

Article

A Progressive Model for Quality Benchmarks of Trainees' Satisfaction in Medical Education: Towards Strategic Enhancement of Residency Training Programs at Saudi Commission for Health Specialties (SCFHS)

Abdulrahman Housawi ¹, Amal Al Amoudi ¹ , Basim Alsaywid ^{1,2,3,*} , Miltiadis Lytras ^{1,4,*} , Yara H. bin Moreba ¹, Wesam Abuznadah ⁵ , Fadi Munshi ¹, Sami Al Haider ⁵ and Abrar W. Tolah ¹

¹ Planning and Organizational Excellence Administration, Saudi Commission for Health Specialties, Riyadh 11614, Saudi Arabia; a.housawi@scfhs.org (A.H.); A.AlAmoudi@scfhs.org (A.A.A.); y.binmoreba@scfhs.org (Y.H.b.M.); f.munshi@scfhs.org (F.M.); a.tolah@scfhs.org (A.W.T.)

² College of Medicine, King Saud Bin-Abdul-Aziz University for Health Sciences, Jeddah 14611, Saudi Arabia

³ Urology Section, Department of Surgery, King Abdulaziz Medical City, Ministry of National Guard, Jeddah 11173, Saudi Arabia

⁴ Effat College of Engineering, Effat University, P.O. Box 34689, Jeddah 11426, Saudi Arabia

⁵ Executive Presidency of Academic Affairs, Saudi Commission for Health Specialties, Riyadh 11614, Saudi Arabia; w.abuznadah@scfhs.org (W.A.); s.alhaidar@scfhs.org (S.A.H.)

* Correspondence: b.alsaywid@scfhs.org (B.A.); mlytras@acg.edu (M.L.)

Received: 24 November 2020; Accepted: 4 December 2020; Published: 6 December 2020



Abstract: The latest developments in Sustainable Health focus on the provision of high quality medical training to health specialists, with a special focus on human factors. The need to promote effective Training Programs also reflects the job satisfaction needs of trainees. The objective of this study is to evaluate the trainees' satisfaction with the quality of Training Programs and assess the degree of achievement based on the defined parameters to provide baseline data based on which strategies for improvement can be formulated. Our study was conducted in Saudi Arabia and our targeted population was residents in medical programs supervised by the Saudi Commission for the Health Specialties (SCFHS). The trainees' response rate to the online survey was 27% (3696/13,688) and the key aspects of job satisfaction investigated include: Satisfaction with Academic Activities in the Center; Satisfaction with the Residents and Colleagues in the Center; Satisfaction with the Administrative Components in the Center; Satisfaction with the Training Programs; Satisfaction with the Specialty; Satisfaction with the Training Center; Satisfaction with the SCFHS. The main contribution of our work is a benchmark model for job satisfaction that can be used as a managerial tool for the enhancement of medical education with reference to the satisfaction of trainees. We analyze the key aspects and components of training satisfaction and we introduce our progressive model for Trainees' Satisfaction in Medical Training. In future work, we intend to enhance the proposed framework with a set of key performance indicators as well as with a focused cause and effect focused survey on factors related to the key benchmark of this study.

Keywords: job satisfaction; sustainable health; medical training; accreditation; satisfaction; health governance; Saudi Commission for Health Specialties; smart healthcare

1. Introduction

Medical education contributes significantly to the vision for Sustainability in Health. In our times, with the COVID-19 pandemic wide-spreading worldwide, the necessity to empower health experts with knowledge, skills, and competencies is a key priority for the management of healthcare. Furthermore, the increase in the positive motivation of health specialists and their willingness to promote their social role and the impact of their professional conduct is associated with various psychological factors like burnout or job satisfaction. The development of high-skilled experts with mental health and increased satisfaction from their work must be set as a key objective towards achieving Sustainable Health.

From a managerial point of view, Sustainable Health also requires the design, implementation, and continuous monitoring of benchmarks and Key Performance Indicators (KPIs) capable of offering a trusted, sustainable, and reliable set of measurements for performance monitoring.

Within this context, the assessment of medical Training Programs and the evaluation of their added value must be a strategic initiative for empowerment and sustainability. The development of medical competence through training and education is a bold action. Our research study is focusing on Residency Training Programs in the Kingdom of the Saudi Arabia supervised by the Saudi Commission for the Health Specialties.

Residency or postgraduate training is a stage of graduate medical education. Residents are trainees who are enrolled in programs recognized by the Saudi Commission for Health Sciences (SCFHS) and are fulfilling the requirements for primary discipline certification or a certification of special competence. A resident refers to a qualified physician, podiatrist, dentist, optometrist, veterinarian, or pharmacist who practices medicine, usually in a hospital or clinic, under the direct or indirect supervision of a senior clinician registered in that specialty such as an attending physician or consultant.

In Section 2, we provide a thorough critical literature review on the concept of Job Satisfaction and we present various research studies that contribute to our research problem specification. The SCFHS has a main responsibility to deliver high quality Training Programs to approximately 18,000 health specialists in the Kingdom of Saudi Arabia. It also supervises numerous training centers and academic programs with a critical objective to deliver value to the Health System and to the Society of the Kingdom. This value-driven strategy of SCFHS has an impact on all the activities undertaken by the institution.

In total, 1200 programs are conducted across Saudi Arabia and other countries in the Gulf region covering 79 health specialties [1]. One of the key strategic aims of the SCFHS is also to design, implement, and monitor a quality assurance system for the execution of all its Training Programs and also to access the efficiency of this system to enhance the update of strategies and policies. In this context, the SCFHS also supervises the quality of the implementation of residency medical Training Programs.

Trainees' satisfaction is a multidimensional concept that has been associated with environmental factors and is predicted by intrinsic (personal growth and perceived ability to work) and extrinsic (perceived social support) forms of motivation. The objective of this study is to evaluate the trainees' satisfaction level and to investigate its association with various features, including the quality of Training Programs.

The study of the trainees' satisfaction is part of a multi-dimensional research strategy in the Saudi Commission of Health Specialties. The SCFHS is deploying a value-driven strategy for the integration of research-based evidence to the quality of its Training Programs. It also collects and processes significant data related to the various Training Programs and their evaluations towards enhanced decision making. Various data are related to key aspects of the residents' perceptions related to the quality of the Training Program and institutions, as well as the self-assessments by the trainees of various psychological aspects of their educational and professional activities.

A continuous quality assurance strategy is in place focusing on different complementary aspects of medical training. In a recent study, we introduced the SCFHS Framework for Sustainable Medical Education and we introduced 23 integrated Key Performance Indicators for Implementing an Innovative

Approach to Advance the Quality of Training Programs at the Saudi Commission for Health Specialties. Other strategic goals include the measurement of the effectiveness of online-training strategies, as well as the deep understanding and interpretation of human factors involved in medical education. For examples, recently we delivered research on the impact of the COVID-19 pandemic on the anxiety and depression of residents in medical Training Programs.

In Figure 1 below, we summarize some of the key aspects of our research problem. The main motivation of our research is the direct association of four integrative pillars in training and professional life of residents. According to the literature that is presented below, the image of physicians has two critical components: the continuous development, and the seeking of life-work balance of the trainee/resident. Thus, the training satisfaction remains a core aspect of efficiency of Training Programs. The intention of our research is to analyze how specific aspects of trainee satisfaction lead to inefficiencies in medical Training Programs and their impact based on international benchmarks and our research approach.

Furthermore, we also focused on psychological factors, including the burnout syndrome of residents, as a key variable for the understanding of trainees' satisfaction. Our ultimate objective is to analyze and to propose enhancements on organizational good practices, and to lead innovative plans and strategies for the beneficiaries of Training Programs of the SCFHS.

As the image of physicians has always been associated with high levels of professionalism, it is notable that values, behavior, and relationships are the main factors that sustain this image in the eyes of people. These factors can be maintained by continuous development and the seeking of a life-work balance of the practitioner. Maintenance of this balance can lead to satisfaction [2].

Studies reported that trainee satisfaction has a major impact on their knowledge enhancement and outcomes of care. Also, this directly affects their education and maintenance of good organizational practices [3].

In a study conducted to measure the satisfaction of UK junior doctors (medical post graduate students), factors of "appropriate workload (sufficient to learn but not oppressive to educational opportunities and to wellbeing), good supervision of practice (clinical supervision) and the receipt of timely, good quality feedback" were found to be correlated with trainee satisfaction. Moreover, assignment of an appropriate workload was found to be the most crucial factor affecting the satisfaction of trainees, followed by the remaining factors prospectively. A high level of dissatisfaction was reported by junior doctors assigned to work in environments with a high workload and this led to the appearance of burnout symptoms in many cases [3,4]. According to [5], burnout syndrome (BS) is a set of psychological symptoms resulting from the interaction between chronic occupational stress and individual factors. The syndrome is characterized by emotional exhaustion, depersonalization, and reduced personal achievement [5]. Emotional exhaustion (EE) indicates the feelings of burden and the weakening of emotional resources; depersonalization (DP) entails responding to others, such as associates and patients, in a cynical and isolated way; reduced personal accomplishment (PA) occurs when the subject feels less competent in his/her role. These factors validate the importance of addressing the problem of burnout as fast as it occurs at all levels (training, education, and practice). As discussed in relevant literature, addressing of the problem can be defined into four main actions: distinguish its existence, address its prevalence and strength, and then perform the preventive and treatment strategy, this should then be followed by periodic measurement of all implemented strategies' effectiveness [6].

This article is organized as follows: In Section 2, we provide an overview of our critical constructive review on the key aspects of our research phenomenon.

Then in Section 3, we summarize our research methodology and we communicate our research objectives. In Section 4, we provide analysis of the results and the key findings of our research. In Section 5, we discuss the contribution and the implications of our work towards Sustainable Health. We also in parallel build our key theoretical contribution, the progressive model for Trainees' Satisfaction in Medical Education for Sustainable Health. Finally, in Section 6, we provide they key conclusions and future research directions.

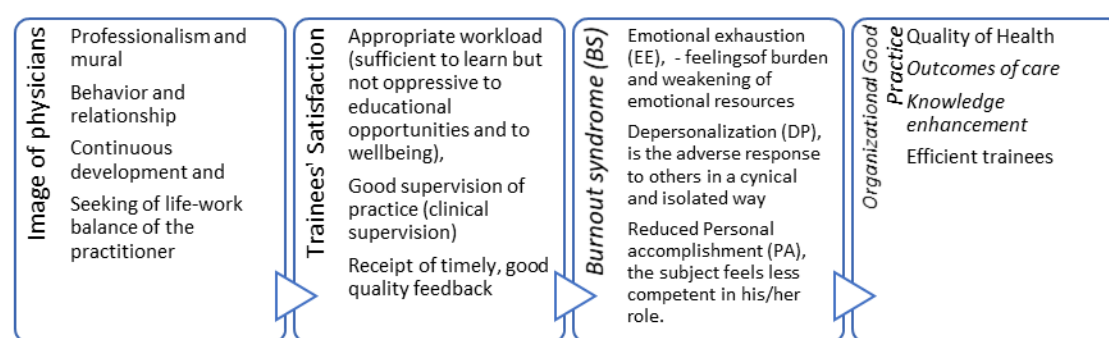


Figure 1. Research problem aspects.

