living with HIV would be anger, sadness, disappointment, and anxiety. They stated that if they lost their jobs due to this situation, they would seek legal rights.

"It would affect very badly. My salary is my only livelihood that takes care of my mother and house. Thus, being stigmatized and fired in such a situation can be devastating. This was not the end of the world. I can find a different job in many places, but of course, it would be very sad if that were the case." (K10)

"Anger, disappointment. However, if I were fired for this reason, I would initiate a legal process for discrimination. I don't know what the end will be tough. At least I would seek my legal right. Of course, I would be angry. People go to space. I am fired because of my health conditions and sexual preferences. I would not want to work there anyway. It would not be someone who deserved to work with me anyway. It's not a place that values me. I wouldn't want to be with people who have that perspective. However, legally, I would seek my rights. I would file a lawsuit. I will start looking for another job suitable for me. Of course, this situation bothered me, but I would never have been crushed

under it. I say this because I have not experienced this situation, and I am sure I would have felt much worse if I had experienced something like it. Maybe it was a job that I loved very much, and I spent effort there to realize myself. Of course, such things would disappoint people, but as a result, I would seek my right and move on." (K1)

The first suggestion of the participants on what should be done to prevent individuals living with HIV from being stigmatized by society was to educate society. They think that this education should start from childhood with the idea that if children are educated, society will also be educated. They also stated that to reduce stigma in the workplace, employees should also be educated about the ways of HIV transmission. They state that using social media for education and awareness is a good way to reach a larger audience.

"Certainly, even if it does not take place every year, on December 1, a presentation about awareness can be presented in companies every few years. Health professionals can be brought in, and employees can be informed about what the disease is, what it is not, and what kind of process it is. Awareness is very important; this is created by telling people. This comes to my mind because it is not something to learn by living. The experiences of the people who have been discriminated against can be explained within the scope of that event. These are the first things to come to mind. Such information is provided on social media channels; however, on December 1, awareness-raising posts can be shared. However, in general, even a 1-hour presentation in the company by an expert from health institutions or one of the officials from associations on this subject may be important for raising awareness about the disease and the need to not discriminate." (K1)

"People need to be aware. I think they should be taught in school. I studied at the university; frankly, I did not see such an event properly. Therefore, education must be provided. There should even be a textbook on this topic. The more education is provided, the more conscious people will become. And here's something. I am talking about the articles I read. First, the child learns something, then teaches it to the mother, and finally the mother teaches it to the father. This is how the ranking proceeds. First, it is necessary to teach the child that this is a normal thing and that it can happen to anyone. I think that children can teach future generations and their elders." (K4)

"It may take many years, but if we can at least enlighten our environment, then we may enlighten other people's own environments, but I think the biggest way can be achieved through social media, and people who give people certain inspiration can get into this issue and there may be a social media campaign explaining that this disease is not so deadly." (K5)

DISCUSSIONS AND CONCLUSIONS

In the historical process, HIV/AIDS ranks first among the diseases that cause stigma due to some factors such as lack of information about the disease itself and its transmission routes, misinformation, and fear of the disease. One of the main reasons for this is the fear it creates in societies owing to the lack of information about the ways of transmission and the fact that it is considered a lethal disease. Despite the new information acquisition, the negative attitudes towards the disease and the infected people are gradually increasing because there is no definitive treatment for the disease, and it is mostly sexually transmitted. HIV-infected men are considered to be homosexual, bisexual, or a person having sex with sex workers, and women with HIV/AIDS are seen as sex workers. This leads to the exclusion of individuals living with HIV by society (Oran and Şenuzun, 2008).

When we look at the effects of the stigma experienced by individuals living with HIV, it is seen that people are excluded from their social environment, they face undesirable behaviours while receiving health services, their rights to education are restricted and they are exposed to mobbing in their working life (Kaya et al., 2020).

As a result of the field research carried out, it can be stated that individuals living with HIV share their illness with a close circle who will not harm them, who should be included in the control process due to their sexual contact, and who can empathize with the individual. According to Gökengin et al. (2017), whether a person is discriminated or not depends on whether they disclose their HIV status to others. It is observed that the participants tend to explain their HIV status more easily to other individuals living with HIV, their spouses/partners, adult family members and healthcare providers compared to their co-workers and colleagues (Gökengin et al., 2017).

While the first feelings of those with whom they voluntarily share this information are usually sorry for the individual, their first reaction is trying to console, hug, and cry. On the other hand, for married individuals, after sharing the situation with their spouses, while their spouses' first feeling was anger, their first reaction was to cry and shout. In the next period, it is one of the positive aspects of the disease that individuals living with HIV are accepted by the people with whom they share their health status voluntarily and that they can see how much they are loved. Another positive aspect is that individuals are diagnosed early if they have another disease due to frequent check-ups and paying attention to healthy living behaviours (health responsibility, physical activity, nutrition, spiritual development, interpersonal relations, and stress management).

It has been observed and determined that patients living with HIV do not prefer to be visible to avoid exposure to stigma by their colleagues and/or managers from their workplaces. Visibility is shared in workplaces, often voluntarily or involuntarily, with the expectation that it will bring about benefits. It has been stated that individuals working in lesbian, gay, bisexual, and transgender (LGBT) friendly companies report their diagnosis more easily and they do not encounter any negativity in the next process, even in the case of promotion. In the field study, individuals hide their diagnoses from their colleagues and/or managers due to the socio-cultural background and low educational level of employees of non-corporate companies. Individuals who hide their HIV status believe that their illness will negatively affect them during promotions. They hide their diagnoses because of fear of being fired, fear of losing their dignity, and fear of ridicule and exclusion. According to Ulasi et al. (2009), the stigmatization of HIV/AIDS can range from simple gossip to outright discrimination that results in job loss, evictions, rejection, isolation, and even the killing of the infected person (Ulasi et al., 2009). The reaction they will give when they lose a job due to their disease varies depending on their educational level and whether they are married. Married individuals and individuals with lower education levels prefer informing their managers about themselves and their disease first, whereas individuals who are single and have a high level of education prefer taking legal action first.