2. Critical Literature Review on Trainee Satisfaction in Training Programs

The recent literature on medical training and healthcare workers research deals extensively with human and psychological factors of trainees, residents, and healthcare workers overall. Various recent studies explain the phenomenon and provide useful insights for our research. Trainee satisfaction appears to be a well discussed human soft factor in diverse studies on medical training. It is also a key variable in broader studies in other research and professional domains. According to literature, several integrated studies focus on the analysis of job satisfaction, professional burnout, the work environment, and health issues. Also, the recent pandemic of COVID-19 has led to new research on the further impact of the pandemic on the traditional human factors of healthcare workers, doctors, and residents. In Table 1, below, we provide an overview of 13 recent studies on the phenomenon.

Table 1. An overview of recent literature on job satisfaction and human factors in health specialties research.

Reference	Authorship	Key Emphasis					
		Job Satisfaction	Professional Burnout	Healthcare Workers	COVID-19	Work Environment	Health
[7]	Alsubaie et al.	x	Not reported	X	Not reported	x	Not reported
[8]	Chen et al.	x	Not reported	X	Not reported	x	x
[9]	Bawakid et al.	x	x	X	Not reported	Not reported	x
[10]	Zhang SX et al.			X	x	Not reported	Not reported
[11]	Leskovic et al.	x	x	X	x	Not reported	Not reported
[12]	Soto-Rubio et al.	x	x	X	x	Not reported	x
[13]	Aoyagi et al.	x (willingness to work)	Not reported	X	x (pandemic)	Not reported	Not reported
[14]	Liu et al.	x	Not reported	X (doctors)	Not reported	X (hospital)	Not reported
[15]	Platis et al.	x	Not reported	X(nurses)	Not reported	X (job performance)	x
[16]	Chao et al.	x	x	Not reported	Not reported	x	x
[17]	Maissiat et al.	x		x	Not reported	x	x
[18]	Pandey et al.	x	x	x			
[19]	Labrague et al.	x	x	x	x		

In Table 2 below, we provide the overview of various research studies related to our research problem. A brief discussion and elaboration on the key aspects of our research problem that is anchored in the selected studies is provided in the next few paragraphs.

Alsubaie and Isouard [7] provide a meta-research analysis of four studies related to job satisfaction, and retention of Saudi nursing staff. The previous four studies involved 2362 nurses in Saudi Arabia, with a rather good rate of job satisfaction but limited job retention. In our research, we need to investigate the value adding components of residents in Training Programs supervised by the SCFHS. We also intend to develop a set of benchmarks for the relevant components of job satisfaction.

Table 2. Connection of our research to recent research on job satisfaction and relevant human factors.

Literature Review			
Author(s)	Title of Article	Key Contribution	Impact on Our Research Model
[7]	Job Satisfaction and Retention of Nursing Staff in Saudi Hospitals.	This paper reviews the research conducted on job satisfaction, and the retention of Saudi nursing staff.	We are interested in setting up benchmarks for the added value components of job satisfaction of residents in Training Programs supervised by the SCFHS.
[8]	Job Satisfaction Analysis in Rural China: A Qualitative Study of Doctors in a Township Hospital.	The goal was to understand the level of job satisfaction of doctors and to make recommendations for improvements.	In our research study, we want to understand the main picture of the job satisfaction phenomenon in the large population of residents in Saudi Arabia and to reveal some key positive and negative relationships of job satisfaction with specific factors. As a responsive action, our research also aims to provide key recommendations for improvement. We are also very much interested in developing a reliable mechanism to monitor the evolution of job satisfaction on residency medical programs.
[9]	Professional Satisfaction of Family Physicians Working in Primary Healthcare Centers: A Comparison of Two Saudi Regions.	The objectives of this study are to assess the level of professional satisfaction and to compare and identify the factors potentially associated with professional satisfaction/dissatisfaction among FPs in two regions.	In our research study, we need to understand the basic “cause and effect” relationships between job satisfaction and aspects of the psychological load of residents including aspects of the Training Program and educational activities, as well as the impact of burnout on satisfaction.
[10]	At the Height of the Storm: Healthcare Staff’s Health Conditions and Job Satisfaction and Their Associated Predictors during the Epidemic Peak of Covid-19.	This study helps to identify the healthcare staff in need to enable more targeted help, as healthcare staff in many countries are facing peaks in their COVID-19 cases.	In our research study, we are also interested in analyzing the psychological factors that affect job satisfaction. We also in parallel run a complimentary study that focuses on the analysis of depression and anxiety in the context of the professional and educational activities of the residents in training centers.
[11]	Burnout and job satisfaction of healthcare workers in Slovenian nursing homes in rural areas during the COVID-19 pandemic.	This study aims to analyze job satisfaction and burnout levels of healthcare professionals working in Slovenian nursing homes in rural areas during the COVID-19 pandemic, and make a comparison with the results of the same services in 2013.	These findings also anchor our research in the relevant literature. As we explained, a key priority in our research to reveal hermeneutic factors for the job satisfaction of residents.
[12]	Effect of Emotional Intelligence and Psychosocial Risks on Burnout, Job Satisfaction, and Nurses’ Health during the COVID-19 Pandemic.	The present study aimed to analyze the effect of psychosocial risks and emotional intelligence on nurses’ health, well-being, burnout level, and job satisfaction during the rise and main peak of the COVID-19 pandemic in Spain.	This is one more interesting anchor for our study. We are interested in understanding which aspects of mental capabilities and skills of residents can work against psychological pressure and dissatisfaction based on the professional and academic conduct of residents.

Table 2. Cont.

Literature Review			
Author(s)	Title of Article	Key Contribution	Impact on Our Research Model
[13]	Healthcare workers' willingness to work during an influenza pandemic: a systematic review and meta-analysis	Meta-analyses of specific factors showed that for male Healthcare workers (HCWs), physicians, and nurses, full-time employment, perceived personal safety, awareness of pandemic risk and clinical knowledge of influenza pandemics, role-specific knowledge, pandemic response training, and confidence in personal skills were statistically significantly associated with increased willingness to work.	In our research, we need to understand the motivation of residents to perform effectively as trainees and also to understand how job satisfaction is associated with specific motivational factors.
[14]	Cross-sectional survey on job satisfaction and its associated factors among doctors in tertiary public hospitals in Shanghai, China	The results of the logistic regression analysis suggested that doctors' job satisfaction was related to their professional title, types of patients that doctors treated or expected to treat, as well as their work stress.	In our research, the focus is on the study of job satisfaction of residents and this differentiates our work from many other related works. Our survey is one of the first covering such a major population of residents.
[15]	Relation between job satisfaction and job performance in healthcare services, Procedia-Social and Behavioral Sciences	In this work, authors try to analyze the relationship between job satisfaction and job performance.	We do not intend to study the possible association of job satisfaction of trainees with job performance. This could be a direction for future research.
[16]	Workplace stress (WS), job satisfaction, job performance, and turnover intention (TI) of health care workers in rural Taiwan.	The results showed that WS had a positive effect on both TI and job performance (JP) but had a negative effect on satisfaction. JS did improve performance.	In future research, we would like to further study the factor of workplace stress, as it is related to job satisfaction of residents.
[17]	Work context, job satisfaction, and suffering in primary health care	To evaluate the work context, job satisfaction, and suffering from the perspective of workers in primary health care.	We are interested in understanding how special aspects of the training institutions of trainees and special aspects of the Training Program affect the job satisfaction of residents.
[18]	Donning the mask: effects of emotional labour strategies on burnout and job satisfaction in community healthcare.	This study brings forth the neglected issues of emotions and their implications for these healthcare workers in low and middle-income countries who are a vital link that delivers healthcare to weaker sections of the society.	In future research, we would also like to investigate the income and rewards parameter's impact on job satisfaction.
[19]	Fear of COVID-19, psychological distress, work satisfaction and turnover intention among frontline nurses.	To examine the relative influence of fear of COVID-19 on nurses' psychological distress, work satisfaction, and intent to leave their organisation and the profession.	We are interested in revealing key psychological barriers affecting the job satisfaction of residents.

Chen et al. [8] conducted a study on 39 doctors from five township hospitals in Guangxi Zhuang, China. The goal was to understand the level of job satisfaction of doctors and to make recommendations for improvements. The key findings of their research highlight that job satisfaction is associated with numerous factors including working conditions, financial rewards, and the doctor's relationships with patients. As a key policy making proposition, the study suggests that the increasing of income and

fringe benefits of healthcare workers will have a positive impact on job satisfaction. Additionally, enhanced training and more opportunities for continuous improvement are set as key reflective actions against unsatisfactory conditions. In our research study, we want to obtain a rich picture of the phenomenon in the large population of residents in Saudi Arabia and to reveal some key positive and negative relationships of job satisfaction with specific factors. As a responsive action, our research also aims to provide key recommendation for improvement. We are also very much interested in developing a trusted way and mechanism to monitor the evolution of job satisfaction on residency medical programs.

In another recent study in KSA (Kingdom of Saudi Arabia), Bawakid et al. [9] conducted a study with 237 Family Physicians (FPs) working in primary healthcare centers under the Ministry of Health in two regions (Jeddah and the Eastern region). In the key findings of their research, it was evident that more than half of the FPs were satisfied in terms of their professional conduct. The majority though had a perception of being inferior to other specialties. As a bold recommendation, the relevant study proposed that the enhancement of self-esteem as well as the continuous support and improvement of the working environment, would limit stress and improve the health and psychological loads of physicians. In our research study, we need to understand the basic “cause and effect” relationships between job satisfaction and aspects of the psychological load of residents, including aspects of the Training Program and educational activities as well as the impact of burnout on satisfaction.

Zhang [10] conducted a recent research study with a sample of 304 healthcare staff (doctors, nurses, radiologists, technicians, etc.) in China during COVID-19 with an emphasis on the revealing of psychological pressure on their professional conduct and job satisfaction including through stress, anxiety, and depression. In the key findings of this research, it was found that a significant portion of this staff faced high levels of anxiety (28.0%), depression (30.6%), and distress (20.1%). Several demographics and factors related to the provision of personal protection equipment were associated negatively with job satisfaction. In our research study, we are also interested in analyzing the psychological factors that affect job satisfaction. We also in parallel run a complimentary study that focuses on the analysis of depression and anxiety in the context of the professional and educational activities of the residents in training centers.