The relatively small number of participants and the fact that all participants are male is among the limitations of this study. Therefore, our study does not reflect the feelings of women living with HIV.

In conclusion, the negativities experienced by PLWHA regarding stigmatization in their work life are presented in detail in this study. When asked how these problems could be eliminated, all participants stated that the most important measure was to educate society. It is necessary to provide education on the ways of HIV transmission to the whole society and in schools through social media, TV, and print media, as well as to carry out studies in workplaces to raise awareness on 1 December World AIDS Day.

Ethical Approval: The study was evaluated and approved by the Üsküdar University Non-Interventional Research Ethics Board (10.01.2022-1005), and a signed voluntary consent form was obtained from all individuals participating in the study. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Authors' Contributions: All authors contributed to the study's concept and design. Organization of the sample and material preparation was performed by Servet ÖZTÜRK. Material preparation was performed by Haydar SUR. Data collection and analysis were performed by Nevin KORKMAZ. The first draft of the manuscript was written by Nevin KORKMAZ, and all authors commented on previous versions of the manuscript. All authors read and approved the first as final manuscript.

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Sri Lankan Health System Response to the Covid-19 Pandemic: A Post Evaluation to Assess the Strengths and Weaknesses by Using Health System Building Blocks

Ranga SABHAPATHIGE[1] ⓘD
Dilrukshi DEERASINGHE[2] ⓘD

ABSTRACT

The COVID-19 pandemic spread across the globe, threatening almost all health systems, from the strongest to the most vulnerable, and the Sri Lankan health system was no exception. Since the COVID 19 pandemic became a serious public health threat in China, India, and other parts of the world, Sri Lanka has been on high alert and ready to respond. The purpose of this research is to describe how Sri Lanka's health system dealt with the COVID-19 pandemic using the World Health Organization's health systems building blocks framework, to assist policymakers in better understanding the deficiencies and planning future crisis management. COVID-19-related documents about Sri Lanka were manually and electronically searched, including peer-reviewed articles in local and international journals, government publications such as circulars, guidelines, and reports, WHO and World Bank publications, local and international news websites, publications, and websites of non-governmental organizations. The Sri Lankan health system responded in a proactive and multi-sectoral manner. Before the pandemic hit the country, the hospital system and a

1   Visiting Research Fellow, University of Kent, Canterbury, United Kingdom
2   Base Hospital, Panadura, Sri Lanka
*   Corresponding author: Ranga SABHAPATHIGE, rangasabhapathige@gmail.com

well-established preventive health sector were prepared. However, issues such as human resource shortages, drug shortages, and other medical equipment shortages, as well as financial constraints, were difficult to manage. Delays in decision-making during the third wave led to negative outcomes for the country. However, the country was protected during the fourth wave due to committed vaccination and other timely preventive measures.

Keywords: Building Blocks Approach, COVID-19, Health System, Response, Sri Lanka

INTRODUCTION

COVID-19 is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and is a global public health issue with the ability to transmit from person to person across geographical boundaries in a short period. COVID-19 was initially identified in December 2019 after an epidemic in China's Hubei province. It has spread to various countries around the world by the beginning of March 2020, and the world health organization (WHO) designated it a pandemic on March 11, 2020 (WHO, 2020a). As a result, since the COVID 19 pandemic became a serious public health threat in China, India, and other parts of the world, Sri Lanka has been on high alert and ready to respond (Liyanapathirana et al., 2020), as being prepared for any type of emergency health threat is a key feature of a resilient health system (Legido-Quigley et al., 2020).

Sri Lanka's citizens have access to free health care through a well-defined preventive and curative sector (Ministry of Health, 2018). A network of tertiary and secondary care facilities, divisional hospitals (outpatient and inpatient treatment) and primary medical care units (outpatient care) provide curative services. The medical officer of health (MOH) and his colleagues provide preventive services to the entire island through health units. The public sector provides approximately 95% of inpatient care, and 50% of outpatient care (Ministry of Health, 2021).

In an international context, Sri Lanka's health system has been identified as a high-impact, low-cost model (Perera et al., 2019). This achievement was primarily due to the following factors: free care at the point of delivery since 1951; the adoption of preventive and primary care systems since 1926; and

the establishment of a large network of accessible primary health care services. The Ministry of Health oversees the overall stewardship and monitoring of government health services throughout the country. A minister and a secretary lead the Ministry. The technical head of the Ministry is the Director-General of Health Services (DGHS). Provincial health services are overseen by a Provincial Ministry of Health led by a Provincial Minister of Health. The work of the provincial health ministry is guided by the Ministry of Health and vertical programs (Ministry of Health, 2021).

The main objective of this paper is to describe how Sri Lanka's health system dealt with the COVID-19 pandemic using the WHO health systems building blocks framework, to help policymakers better understand the strengths and weaknesses, and to plan future crisis management.