In their study that conducted in Spring 2013 ($n = 556$) and Spring 2020 at the peak of the pandemic in Eastern Europe ($n = 781$) in Slovenia, Leskovic et al. [11] concluded that the COVID-19 pandemic significantly increased the burnout syndrome faced by nursing homes healthcare workers in Slovenian rural areas. In their study, they also dealt with job satisfaction and they proved that there is a direct association a predicting capability for the burnout syndrome. Additionally, they observed a negative correlation between job satisfaction in 2020 and feelings of emotional exhaustion and personal accomplishment in both 2013 and 2020. These findings also anchor our research in the relevant literature. As we explained, it is a key priority in our research to reveal hermeneutic factors for the job satisfaction of residents.

Soto-Rubio et al. [12] delivers integrated research in Spain that involved 125 nurses. In their key findings, they emphasize that emotional intelligence serves as a positive favorable effect on job satisfaction. This is one more interesting anchor for our study. We are also interested in understanding which aspects of the mental capabilities and skills of residents can work against psychological pressure and dissatisfaction stemming from the professional and academic conduct of residents.

Aoyagi et al. [13] performed a meta-analysis and narrative synthesis of available research and found out that respondents' willingness to work ranged from 23.1% to 95.8%, depending on their work context. A variety of factors determine an increased willingness to work and these include full-time employment, perceived personal safety, awareness of pandemic risk and clinical knowledge of influenza pandemics, role-specific knowledge, pandemic response training, and confidence in personal skills. In our research, we need to understand the motivation of residents to perform effectively as trainees and to understand how job satisfaction is associated with specific motivational factors.

Liu et al. [14]’s study of job satisfaction through a survey of 897 doctors from 11 tertiary public hospitals in Shanghai, China revealed that 64.8% of participants were dissatisfied with their jobs. A variety of factors were determined to have a direct relationship with dissatisfaction including professional title, the types of patients that doctors treated or expected to treat, as well as their work stress. In our research, the main interest is on the study of job satisfaction of residents and this differentiates our work from many other related works. Our survey is one of the first covering such a major population of residents.

Various other research studies contribute also to the domain of knowledge of job satisfaction and healthcare workers, nurses, physicians, licensed professionals, and social health activists of frontline nurses [15–19]. For example, in [15] a list of factors for the job satisfaction of nurses includes the following components: (satisfaction from the manager; satisfaction from the management administration; satisfaction with the ways of working; satisfaction of recognition; satisfactory working hours; satisfactory working security; self-satisfaction towards productivity; self-satisfaction of initiatives; self-satisfaction of working; self-satisfaction of quality improvements). Last but not least, a recent study during the COVID-19 pandemic [19] proved that COVID-19 has an increased impact on the level of fear that is also associated with decreased job satisfaction and increased psychological distress, among other implications.

Some further aspects for the anchors of our study to the literature are discussed in the next paragraphs. These provide some more directions for the design of our research tools and the key objectives of our research.

In a global systematic review study focused on the correlation between residents’ burnout rate and their specialty, the highest prevalence of burnout was found to be among residents of radiology, neurology, and general surgery. In contrast, residents with the specialties of psychiatry, oncology, and family medicine were found to have the lowest level of burnout. Also, the same study reported the highest levels of burnout being experienced among males and older residents [20].

The presence of life-work balance and meaning in work were found to be associated with lower levels or the absence of burnout and was associated with career satisfaction among residents [21]. In a study of the prevalence of burnout among pediatric residents, burnout found to have a negative impact on the medical knowledge quality of care and professional conduct [22].

Studies reported higher levels of depression among medical students when compared to the normal population; recommendations to focus on students’ psychological well-being and faculty support were raised. In the same vein, the advantages of including well-being as a curriculum area in addition to skills of stress management was highlighted [23]. A systematic review focused on identifying factors affecting psychological well-being listed sleep, resilience, residents’ independence, building competence, and enhanced social relatedness as the main factors influencing residents’ well-being and requiring further focus and research [24].

Psychological well-being featured in a study focused on measuring the burnout among 2nd year U.S. residents and regret towards career choices; the study found that a higher prevalence of burnout existed among the population associated with regret towards their career choices. Furthermore, the study recommended further research on this topic [25].

The effect of burnout is not limited to the medical trainee only; it also affects patients under treatment and the community. It plays a role in medical error as well as patient dissatisfaction. Studies urge prompt intervention; such interventions might be as simple as the limitation of working hours and mindfulness training [26].

In a national level study, physicians’ burnout, exhaustion, and work unit safety were found to be associated with major medical errors, and prompt intervention was requested to minimize the medical error through addressing physicians’ well-being and unit safety, as well by the assessment and modification of workload and alleviating the exhaustion of medical trainees and physicians [27]. Some studies found that self-blame is higher in female residents, which leads to resident distress [28].

A systematic review analysis conducted on the effect on different interventions on the level of trainees burnout and emotional exhaustion found that the limitation of working hours to the Accreditation Council for Graduate Medical Education (ACGME) work hour limits were associated with improvements in avoiding emotional exhaustion and burnout [29].

Physician wellness has a great significant impact on patient satisfaction, long-term physician satisfaction, and increased physician productivity. Therefore, medical educators, academic leaders, and researchers are focusing on the initiative of ‘improving trainee well-being’ or on satisfaction and analyzing burnout [26].

Management and dealing with the health professional practice requires stamina, good health, appropriate knowledge and skills, and the ability to respond positively to challenging experiences. Doctors need to have good psychological and physical health to perform according to good practices and not to burn out. A recent study introduced the psychological concept of Resilience, which relates to the long-term ability of individuals to survive in and thrive on adversity; this concept is rarely used in medical practice but proved to increase the psychological stamina and interaction of individuals, which in turn showed significant impacts on the reduction of dissatisfaction and burnout. More research is highly recommended to be performed on this topic and the implementation of resilience assistance for medical trainees and practitioners [2].

The performance of prospective observational studies is highly recommended by the literature; the conducting of such studies using validated international scales will provide a clear assessment of the affected population over time (trainees), which will measure the prevalence of the burnout syndrome and associated factors at each level (education, intern, resident, or practice). This will help in building both prevention and treatment strategies and increase their effectiveness [30]. Within this context, our research study is timely and responds to a key requirement for resilient healthcare [31,32]. It is critical to monitor variations in trainees’ satisfaction and burnout rates in the short and long term in order to be capable of recognizing the effect of novel didactical approaches in Training Programs and in best practices [33–36].

Lastly, such investments in the wellness of physicians is an ethical responsibility that needs to be upheld by the medical community to assure good practices are conducted by future generations of practitioners [37–49].

From this point of view, our research delivers this ethical responsibility and provides significant findings that can be exploited towards the enhancement of well-being, quality of life, and images of the residents in Training Programs. It is also a bold initiative for promoting the health specialties community’s involvement in the recognition of performance in all the aspects of health practices and training.

In summary, the contribution of the critical literature review to the specification of our research problem can be summarized as follows:

- We are interested in setting up benchmarks to indicate the added value components of job satisfaction of residents in Training Programs supervised by the SCFHS.
- We want to obtain a comprehensive picture of the burnout phenomenon in a large population of residents in Saudi Arabia and to reveal some key positive and negative relationships of job satisfaction with specific factors.
- As a responsive action, our research also aims to provide key recommendations for improvement.
- We intend to develop a trusted mechanism to monitor the evolution of job satisfaction during residency medical programs.
- We want to understand the basic “cause and effect” relationships between job satisfaction and aspects of the psychological load of residents, including aspects of the Training Program and educational activities as well as the impact of burnout on satisfaction.
- We focus on the analysis of the psychological factors that affect job satisfaction. We also in parallel run a complimentary study that studies the rates and impact of depression and anxiety in the context of the professional and educational activities of the residents in training centers.

- We are also interested in understanding which aspects of mental capabilities and skills of residents can work against psychological pressure and dissatisfaction based on the professional and academic conduct of residents.
- We do not intend to study the possible association of the job satisfaction of trainees with job performance. This can be a direction for future research.
- We are interested in understanding how special aspects of the training institutions of trainees and special aspects of Training Programs affect the job satisfaction of residents.
- In future research we would also like to investigate the income and rewards parameter and how it affects job satisfaction.

In the next section, we provide our research methodology strategy and we outline our research objectives.

3. Methods

The previous critical literature review revealed several complementary aspects of the research area in the wider literature. The focus of our research is on factors that enhance trainees' satisfaction in post graduate medical Training Programs. We are very interested in analyzing, understanding, and interpreting perceptions from trainees of the quality of their residency programs. Our methodological approach is integrated into a greater research context. The SCFHS has launched the Quality Initiative, within which a multidimensional framework for quality assurance has been introduced. The core part of this framework is a set of 23 Key Performance Indicators (KPIs) that can be exploited as a significant managerial tool for enhanced decision making. In this research paper, we emphasize the perceptions of residents in postgraduate medical Training Programs as they refer to their job satisfaction. We also intend to add additional aspects for our Quality Assessment framework with an emphasis on KPIs related to job satisfaction.

Trainees' satisfaction in residents Training Programs is a key factor for the measurement of efficiency. In our approach, we integrate several value components of the trainees' satisfaction and we investigate the attitude of residents and fellows in the SCFHS's medical Training Programs.

The seven components of trainees' satisfaction under investigation in our research are summarized below (see Table 3, below):

- Q1: *Satisfaction with Academic Activities in the Training Center.*** This is a critical aspect of our study on residents' satisfaction. We are interested in analyzing and interpreting the degree of satisfaction of trainees related to the academic activities and learning strategies of their training center. The ultimate objective of our integrated research involving the SCFHS is to develop reflective strategies and actions towards improvement of the quality of Training Programs offered by the SCFHS.
- Q2: *Satisfaction with the Residents and Colleagues in the Training Center.*** This component is related to the collegiality and the professional social interaction of trainees with other parties in their training centers. It is important to investigate how trainees perceive the quality of their interaction with other residents and colleagues in the training center. We understand that several psychological and behavioral factors determine this relationship, but we intend to study its overall measure.
- Q3: *Satisfaction with the Administrative Components in the Training Center.*** We focus on the key aspects of interactions of residents with their administration and the execution of administrative tasks integrated in their training. We are interested in understanding the overall satisfaction and how to interpret it to provide significant and meaningful recommendations.
- Q4: *Satisfaction with the Training Program.*** The overall perception and evaluation of the Training Program by the trainees provides a holistic, subjective measure for the quality of education. We are interested in monitoring this rate over time and this study serves as a benchmark for future studies and initiatives related to the enhancement of the quality of Training Programs. It is also associated with our effort to update, and to enhance a compact set of Key Performance

Indicators (KPIs) associated to the Quality Initiative in SCFHS. A full set of these KPIs can be found in our recent previous publication.

- Q5: *Satisfaction with the Specialty*.** The perception of residents and fellows towards their specialty and their internal association of different levels of satisfaction is another factor under investigation in our research study.
- Q6: *Satisfaction with the Training Center*.** The perception of trainees towards their training center is also an important area for understanding possible barriers, difficulties, and quality evaluations for residents. This quantifiable measure can also be used for strategic actions towards improvements.
- Q7: *Satisfaction with the SCFHS*.** Trainees in their daily interaction with the Training Program in the training center also indirectly interact with the SCFHS as a supervising and accreditation body. It is extremely important to reveal how this relationship is valued by the residents and also how it informs reflective actions for the enhancement of the overall quality.