METHODOLOGY

This non-systematic document review was conducted from January 1, 2020, to January 1, 2022, to review COVID-19-related documents about Sri Lanka. Peer-reviewed articles in local and international journals, government publications such as circulars, guidelines, and reports, WHO and World Bank publications, local and international news websites, publications, and websites of non-governmental organizations were manually and electronically searched. Articles were chosen for inclusion in the study by two authors based on the eligibility criteria and subjected to a rigorous verification process. Both members were given access to the relevant documents. Each member read through all the documents and highlighted the sections that were relevant to them. The data that was highlighted was entered into an Excel sheet under components of health system building blocks.

Health Service Delivery

During an infectious disease pandemic, both preventive and curative services must be well organized to provide effective service delivery to the public, which would not be possible in the face of a shortage and misdistribution of qualified staff, inadequate drugs, and medical supplies, and a lack of equipment and infrastructure (Hanson et al., 2003).

Curative Sector Response

Sri Lanka's curative sector response during the first and second waves was somewhat different from that of other countries, admitting all COVID-19 positive individuals to COVID-19 treatment hospitals without considering disease severity and admitting COVID-19 suspected patients only to designated hospitals. Although it appeared to be effective in preventing community spread, it had to be changed during the third wave due to rising caseloads, with only symptomatic patients being hospitalized (Epidemiology Unit, 2020).

Expansion and Improvement of Patient Management Facilities in Hospitals

At the beginning of the pandemic, there was only one hospital in the country equipped to manage highly infectious diseases: the National Institute of Infectious Diseases, with a 100-bed capacity.

By the end of 2020, hospitals had been strengthened by increasing the number of beds available to treat COVID-19 patients and increasing the number of ICU beds and high dependency units (HDU) available to treat critically ill patients. In addition to these measures, the Ministry of Health established a home-based care system to manage asymptomatic and mildly symptomatic patients at home with telemedicine facilities. Later, it was increased to up to 98 hospitals subsequently with the increase of suspected and confirmed cases, with a separate four hospitals to manage COVID-19 suspected pregnant mothers in May 2021 (Ministry of Health, 2021).

Many circulars and guidelines related to clinical management and outbreak control were prepared and issued by the Ministry of Health with the participation of relevant specialists, including provisional clinical practice guidelines, guidelines on the preparation of healthcare institutions to face pandemics, guidelines on the rational use of personal protective equipment (PPE), and infection control guidelines (Ministry of Health, 2020).

Expansion of Hospital Diagnostic Facilities

In order to increase COVID-19 RT-PCR testing capacity, the Ministry of Health facilitated the establishment of PCR testing laboratories in several hospitals. A focal point was established at the Ministry of Health to monitor the performance

of the country's PCR laboratories (Athapattu et al., 2021). These prompt measures enabled the expansion of testing capacity in 37 PCR laboratories from 600 to 22.000 tests per day by April 30, 2021 (Ministry of Health, 2021).

To Improve The Safety Measures to Prevent The Spreading of Infection from Patient to Patient as well as Patient to Health Care Workers

Providing efficient, high-quality care while guaranteeing the safety of workers and limiting the exposure of other patients during the epidemic was a challenge. However, the ministry of health recognized this as a sensitive and critical issue and collaborated with WHO and the Sri Lankan College of microbiologists to develop a set of training modules for frontline healthcare workers [HCW] on COVID-19 infection prevention and control [IPC] guidelines in Sri Lanka (WHO, 2020b)**.**

Aside from that, the Ministry of Health has established a 1.390 emergency hotline where the public can get free medical consultation on COVID-19 symptoms. Patients with COVID-19 symptoms could contact this number instead of going to the hospital for help. A devoted doctor verifies the symptoms over the phone and, if necessary, assists in the patient's admittance to a hospital, as well as assisting with the dispatch of a free ambulance through the "1990 Suwasariya" service. By knowing the information about the patients coming to hospitals beforehand, healthcare workers could be able to take the necessary protective measures (Economynest, 2020).

Maintain Essential Routine Services, Emergency, and Potential Emergency Management Services During The Outbreak Period

During the pandemic, healthcare utilization fell by nearly a third, with the decreases being greater among those with less severe illnesses (Moynihan et al., 2021). In a modeling study, it was estimated that a reduction in essential maternal and child health services may result in more than a million additional child deaths worldwide (Timothy and Carter, 2020).

During the outbreak period, however, the Sri Lankan ministry of health issued guidelines on managing essential routine services, emergency, and potential emergency management services. Although some aspects of reproduc-

tive, maternal, and child health services were disrupted, most essential health services, such as antenatal care, postpartum care, and newborn care, were available throughout the pandemic. Institutional deliveries and skilled birth attendance remained unaffected (Silva and Jayakody, 2020). During this time, the ministry of health made the necessary arrangements to ensure the continuous supply of drugs to non-communicable diseases and other chronic patients by delivering monthly drug requirements from hospitals to patients' homes via Sri Lanka post, approving the delivery of two months' drug requirements to patients, and allowing them to open private pharmacies even during strict curfew periods (Wanigasinghe et al., 2021).

Preventive Sector Response
Intensify Case Finding, Contact Tracing, Monitoring, Quarantine of Contacts, and Isolation of Cases

To reduce the spread of disease from foreign travelers, the Sri Lankan government strengthened quarantine measures under the Quarantine and Prevention of Diseases Ordinance No.03 of 1897; all of them were quarantined after March 27, 2020 (GoSL, 1897). Cases were transferred to the specialized COVID-19 treatment hospitals once they were detected in hospitals and in the community, regardless of symptoms, to reduce the caseload in the community. PHIs tracked down all the contacts of the positive cases. The Epidemiology unit coordinated Covid-19 contact tracing in Sri Lanka, with assistance from MOH field staff, military forces, and police (Liyanapathirana et al., 2020). Initially, all primary and secondary contacts were quarantined at Sri Lanka army quarantine facilities. To prevent the spread of the disease, the entire village was locked down in some places. Furthermore, home quarantine guidelines were developed and implemented in some areas where contact history was not strong (Epidemiology, 2020). Later, the process of contact tracing was changed based on a circular issued by the director general of health services (DGHS) on November 16, 2020. Individuals who had contact with the index case are quarantined at home rather than in quarantine centers, and PCR testing is performed based on the date of exposure and the level of exposure (Ministry of Health, 2020a).

Strengthen Disease Surveillance

The disease surveillance system is bolstered further by COVID-19 surveillance, which utilizes existing respiratory disease surveillance systems as well as hospital-based surveillance. The surveillance network is being expanded to allow for contact tracing and community-based monitoring of people in-home quarantine. Other sectors have indeed been mobilized to strengthen surveillance even further, including at ports of entry (Health, 2020).

Vaccination

The primary goal of the global COVID-19 vaccination program is to reduce severe disease and, as a result, deaths caused by COVID-19 (Immunization and Advisory, 2021). In pursuit of this objective, the ministry of health introduced the safe and effective COVID-19 vaccine at the earliest possible time. The healthcare staff and other support frontline employees (from defense, police/ STF, and services at ports of entry) are offered the initial 3 vaccination stocks received by the government in January 2021, with the priority of safeguarding essential healthcare facilities in the country (Epidemiology Unit, 2021).

In the second phase, the government began vaccination of people aged 30–60 in selected Western province communities in late February 2021. However, due to a lack of vaccines in the country, there was a significant lag period before beginning the country-wide community vaccination program in Sri Lanka. In Sri Lanka, however, with an available MOH network, country-wide community vaccination began in early June 2021 with the Sinopharm vaccine. With the rise in cases of the third wave, demand for vaccination has risen, and the existing preventive sector MOH system is unable to meet the demand, forcing the ministry of health to open vaccination centers in hospitals across the country. The Sri Lanka army and the government medical officers' union supported the ministry of health in its efforts to expand the country's immunization program (Ministry of Health, 2021b). By January 17, 2022, 94.8 percent of the target population had received two vaccine doses and 32.5 percent had received the booster dose, indicating a greater vaccination rate than comparable countries in the region (Epidemiology Unit, 2022).

Health Workforce

The COVID-19 outbreak boosted demand for the health workforce since the Ministry of Health had to establish new isolation units, ICUs, HDUs, intermediate care facilities, and hospitals around the country to accommodate the increasing patient population. It was extremely difficult to find workers for those units because most hospitals were already operating with a limited staff. The ministry of health, on the other hand, might address this issue by temporarily relocating doctors, nurses, and health care assistants from hospitals with a sufficient staffing level in big cities to underserved areas and boosting overtime hours for health care employees. Healthcare professionals were unprepared to deal with the new COVID-19 pandemic because they had never seen such a large epidemic before, but the Ministry of health overcame these obstacles by training staff with the help of professional colleges and the World Health Organization (WHO, 2020b).

In addition, the ministry of health's medical services unit trained healthcare workers on ICU care, infection control, COVID patient management, and a variety of other related topics, as well as developing a user-friendly online platform for sharing training materials, videos, circulars, and guidelines to improve workforce knowledge. According to a government decision, the ministry of health encourages flexible working conditions, such as flexible duty hours, shift rescheduling, and working from home when possible (Lanka, 2020).

Medicines and Other Logistic Supply

The delivery of medications and other medical supplies has been short and late during the COVID-19 pandemic, which could be owing to logistics and production problems for a variety of causes. There were certain limits on international trade because several countries shuttered their ports of entry (Ying et al., 2020).

Due to Sri Lanka's reliance on medical supplies from other countries, there was a shortage of personal protective equipment (PPE) in both healthcare institutions and the local market. To address this issue, the Ministry of health encourages healthcare institutions to prepare PPE locally, and many institutions have begun to prepare PPE with the available suitable material using their sewing rooms as well as the help of local garment industries and

donors. It was a bonus that Sri Lanka had a textile garment factory network, allowing standard PPE kits to be produced throughout the country. In parallel with those activities, the ministry of health formed an emergency procurement committee, comprised of the highest-ranking officials, to expedite the procurement process in order to ensure the supply of drugs, medical equipment, and consumables to hospitals (Ministry of Health, 2020b).

Health Information

Robust and dependable information management systems serve as the foundation for evidence-based decision-making across all health system building blocks. It is essential for the development and implementation of health policies, governance and regulation, health research, human resource development, health education, and training, service delivery, and financing (Sirintrapun and Artz, 2015).

During the COVID-19 pandemic period in the country, the ministry of health's epidemiology unit served as the focal point of disease surveillance, reporting data relevant to the virus situation (Liyanapathirana et al., 2020). The disease surveillance system of Sri Lanka allows for a bottom-up flow of information to the epidemiological unit from hospitals, medical officers of health (MOH), and regional directors of health services (RDHS). The country's well-established disease notification system aided in the surveillance of the COVID-19 epidemic (Epidemiology Unit, 2005).

COVID-19: live situational analysis dashboard providing information related to the disease was established at the website of the health promotion bureau (HPB, 2020), and Covid daily status report has been displayed on the epidemiology unit website to provide the correct information to necessary parties and public (Epidemiology Unit, 2021).