In Figure 2, below we summarize the core components of the job satisfaction as we approached them with our methodological tool. Namely, seven core components of job satisfaction were set in the center of our focus.

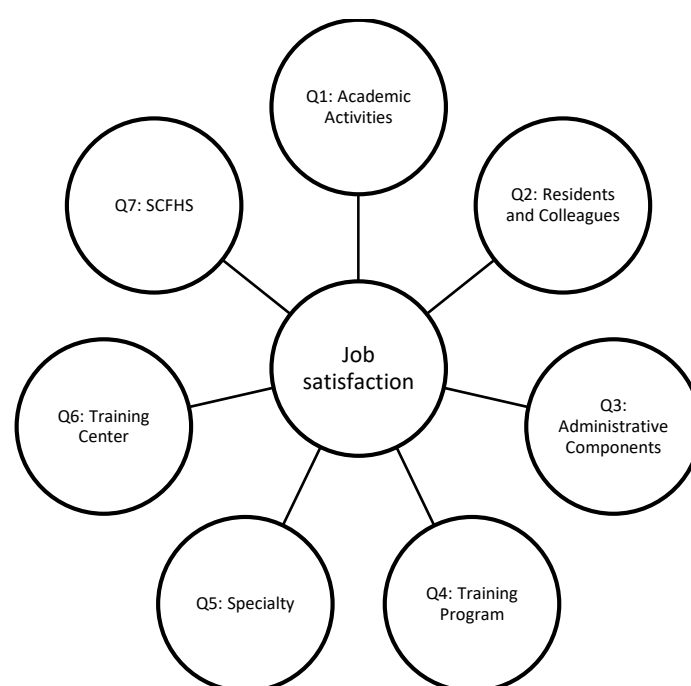


Figure 2. The research focus on job satisfaction.

Table 3. Core components of Job Satisfaction of Trainees in Residency Programs.

Q1	Satisfaction with Academic Activities in the Center
Q2	Satisfaction with the Residents and Colleagues in the Center
Q3	Satisfaction with the Administrative Components in the Center
Q4	Satisfaction with the Training Program
Q5	Satisfaction with the Speciality
Q6	Satisfaction with the Training Center
Q7	Satisfaction with the SCFHS

Our research has four critical key objectives:

- Research Question 1:** Which are the core components of job satisfaction in residency medical Training Programs as perceived by the trainees?
- Research Question 2:** Which are the current benchmarks of job satisfaction in the residency program supervised by the Saudi Commission for the Health Specialties?
- Research Question 3:** Which are the key recommendations for the enhancement of residency Training Programs for enhanced trainee satisfaction?
- Research Question 4:** How can we interpret the main perceptions of trainees' job satisfaction in terms of measurable, trusted, and reliable Key Performance Indicators for promoting the quality of post graduate medical Training Programs?

The key aspects of our research approach are summarized as follows:

This is an analytical, prospective, cross-sectional study design that represents the trainees' job satisfaction towards Training Programs supervised by the SCFHS in 2018. A self-administered, semi-structured questionnaire survey with both open and close ended questions was distributed to trainees through an online link.

The validation process of the questionnaire included assessing its content validity, which was performed by content experts, after its face validity was assessed by a medical educationist who found that the survey fulfilled the objectives of the study and that the flow of questions followed a logical sequence. To test the reliability of the questionnaire, a pilot study was conducted on 40 participants.

The survey questionnaires for residents were developed by the PGMT Quality Indicator Committee (QIC) to produce an error-free measure of the quality of care, based on characteristics of best practice such as validity, reliability, and transparency. The questionnaire comprised items and included domains pertaining to the training center evaluation, research and simulation training, personal issues, residency program evaluation, and recommendations.

In total, there were 13,688 residents working in different specialties throughout Saudi Arabia, of which only 3442 (25.14%) agreed to participate in the online survey. The trainers were excluded from the survey owing to time constraints. A total of 41 questions represented the indicators of the quality of Training Programs, which were validated by experts and QIC panels for clarity and content relevance.

The questionnaire comprised six sections (see Figure 3):

- The first section comprised eight questions on demographic characteristics
- The second section comprised 14 questions on trainees' educational activities
- The third section comprised three questions on satisfaction with the Training Program
- The fourth section comprised eight questions on perceptions and personal experience
- The fifth and sixth sections comprised three and five questions on research participation and satisfaction with SCFHS, respectively.

The Key Performance Indicators Working Group is responsible for collecting and analyzing data annually and ensuring that the indicators remain precise and appropriate. This goes against Toussaint et al.'s suggestion of releasing quarterly reports [22]. After respondents' data were collected and entered into Microsoft Excel, they were rechecked to ensure there were no typos or blank/empty data cells. The statistical program SPSS version 24 was used for online data analysis. A test was considered significant if the p -value < 0.05 .

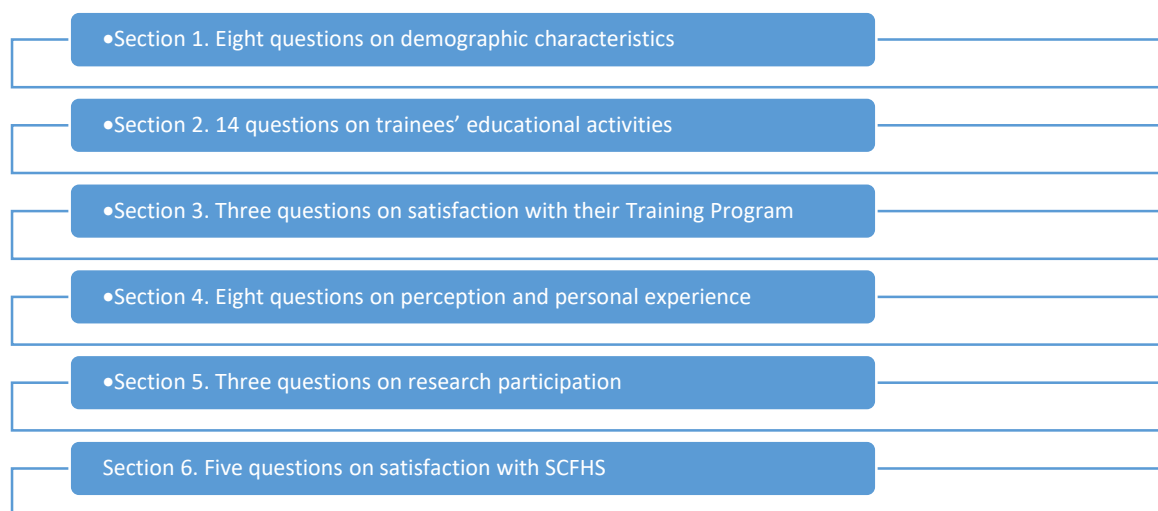


Figure 3. The structure of our research questionnaire.

In the next section, we provide a systematic overview of key findings organized into five distinct areas of interest:

- In Section 4.1, we present the key demographics of our study
- In Section 4.2, we present the key findings related to the Overall Job Satisfaction of trainees in residency programs
- In Section 4.3, we summarize the key aspects of core components of trainees' satisfaction per their discipline and gender
- In Section 4.4, we discuss the findings related to job satisfaction associated to the Training Center of the residents
- In Section 4.5, we elaborate on the key perceptions of residents for their job satisfaction associated to the Training Program they participated in
- Last but not least, in Section 4.6 we present some key aspects of the impact of burnout and sexual harassment on trainees' satisfaction.

In Section 5, we provide a thorough discussion of key findings and their implications. We also discuss the limitations of our study, as well as key recommendations related to sustainable health.

4. Results

The trainees' response rate to the online survey was 27% (3696/13,688) which is satisfactory and represents a significant sample for our interpretations and key findings. This section is organized as follows. First, we present the key demographics of our research. Then we emphasize the presentation of the overall job satisfaction of residents per their discipline, residency type, and gender. After this overall analysis, we emphasize key aspects affecting the perceptions of trainees towards the Training Program and the training institution. Finally, we discuss the important factors affecting burnout and other psychological aspects of trainees' satisfaction.

4.1. Demographics of Our Survey

There were 1932 (52.3%) male respondents (see Figure 4, below), and the majority (91.9%) were Saudi nationals.

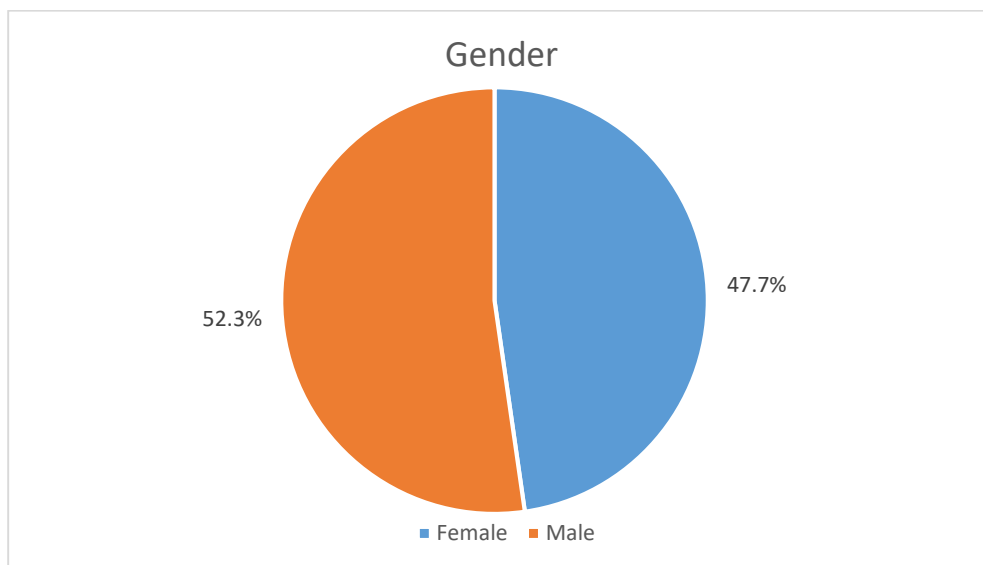


Figure 4. Demographics: Gender.

Concerning the discipline, as seen in Figure 5 below, the vast majority, almost 9 out of 10 respondents belong to the Medicine discipline (90.9%) while the second largest representative discipline is Dentistry with 5.9% (see Tables 4 and 5 below).

Table 4. Respondents per Discipline.

Discipline	Count	Percentage
Pharmacy	35	0.9%
Applied Health Sciences	21	0.6%
Dentistry	217	5.9%
Medicine	3361	90.9%
Nursing	62	1.7%
	3696	100.0%

Table 5. Respondents per Residency Type.