A holistic web-based "Hospital Information Upgrading system [HIUS]" was successfully launched to collect aily data on the number of available beds for COVID-19 patients, including HDUs and ICUs, medical equipment availability and requirements, and oxygen requirements of 130 COVID-19 treatment hospitals of the country (Fernando et al., 2021).

The Covid-19 immunization tracker (CIT), smart vaccination certificate (SVC), and national Covid-19 health information system (NCHIS) were the

key digital health innovations that aided COVID-19 information management in Sri Lanka. Furthermore, Sri Lanka has created a COVID-19 immunization tracker, a global good for health information that captures and analyses individual level, disaggregated COVID-19 vaccination data (WHO, 2021).

Leadership and Governance

Governance, according to the world halth organization, is a cross-cutting health system function that influences the function of all building blocks. Despite this, its importance is sometimes overlooked during times of crisis (Gostin and Mundaca, 2016).

The national public health emergency mechanisms were activated under the DGHS to respond to the COVID-19 pandemic in Sri Lanka, and the ministry of health's disaster preparedness and response division (DPRD) served as the overall country-level coordinator for the health sector (Ministry of Health, 2020b). Furthermore, the government of Sri Lanka established the 'national operation center for COVID-19 outbreak prevention' as the country's command center for managing the outbreak. The commander of the army was appointed as the head of this committee (NOCPCO, 2020). Although the government's leadership and governance were praised during the first and second waves, it was stated that during the third wave, the government failed to impose travel restrictions, considering the economic situation, resulting in many cases and deaths despite health authorities' instructions (Kumarasinghe, 2021).

Health Care Financing

A good health financing mechanism should raise funds to achieve universal coverage in the health system, ensuring that people can access needed services without financial hardship (WHO, 2007). Adequately funded health systems are better able to withstand the pressures of disasters, whether man-made or natural, whereas funding gaps exacerbate the negative impact (Karanikolos et al., 2016).

In 2019, the government of Sri Lanka spent only 1.8 percent of GNP on health, as it does in many other low- and middle-income countries. A large portion of this was recurring in nature, with less emphasis on capital development. As a result, it was difficult to cope with this massive global pandemic

of COVID-19 in 2020 (Ministry of Health, 2019). However, the government of Sri Lanka released additional funds to strengthen the ministry of health's outbreak response, and development partners such as the world bank, Asian development bank (ADB), WHO, and United States agency for international development (USAID) gave a helping hand by providing monetary and equipment support (Ministry of Health, 2020).

DISCUSSION

During the first two waves of the COVID-19 pandemic, Sri Lanka's overall COVID-19 response was highly ranked internationally in terms of effectiveness, efficiency, and leadership, as well as case fatality rate and cases per 100,000 population, owing to the ministry of health's proactive response with a good disaster readiness plan (CMA, 2020).

However, in the 3rd wave due to the delay in enforcing the travel restriction and community vaccination, the number of confirmed cases increased exponentially, and by May 27, 2021, there were 172.277 cases, with an unprecedented case fatality rate of 2.6, and cases per 100.000 population remained relatively low (69.6). This increase in mortality could be attributed to overburdened hospitals with fewer resources, a low case detection rate, and a demographically aging Sri Lankan population with a high mortality rate, which is common with aging (JHCRC, 2021).

At the policy level, the decision to prepare the hospital system in advance to accept the cases and the participation of experts for the preparation of clinical management and outbreak control guidelines were the key strengths of the initial response.

On an operational level, Sri Lanka's response to COVID-19 was bolstered by the tireless work of trained MOH staff in a well-established preventive health network, the availability of a network of easily accessible primary care institutions, the availability of a well-functioning communicable disease surveillance system, strict contact tracing and quarantine of exposed individuals, institutionalized treatment of asymptomatic positive cases, and high vaccination coverage. The mission has been strengthened further by the dedicated healthcare management team in key positions of the ministry of health, the availability of skilled medical personnel, the construction of innovative information systems,

strong political leadership, and inter-sectorial collaboration (Hettiarachchi et al., 2020).

In terms of weaknesses, inadequate ICU beds, inadequately trained ICU staff, and staff distribution anomalies all harmed service delivery. The health ministry should find a way to expand ICU facilities and train additional ICU staff to be used in disasters. Furthermore, health staff mal-distribution should be addressed at the national level through policy decisions and implementation. Another issue was a lack of medicine, other equipment, and personal protective equipment (PPE), which was primarily due to a lack of production in the country. To effectively combat future outbreaks, authorities must prioritize the start of production of those items within the country (Hettiarachchi et al., 2020). During the third wave, some issues with information reliability were reported, and the epidemiology unit should strengthen the information system by adding relevant checks at the necessary points to prevent such errors in the future (The Island, 2021).

Delays in imposing restrictions during the third wave, while India was severely impacted by the delta variant, were heavily criticized, and decision-makers should be more concerned with evidence than political judgments in such situations in the future. Aside from that, the delay in beginning community immunization was a problem due to evidence-based decision-making, and policymakers must be aware of these issues in the future. Although the involvement of tri-forces in COVID control activities was commended, the undue involvement of military personnel in health decision-making was strongly criticized by the country's professionals (Amaratunga et al., 2020).

Inadequate financial allocation from the national budget hampered the Sri Lankan health sector's ability to grow capital development, limiting infrastructure development in the health sector during the last few years and negatively impacting the epidemic response. Therefore, the government of Sri Lanka (GoSL) should enhance the financial allocation to the ministry of health in the future to better equip the Sri Lankan health system to deal with future health catastrophes. Even though the country's economy had been severely harmed by the pandemic, with a 71% drop in tourist arrivals, a 74% drop in industrial exports, a 32% drop in agriculture exports, and a 32% drop in remittances from foreign workers, the government was still committed to finding ways to

immunize the country's nearly entire target population (Sltda, 2020; Ranga et al., 2021; Seneviwickrama et al., 2020).