Type	Count	Percentage
F1	26	0.7%
F2	145	3.9%
F3	34	0.9%
R1	459	12.4%
R2	1270	34.4%
R3	860	23.3%
R4	709	19.2%
R5	182	4.9%
R6	11	0.3%
	3696	100.0%

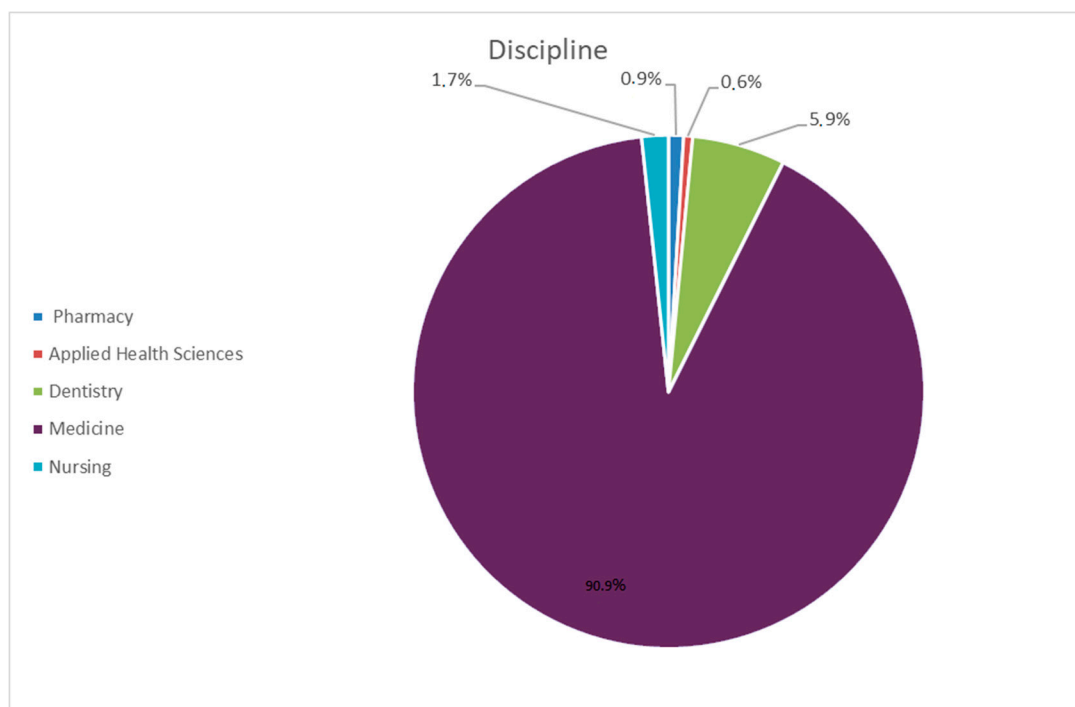


Figure 5. Demographics: Disciplines of respondents.

Almost third of the residents (1270 or 34.4%) were working in the R2 level, while 860 (23.3%) were working in the R3 level (see Figure 6 below).

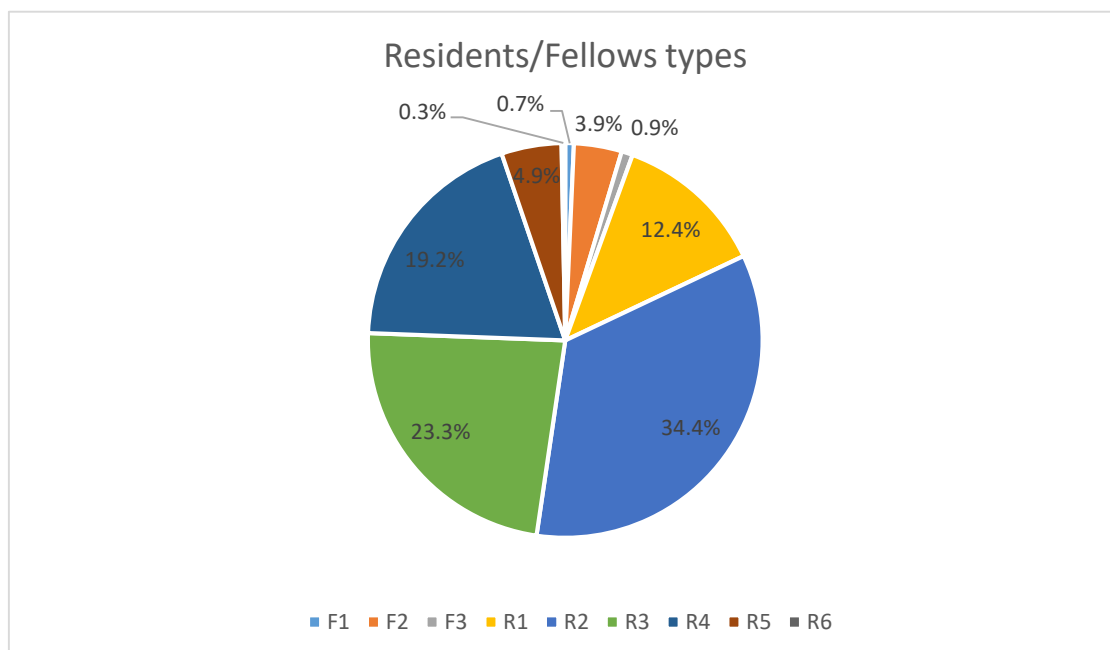


Figure 6. Demographics: Type of residency of respondents.

More than one-third (40.4%) of the trainees were in the Central Region of Saudi Arabia and approximately one-third (34.5%) were in the Western Region. The highest proportion of trainees (39.6%) were working in Riyadh City and 20.1% were working in Jeddah.

4.2. Analysis of Overall Job Satisfaction

One of the key objectives of our research was to develop a benchmark for the measurement of the job satisfaction of trainees in residency programs in the Kingdom of the Saudi Arabia. From this point of view, our work is novel and provides a snapshot for the measurement of trainees' satisfaction in this given period. This metric is significant and allows further developments related to its constitutional factors.

In Figure 7 below, we provide the overall trainees' satisfaction per discipline. The absolute rate for Medicine is 58.6%, a number which allows for significant improvement and sets an initial benchmark for the Training Programs of the SCFHS. From a decision-making point of view, an update of the integrate strategy for the integration of quality in residency programs is required. We intend to discuss this first significant finding of our research further in the Discussion and Implications of our research study section. The overall satisfaction for Pharmacy, is quite like the one related to Medicine and it equals 58.8% (see Table 6, below).

Table 6. Overall Trainees' Satisfaction per discipline.

Discipline	Overall Trainees' Satisfaction
Pharmacy	58.8
Applied Health Sciences	69.6
Dentistry	56.6
Medicine	58.6
Nursing	61.7
Average	58.6

The highest satisfaction rate is for the Applied Health Science trainees, at almost 70%, while the lowest is related to Dentistry at 56.6%. The first interpretation for this finding is that it can be used as a benchmark for the ongoing and future monitoring of trainees' satisfaction in the near future and also that the especially for the Medicine specialty, there is significant space for improvement. In the Discussion section, we provide our key recommendations.

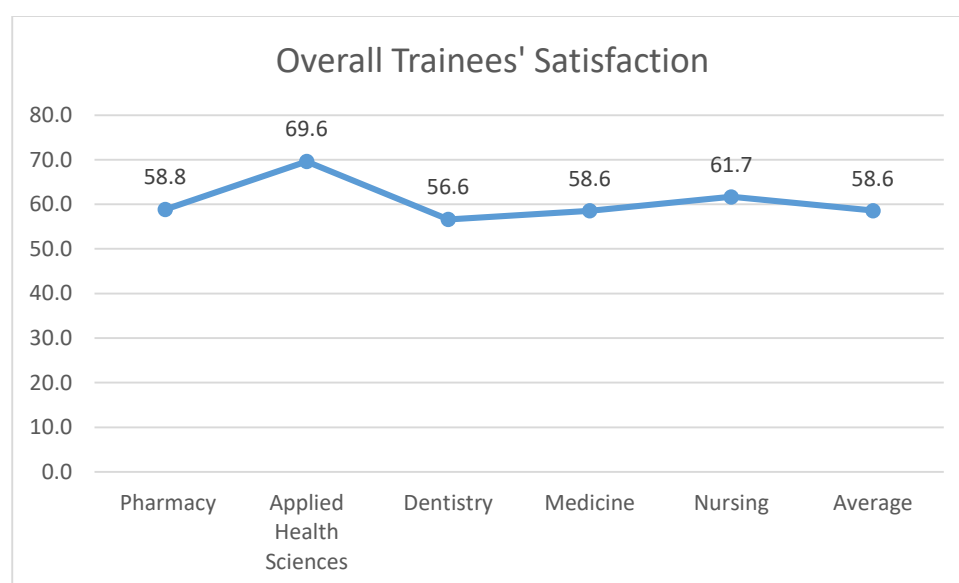


Figure 7. Overall Trainees' Satisfaction per discipline.

Another interesting finding of our research is summarized in Figure 8 below, which is related to the overall satisfaction per residency type. It seems that fellows in residency programs have 8% greater satisfaction than junior and senior residents.

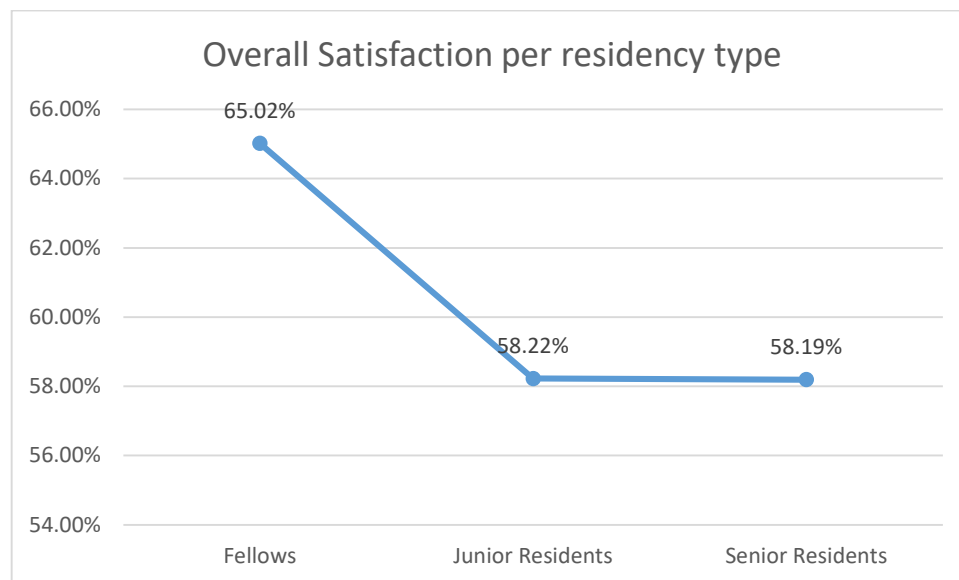


Figure 8. Overall Trainees' Satisfaction per residency type.