Overall, Sri Lanka employed the same containment strategies to control COVID-19 as China, South Korea, and Singapore, applying a proactive approach by identifying and managing cases, as well as tracking and isolating close contacts, as compared with the mitigation strategies used by the United States, the United Kingdom, and France, which focused on treating severe cases and those with underlying conditions (Chen et al., 2021).

RECOMMENDATIONS

Although Sri Lanka increased hospital bed capacity to meet demand, the number of ICU beds remained woefully inadequate. Since the healthcare system should invest more in increasing ICU bed capacity. Due to the country's economic insecurity during the third wave, there is a delay in enforcing travel restrictions, resulting in an increased caseload. As a result, in future pandemics, decisions on pandemic control should be made as soon as possible. Due to a shortage of vaccines, community immunization in Sri Lanka was delayed. In the future, the Ministry of Health should work with key industries to determine how to procure vaccines in time for future epidemics. Financial resources for health should be raised in order to enhance the health system and better respond to outbreaks. To effectively respond to outbreaks, the government should begin manufacturing medications and other therapeutic products.

CONCLUSION

This article examines the Sri Lankan health system's COVID-19 response concerning WHO's health system building blocks framework. The key strengths of their response were being proactive in response to the pandemic by preparing hospital networks, involving experts in the development of guidelines, and utilizing a robust preventive sector network. Human resource and financial constraints, drug, and other equipment availability issues, and gaps in evidence-based policy decisions should all be addressed to build a more resilient health system for future disasters.

Finally, it is reasonable to commend the ministry of health Sri Lanka's pandemic response strategies, as evidenced by the reduction in transmission, rel-

atively low caseload, and high vaccination coverage during the fourth wave.

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Navigating the Aftermath: The Complex Landscape of COVID-19 in Northwest Syria

Orwa AL-ABDULLA[1] ⓘD
Maher ALAREF[2] ⓘD

ABSTRACT

In the aftermath of the global upheaval caused by the COVID-19 pandemic, a nuanced perspective emerges, underscoring the need for vigilant and strategic healthcare responses. This article delves into the intricate landscape of COVID-19 within northwest Syria, highlighting the enduring challenges and the imperative for astute resource allocation, sustained vaccination efforts, and effective risk communication and community engagement programs. Situated within a region characterized by historical complexities and ongoing conflict, Northwest Syria remains a microcosm of persistent healthcare challenges amidst an intricate web of adversities. The shifting pandemic classification, while marking a changing phase, does not diminish the lasting impact that demands continuous vigilance. The region's intricate dynamics amplify the need for sustained attention, even as the classification shifts. This article delves into the intricate landscape of COVID-19 within Northwest Syria, highlighting enduring challenges and the imperative for astute resource allocation, sustained vaccination efforts, and effective risk communication and community engagement programs. The imperative of vaccination, coupled with the formidable challenge of hesitancy, underscores the need for targeted and adaptable risk communication and community engagement initiatives. Drawing lessons from

1   Institute of Public Health and Clinical Nutrition, Faculty of Health Sciences,
    University of Eastern Finland, Kuopio, Finland
2   Strategic Research Center ÖZ SRC, Gaziantep, Türkiye
*   Corresponding author: Orwa AL-ABDULLA, info@strategicresearchcenter.com

past shortcomings, Northwest Syria is poised to recalibrate its approach, fostering a blueprint for future crises that is attuned to community sentiments and responsive to evolving challenges. As Northwest Syria navigates the path to recovery, a comprehensive and adaptive response strategy anchored in effective risk communication and community engagement programs becomes a linchpin, guiding the region towards fortified health systems and improved public health conditions.

Keywords: Community Engagement, COVID-19, Risk Communication, Syria, Vaccine Hesitancy

INTRODUCTION

In the tumultuous odyssey that has marked the global community's journey through the labyrinthine complexities of the COVID-19 pandemic, the once-pervasive atmosphere of panic has gradually given way to a tempered ambiance of cautious optimism (Vazquez et al., 2021). However, the metamorphosis of COVID-19 from a pandemic classification has not ushered in an era of resounding conclusion (Harris, 2023; Soriano and Infante, 2023); rather, its persistent impact continue to reverberate within the intricate tapestry of healthcare systems spanning the globe (Alhassan et al., 2023). Among the regions grappling with the profound and lasting impact of the pandemic, the intricate context of northwest Syria (NWS), a region beyond the reach of governmental authority, serves as a striking example. While there are other countries facing similar challenges, such as Yemen, Haiti, and Somalia, the unique convergence of historical complexities, ongoing conflict, and healthcare vulnerabilities in NWS magnifies the intensity of this impact (Barnard and Winter, 2023; Ekzayez et al., 2020).

In recent years, the northwestern region of Syria has faced considerable upheaval as a result of the ongoing Syrian conflict. It has been the epicenter of intense fighting and displacement, resulting in immense humanitarian challenges (Pollock et al., 2019). The conflict has had a significant impact on the region's infrastructure, healthcare, and socio- economic conditions, requiring international attention and assistance (Garry and Checchi, 2020). Given the challenges posed by the conflict, humanitarian organizations and international entities have been actively involved in providing aid, relief, and health ser-

vices to the affected population in the region. The humanitarian response in NWS has been led by the United Nations coordination mechanism since 2014 (Al-Abdulla et al., 2023). In 2020, the health cluster responsible for the humanitarian response in NWS, led by the World Health Organization (WHO), formulated an elaborate preparedness and response strategy to address the challenges posed by the COVID-19 outbreak in the region. This comprehensive plan includes nine fundamental pillars, with a notable emphasis on the implementation of multi- sectoral risk communication and community engagement (RCCE) programs (Al-Abdulla and Kallström, 2023).