4.3. Analysis Trainees' Satisfaction Core Components

As discussed in the Research methodology section, one the key objectives of our survey is to understand the perception of trainees in residency medical programs related to seven core aspects of satisfaction including:

- Q1: Academic Activities
- Q2: Residents and Colleagues
- Q3: Administrative Components
- Q4: Training Program
- Q5: Specialty
- Q6: Training Center
- Q7: SCFHS.

In Figures 9 and 10 below, we provide the key findings per Gender. The female participants rate showed high satisfaction gained from their interaction and co-existence with other residents and colleagues in the center (76.6%). They also appreciate the administrative components in the center at a fairly high rate (64.5%) and they are satisfied with their specialty at a good rate (62.1%). Their perceptions of their Training Center and the Training Program at the center are also rather fair (53.3% and 56.8%, respectively). It seems that there is lots of room for improvement for their academic activities in the center, as well as their interactions and integration with the SCFHS (41% and 47.8%) ((see Table 7, below).

Male participants in our survey have similar attitudes to the seven components with some minor differentiations. They rate their overall satisfaction (+1.5%), their satisfaction related to administration in the Training Center (+1.7%), and to academic activities in the center (+1.2%) a bit higher. They are happier with their specialty (+4.3%) and also they value their relation with the SCFHS (+2.4%) more highly. Similarly to females, males seem to need further developments and enhancement in their academic activities in the center.

Table 7. Job Satisfaction overview by core components (Q1–Q7).

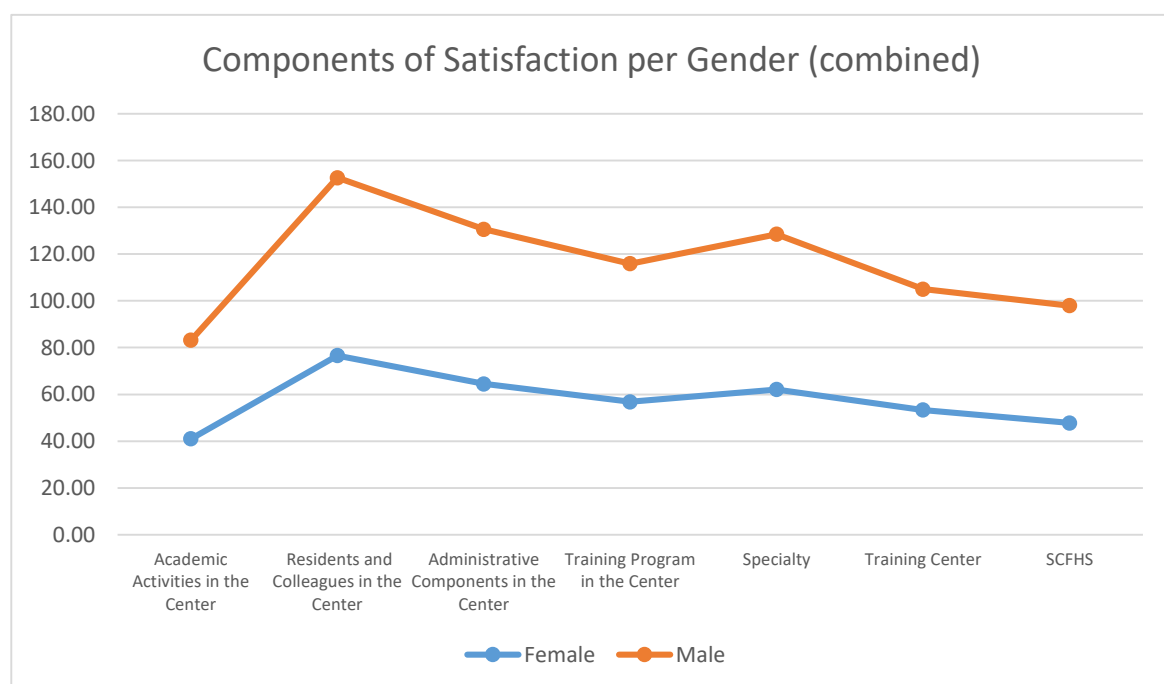
	Q1: Academic Activities in the Center	Q2: Residents and Colleagues in the Center	Q3: Administrative Components in the Center	Q4: Training Program in the Center	Q5: Specialty	Q6: Training Center	Q7: SCFHS	Overall
Female	41.0	76.6	64.5	56.8	62.1	53.3	47.8	57.8
Male	42.2	76.0	66.2	59.1	66.4	51.7	50.2	59.3
Difference	1.2	−0.6	1.7	2.3	4.3	−1.6	2.4	1.5

The rather low degree of satisfaction of residents related to the academic activities in the training institution must initiate a debate on a strategic plan for quality enhancement. Various ideas and approaches can be integrated. Some ideas are related to:

- Access to trusted online academic content
- Teamwork and active learning strategies
- Extensive use of robotics, Artificial intelligence tools, virtual and augmented reality labs, and simulation labs
- Extensive research enhancement initiatives for the support of residents in the research domain
- Applied research-based training and learning
- Technology enhanced learning interventions
- Integration of academic activities with the healthcare industry
- Enhancement of the relation of residents with academic supervisors
- Psychological support and relief of burnout rates. A more balanced work-life-study approach

In the discussion section, we elaborate further on this key finding of our research. We also comment on our future research for a more sophisticated analysis of these core components of satisfaction.

In Figure 11 below, we add one more level of analysis concerning the core components of trainees' satisfaction. We summarize the values for the seven core components of residents' satisfaction per different discipline. In the attached table, we also highlight some significant findings for further discussion.

**Figure 9.** Analysis of Trainees' Satisfaction per Gender (combined).

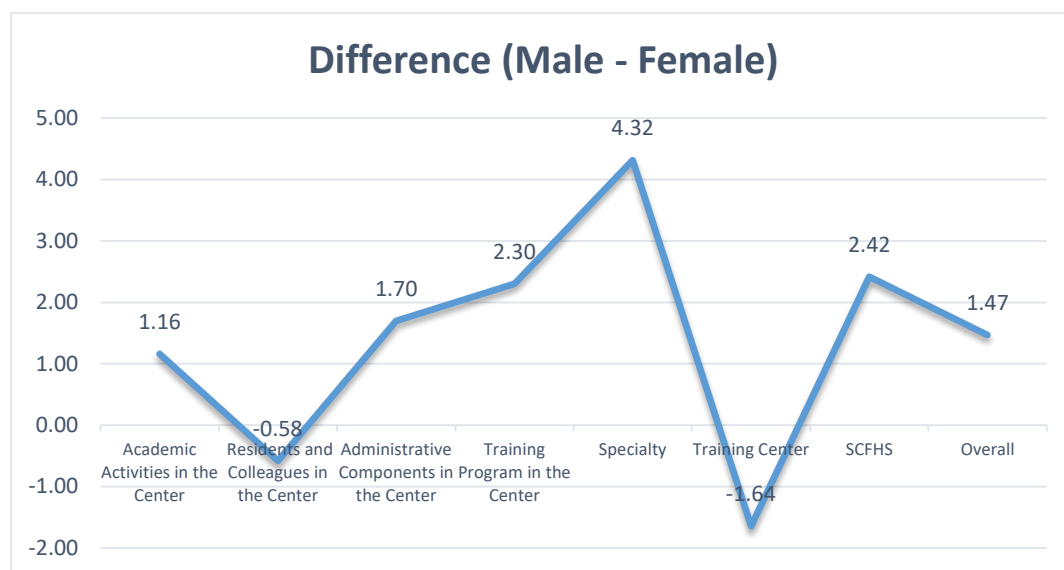


Figure 10. Analysis of Trainees' Satisfaction variations per Gender.

In the Pharmacy and Dentistry disciplines, there is a rather low satisfaction of residents towards their Training Center. The absolute rates (38.6% and 43.2%, respectively) require further study and investigation. Obviously, some aspects of the training centers do not satisfy residents.

As the key finding for most of our sample, the Medicine discipline residents are not satisfied with their academic activities in the Training Center. Their rate of 41.6% is a bit higher from the relevant rate for the Dentistry specialty, which is 38.9%. One of the key propositions of our study is that the Academic activities should be reconsidered and we should also initiate this satisfaction component as an absolute KPI for the quality of the Training Programs offered by the SCFHS.

Residents in Applied Health Sciences seem to be enthusiastic towards their Training Program in the center, with an extremely high rate of 94.1%. They also seem the happiest in terms of their specialty (94.1%) (see Table 8, below).

All the other findings follow the same trends and patterns of male and female participant averages. It seems from all the different disciplines that there is a need for focused strategic actions targeted towards:

- The multidimensional enhancement of the academic activities in the training center. For this purpose, we intend to initiate a new survey of the required actions and the suggestions of administrators and trainees.
- The cultivation of a trusted relationship between the residents and the SCFHS. It is necessary to update communication channels and to increase the awareness of residents to provide added value and increase its contribution to their careers.
- The enhancement of the Training Centers and a continuous improvement process and strategy over time. It is a recommendation to use the benchmarks of this study as a managerial tool for enhancing satisfaction rates over time for the next 5 years by 5–10% per year. This is a bold requirement that needs further investigation, planning, and implementation.
- The development of an institution-wide initiative for the enhancement of the Training Centers in all their aspects. In the next section of our survey, we provide numerous additional qualitative features of the perceptions of the residents towards their Training Center. We do believe that one of the bold findings of our research is related to the average perceptions of respondents towards the Training Center and the academic activities. These two aspects jointly summarize the core components for the residents' experiences and behavior.

Table 8. Core components of Job Satisfaction Per Discipline.

Discipline	Average Q1: Academic Activities in the Center	Average Q2: Residents and Colleagues in the Center	Average Q3: Administrative Components in the Center	Average Q4: Training Program in the Center	Average Q5: Specialty	Average Q6: Training Center	Average Q7: SCFHS	Average Overall Satisfaction
Pharmacy	45.3	78.4	69.0	63.6	62.5	38.6	45.5	58.8
Applied Health Sciences	51.0	85.4	77.8	94.1	82.4	45.9	39.4	69.6
Dentistry	38.9	78.7	66.5	54.6	58.7	43.2	48.0	56.6
Medicine	41.6	76.0	65.1	57.7	64.6	53.1	49.3	58.6
Nursing	48.2	79.3	67.1	72.2	66.0	54.0	44.5	61.7
Average	41.0	76.3	65.4	58.0	64.4	52.5	49.1	58.6

Note: Colored numbers refer to significant findings (for improvement or interpretation).