Against this complex backdrop, a delicate equilibrium teeters, weighed down by the twin forces of healthcare capacity and the ever-evolving nature of the outbreak (Chowdhury et al., 2020). It is a conundrum that calls for renewed attention and a recalibration of resource allocation strategies (Yuda and Munir, 2023). In the ensuing discourse, this article unravels the multifaceted facets that encapsulate the prevailing COVID-19 scenario in NWS. It underscores the indispensable need for the sustained cultivation of vigilance, the astute optimisation of resource deployment, the unwavering prioritisation of vaccination efforts, and the imperative of taming the tide of hesitation through the deliberate, laser-focused implementation of RCCE programmes.

This article is in line with various publications from the Strategic Research Center (ÖZ SRC) that focus on reviewing and improving the COVID-19 outbreak response strategy in NWS.

Transitioning Beyond Pandemic Status

As the global community moves forward into the pandemic's aftermath, a nuanced understanding emerges that while COVID-19 may have shed its pandemic label in the conventional context (Wise, 2023), its far-reaching effects continue unabated, especially in low and middle-income countries (Sahoo et al., 2023; Mobarak et al., 2022). The healthcare infrastructure of Syria remains entrenched in a constant struggle against the reverberations caused by the virus and is grappling with the enduring complexities resulting from its capricious trajectory (Swed et al., 2022). Amidst this dynamic landscape, healthcare professionals and policymakers are engaged in a delicate endeavour to achieve equilibrium, mindful that the ongoing presence of the virus continues to exert

a significant influence, warranting strategic orchestration of planning and re-source allocation (Alsalem et al., 2022; John et al., 2023).

Rethinking Resource Mobilization

In the current context, the imperative for a comprehensive and carefully or-chestrated resource allocation strategy takes on even greater significance, espe-cially within the intricate tapestry of NWS (Al-Abdulla et al., 2023; Alkhalil et al., 2022). As the initial surge of urgency that accompanied the onset of the pan-demic gives way to a more measured approach, the call for discerning and stra-tegic allocation of resources resonates profoundly (Hanafi et al., 2023). Within the unique complexities of NWS, where the intersection of historical, cultur-al, and geopolitical factors intertwine with the healthcare landscape, a delicate equilibrium must be achieved. This equilibrium demands deft navigation be-tween the ongoing management of the COVID-19 outbreak and the simultane-ous pursuit of other critical healthcare imperatives that precede and transcend the pandemic (Al-Abdulla and Kallström, 2023). Within this nuanced balance, the prudent allocation of resources emerges not only as a vital necessity, but also as a poignant emblem of resilience – a model response strategy that recon-ciles the challenges posed by the lingering effects of COVID-19 with the broader, intricate tapestry of healthcare needs within the region (Foroughi et al., 2022). Based on the accessible data, a total of 384.2 million US dollars was deemed necessary to address the response efforts pertaining to the COVID-19 outbreak within the specified nation-states (NWS). It is noteworthy that of this amount, a sum of 197.6 million US dollars was secured through funding mechanisms (OCHA, 2023). The careful deployment of resources becomes an instrumental enabler, especially after the devastating impact of the last earthquake in Syria and Türkiye that occured on February 6, 2023, ensuring that both the immedi-ate and long- term healthcare challenges are met with foresight, agility, and an unwavering commitment to the well-being of NWS's diverse and resilient popu-lation (Al-Abdulla and Kallström, 2023; Jabbour et al., 2023).

The Continued Need for Vaccination

Amidst the ever-evolving global landscape, the unwavering importance of COVID-19 vaccination stands as a beacon of hope and necessity, that tran-

scends negotiations. Nowhere is this imperative more evident than within the complex and resilient context of NWS (Karaca and Çelik, 2022; Swed et al., 2022). Based on the data provided by the health cluster – NWS response, the proportion of the overall population that had received complete COVID-19 vaccinations by the end of July 2023 remained below 18% (OCHA, 2023). A recent study by (Alhaffar et al., 2023) revealed that the low levels of COVID-19 vaccine acceptance within the context of NWS can be attributed to health-related apprehensions, anxieties concerning potential adverse effects, informational deficiencies, and the propagation of conspiracy theories intertwined with ideological viewpoints.

The contextualized pursuit of extensive vaccination initiatives serves as a key element, intricately interwoven with the region's determination to contain the spread of the virus and reduce the burden on its healthcare infrastructure (Marzo et al., 2022). Within the fabric of NWS, however, looms a challenge that cannot be underestimated – the formidable obstacle of vaccine hesitancy, a barrier that casts a shadow of doubt and uncertainty over the comprehensive immunisation effort. This disconcerting gap underscores a stark and disturbing shortcoming and highlights the need for an urgent and holistic recalibration of strategies aimed at dismantling the fortress of hesitancy. At this critical pivotal juncture, the collective efforts of healthcare authorities, community leaders, and global partners are needed to chart the way forward. The multifaceted approach must include tailored education, culturally sensitive engagement, and an unwavering commitment to rebuilding confidence in the life-saving potential of vaccination (Alhaffar et al., 2023; Marzouk et al., 2022). As NWS navigates this complex landscape, the imperative goes beyond mere rhetoric – it beckons for a determined and concerted effort to rebuild the flame of confidence and unity, foster a renewed sense of purpose in the immunisation endeavour, and ultimately chart a trajectory towards a safer and healthier future.

Addressing Hesitancy Through RCCE Programs

In the current dynamic landscape, marked by the lingering effects of the COVID-19 pandemic, the imperative of vaccination remains resolute. As the global community strives to inoculate itself against the persistence of virus, a

major concern is emerging in the form of vaccine hesitancy. This ongoing challenge, characterised by reluctance or skepticism toward vaccination, increases the urgency for multifaceted and far-reaching interventions (Alhaffar et al., 2023; Douedari et al., 2020). The WHO's Strategic Advisory Group of Experts (SAGE) on immunization defined vaccine hesitancy as: "Vaccine hesitancy refers to delay in acceptance or refusal of vaccines despite availability of vaccination services. Vaccine hesitancy is complex and context-specific, varying across time, place, and vaccines. It is influenced by factors such as complacency, convenience, and confidence" (Galagali et al., 2022). Over the past decade, a substantial body of research has been undertaken concerning vaccine hesitancy and the diverse array of factors exerting influence on an individual's inclination to either embrace or decline a vaccine (Nuwarda et al., 2022). Nonetheless, research pertaining to this topic within protracted emergency contexts remains profoundly restricted (Al-Abdulla and Kallström, 2023).

In this complex tapestry of response strategies, RCCE programs emerge as a pivotal linchpin, ready to break down the barriers that impede vaccine acceptance and cultivate a fertile ground for informed decision-making (Al-Abdulla and Kallström, 2023). By orchestrating strategic dialogues that resonate within communities, these programs have the potential to debunk entrenched myths, alleviate lingering concerns, and underscore the critical significance of vaccination as an integral tool for protecting public health (Khan et al., 2022; Zhu et al., 2022). However, the landscape in NWS reveals a troubling oversight – the underutilisation of model-driven RCCE programmes as a powerful tool to drive vaccine uptake, signalling a clarion call for immediate and targeted action to bridge this gap and harness the full transformative power of these initiatives (Al-Abdulla and Kallström, 2023; Habboush et al., 2023).

Acknowledging Shortcomings and Pioneering a New Path for RCCE

The undeniable failure to comprehensively harness the potential of RCCE programs to mitigate vaccine hesitancy within the complex landscape of NWS serves as a poignant call to action and heralds a pivotal juncture for transformation (Al-Abdulla and Alaref, 2022). This juncture calls for a critical evolution that transcends traditional paradigms and necessitates the metamorpho-

sis of RCCE programmes from their static role as mere information providers to dynamic catalysts for change that are seamlessly woven into the fabric of communities (Habboush et al., 2023). Inspired by resounding global initiatives in this regard, NWS stands at the threshold of recalibration, ready to embark on a new trajectory.

The journey through the COVID-19 outbreak has taught us invaluable lessons. The shortcomings in addressing vaccine hesitancy emphasise the importance of early and proactive engagement with communities (Mills and Thindwa, 2022). The failure to comprehend the complexity of public opinion and address concerns promptly has magnified the challenge of achieving high vaccine uptake (Alhaffar et al., 2023). NWS must draw from these lessons to create a blueprint for future crises – one that prioritizes adaptable RCCE strategies rooted in science and attentive to the pulse of the community. Years of conflict and the intricacies of public opinion, often multifaceted and diverse, have proven difficult to fully understand, and the resulting delay in addressing concerns has notably compounded the formidable challenge of achieving a substantial vaccine uptake (Al-Abdulla and Alaref, 2022; Alhaffar et al., 2022). NWS finds itself at a pivotal juncture, ready to absorb these profound lessons and forge a resilient blueprint for managing future crises. A blueprint underpinned by an unwavering commitment to adaptive COVID-19 vaccine hesitancy response strategies, firmly rooted in scientific rigour and acutely attuned to the nuanced cadence of community sentiment.

CONCLUSION

In the wake of the COVID-19 pandemic, the NWS stands at a pivotal juncture as it endeavors to restore stability. This moment demands evidence-based decision-making, as the transition away from pandemic classification reshapes response strategies while the enduring aftermath of the virus necessitates unwavering vigilance and strategic resource allocation. The significance of vaccination as a cornerstone for resurgence cannot be overstated, compelling a proactive revitalization of RCCE programs and active engagement of humanitarian stakeholders to overcome the barriers of hesitancy.

The effectiveness of these strategies hinges on their contextualized adaptation to align with the unique regional landscape. Infused with well-founded

insights and characterized by adaptability, this customization emerges as the linchpin for steering northwest Syria toward a bastion of resilient health systems. Guided by knowledgeable humanitarian entities and empowered workers, this journey is poised to navigate the evolving healthcare challenges that loom ahead.

It is crucial to recognize that the challenges encountered in addressing vaccine hesitancy and enhancing uptake in the NWS offer invaluable lessons. These lessons underscore the imperative of systematically contextualizing aid programs and intertwining them with the humanitarian response plan. This approach reinforces the essence of effective crisis management, firmly rooted in the enhancement of public health conditions.

As the NWS charts its course forward, the convergence of strategic foresight, adaptive implementation, and holistic collaboration will be paramount. By internalizing the experiences of the past, the NWS can not only fortify itself against future uncertainties but also set a resilient precedent for safeguarding public health on a broader scale.

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