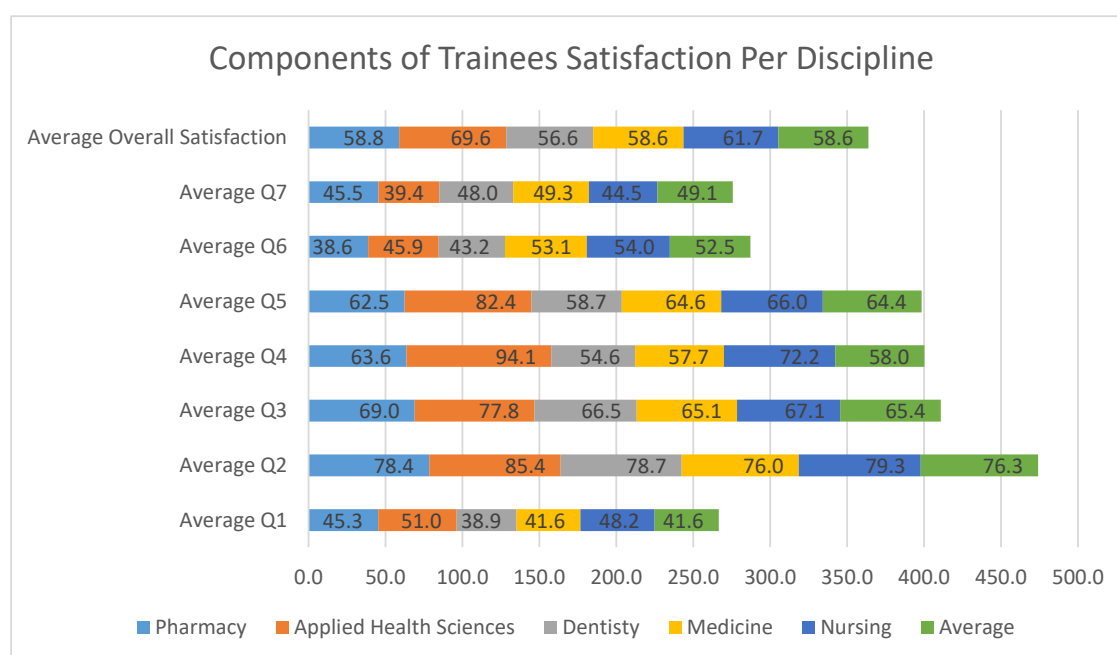


Figure 11. Analysis of Trainees' Satisfaction per Discipline (combined).

4.4. Special Analysis of Trainees' Satisfaction Related to Training Center

Our research study is one of the first efforts worldwide to identify, measure, and interpret the satisfaction of trainees in residency medical programs for the enhancement in their quality and their impacts. It is linked to the Sustainability and Health debate because it promotes a scientific debate for the constitutional value adding components in medical training. In the discussion section, we provide thorough case for the connection and the implications of our research for the Sustainable Health domain.

In this section, we elaborate further in the perceptions of our respondents for their satisfaction towards the Training Program and the Training Center. In Figure 12, we provide a high-level abstraction for the satisfaction rate of residents for 120 different Training Centers without uncovering the identity of each center. The picture provided in this figure is interesting. There are Training Centers that are perceived highly by residents, which provide high satisfaction and happiness. From the other side, residents also provide rather low satisfaction rates for numerous other Training Centers. The overall rate of satisfaction of trainees for all the Training Centers is approximately 55%. This is another interesting benchmark that our research study reveals.

It is necessary to study the findings of Figure 12 further. The SCFHS must have a continuous improvement process to understand in depth the causal factors for the low evaluation of specific training centers indicated by the respondents of our survey. We do understand that the current survey provides a snapshot of a given moment, but the overall findings have validity and require interpretation and revision of policies, as well as actions for enhanced decision making. In the next section, we try to provide more data and facts indicating the perceptions and attitudes of trainees towards their Training Center and program. We recommend a new run of a similar surveys in due time to understand how some reflective actions and recommendations had an impact on overall quality and satisfaction levels.

In Figure 13, we also provide the top Training Centers in terms of residents' satisfaction. We understand the limitations of our study, which will also be discussed in Section 5 of this paper, but we also consider that the ratings of such a large sample in our study provide trustworthy approximations of quality and satisfaction.

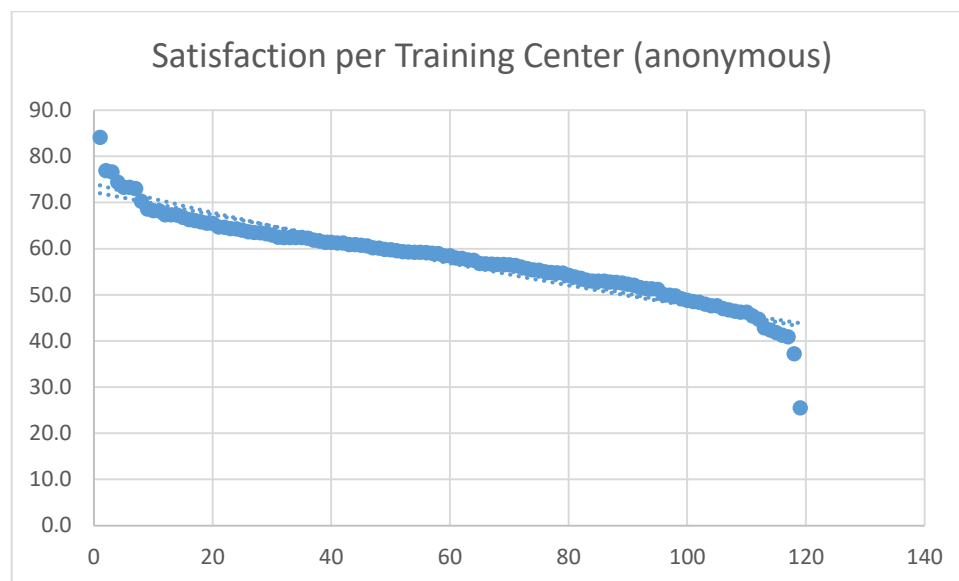


Figure 12. Overall Trainees' Satisfaction per Training Center.

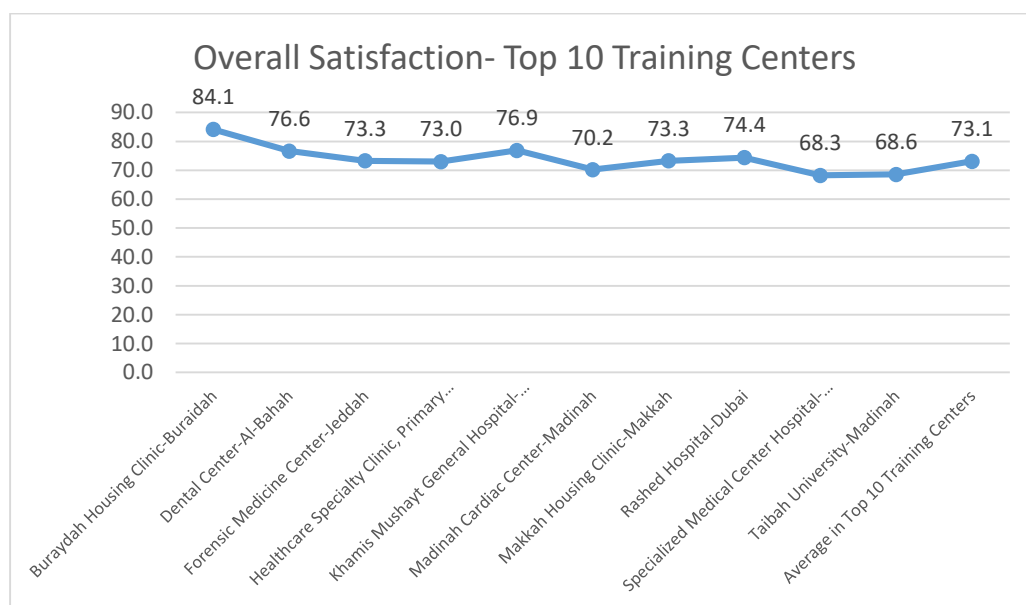


Figure 13. Perception of residents towards the quality of the Training Centers.

The concluding comment for the attitudes of residents related to the Training Centers is that overall residents feel that more value can be delivered in the academic program, as well as in the integration with the services and supervision of the SCFHS. In the next section, we provide additional key data and facts related to the disposition of trainees with the Training Program. Last but not least, we also provide some sensitive data related to burnout rates and sexual harassment figures.

4.5. Special Analysis of Trainees' Satisfaction Related to the Training Program

The fourth value component and interpretive factor for the overall job satisfaction of trainees in our methodological approach is related to the training program. The analysis of the key findings is presented in this section. Overall, there is some appreciation from the residents for their Training Programs. According to our collected data, 16.5% of trainees are satisfied with their current Training Programs, while almost 50% request improvements or have neutral attitudes. This is a significant finding.

We do believe that a thorough strategic initiative for the enhancement of Training Programs must be undertaken by the SCFHS and the other bodies that are involved in these programs. Some additional facts that are presented below provide directions for this enhancement.

Regarding the satisfaction rate of the trainees, 34.7% believe the programs are good, 16.5% believe that they can be improved, and 2.7% think they are useless (see Figure 14 below). One fourth of respondents also provided neutral perceptions, which highlights that currently there is a lot of space for enhancements in the Training Programs for residents. From this short overview of the satisfaction with Training Programs, it is highly recommended to use the current benchmarks the Useful as it is and the Useful but needs improvement rates as initial points for improving the satisfaction rate over the next two years by 20%.

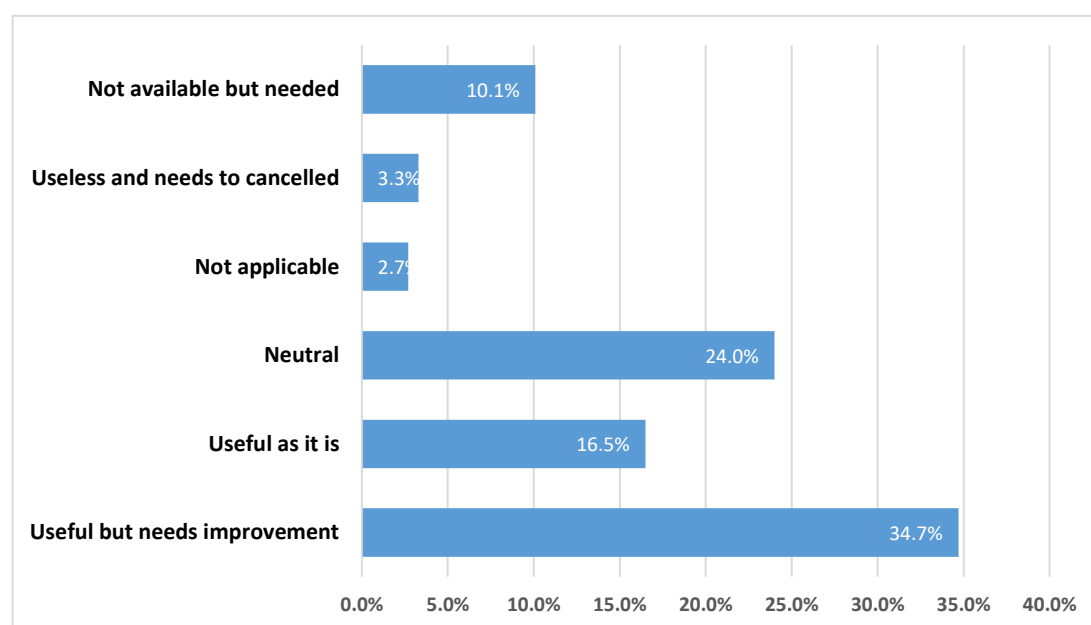


Figure 14. Trainees' satisfaction with the training programs.

In the same direction, we also tried to understand some key factors with a significant impact on trainees' perception towards the quality of the Training Programs.

With regard to the satisfaction rate of the trainees, 34.7%, 31%, 22%, 25.3%, 25.5%, and 25.3% considered the program, academic half-day, bedside teaching, grand round, bedside round with a senior, and bedside round with a consultant to be good, respectively (see Table 9, below).

Table 9. Training Program aspects that are valued by residents.

Key Aspect	Rate %
Program	34.70%
Academic Half-day	31%
Bedside teaching	22%
Grand round	25.30%
Bedside round with a senior	25.50%
Bedside round with a consultant	25.20%

It is important to emphasize that residents commented that academic half-day is a key aspect of satisfaction, which implies that research and training beyond professional service are recognized as

top priorities by trainees. This is a key finding that needs to be exploited further through strategic consultation by enhancing the research and academic life and practice of residents. Trainees selected attitude, interest in learning, and interest in helping others as top priorities while rating features of other residents working in the program.

More than half (58%) were very likely to recommend the program in which they work to others, while 12.2% were unlikely to do so (see Figures 15 and 16 below). This seems to be a strong core component of trainees' satisfaction. In future research, we plan to study the value components for his likelihood behavior for recommendation using a Structural Equation Modeling research tool. In the Section 5, we also provide our constructive interpretation of the key findings of our research towards a progressive model for Trainees' Satisfaction in Medical Education.

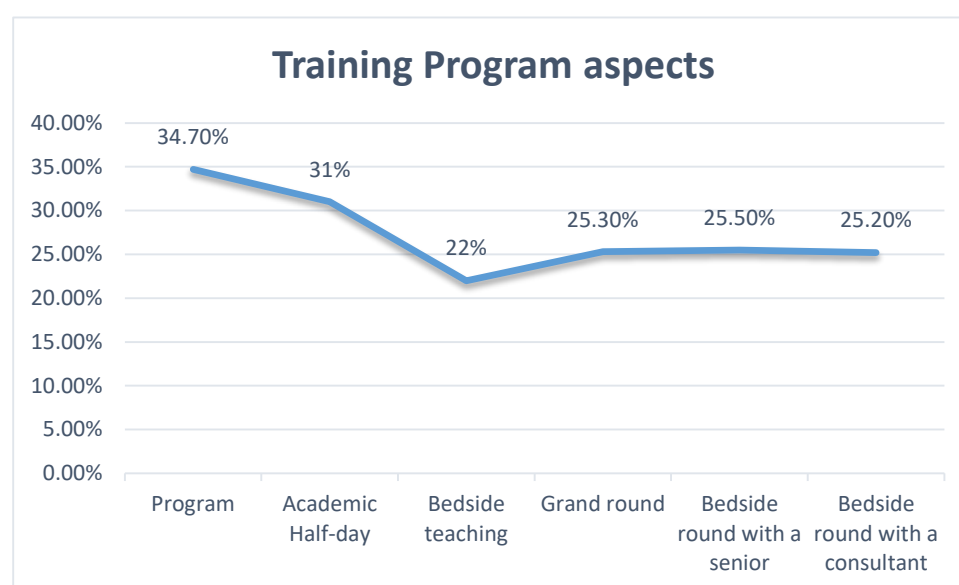


Figure 15. Training program aspects that are valued by residents.

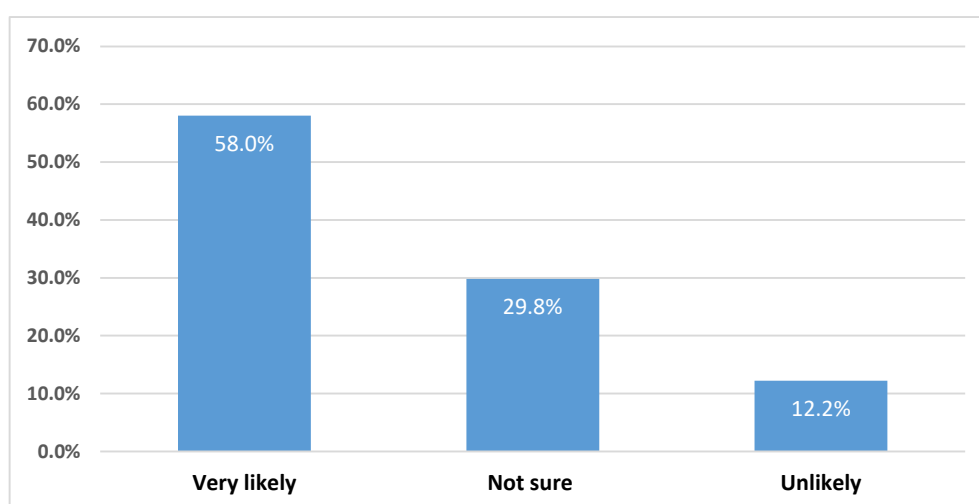


Figure 16. Trainees' responses to whether they would recommend their training program to others.

These absolute numbers can also be used for future benchmarking research. They can serve as managerial tools for enhancement and also for monitoring and control of the value proposition of the medical Training Programs supervised by the SCFHS.

In response to the question on whether they would choose another center for residency training after joining the residency program, nearly one third of the trainees (30.5%) agreed they would (see

Figure 17 below). This is potentially another factor that links the satisfaction rate of trainees to their perceptions towards their Training Center. It seems that one third of respondents do not build a strong bond with their selected Training Center. This finding requires further investigation. We must reveal the factors behind this attitude held by residents. The absolute rate of almost one third is rather high and means that several residents are not satisfied with their current Training Center.

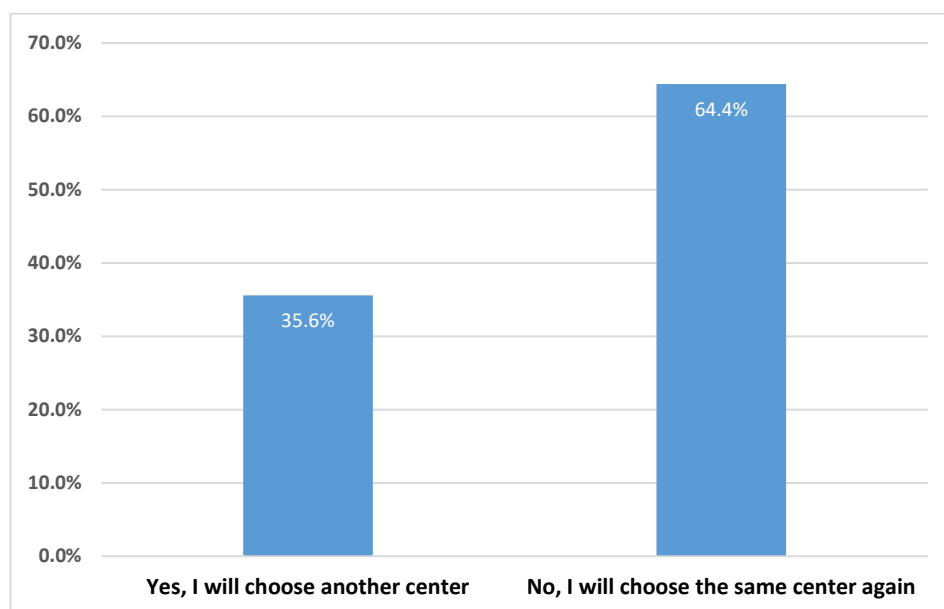


Figure 17. Trainees' responses to whether they would choose another center for their residency training after having joined their program.

More males than females consider it "very likely" that they will recommend their program to other trainees, while more females consider it "unlikely" that they will do so (see Figures 18–20 below).

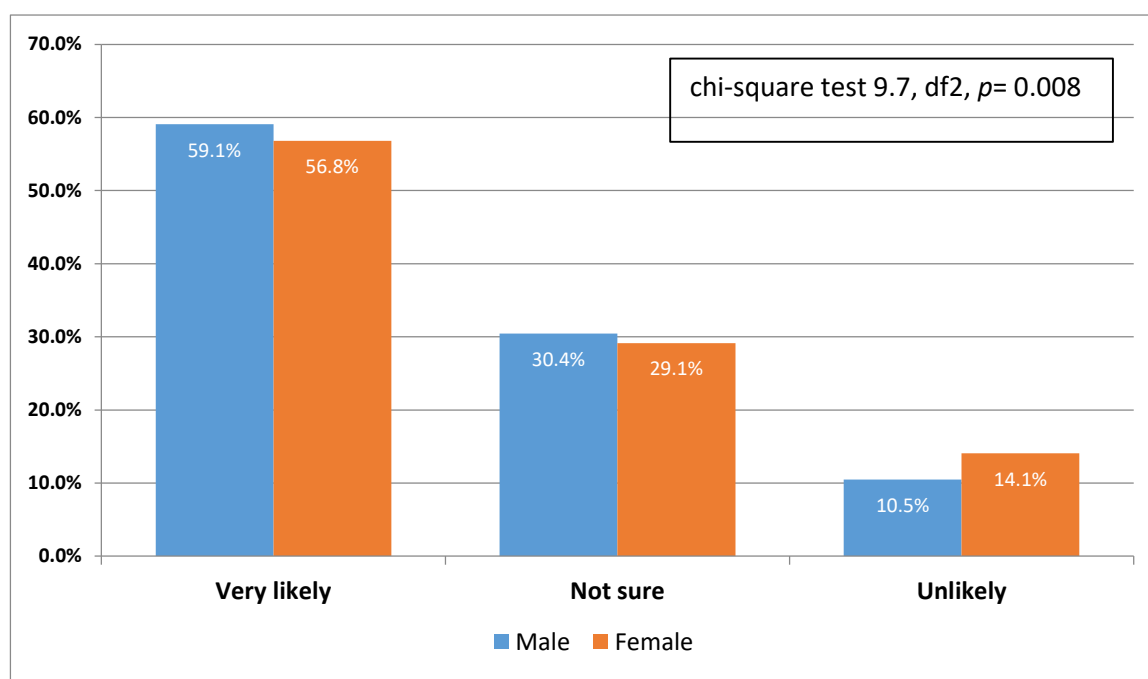


Figure 18. Gender differences regarding the likelihood of respondents recommending their Training Program to other trainees.

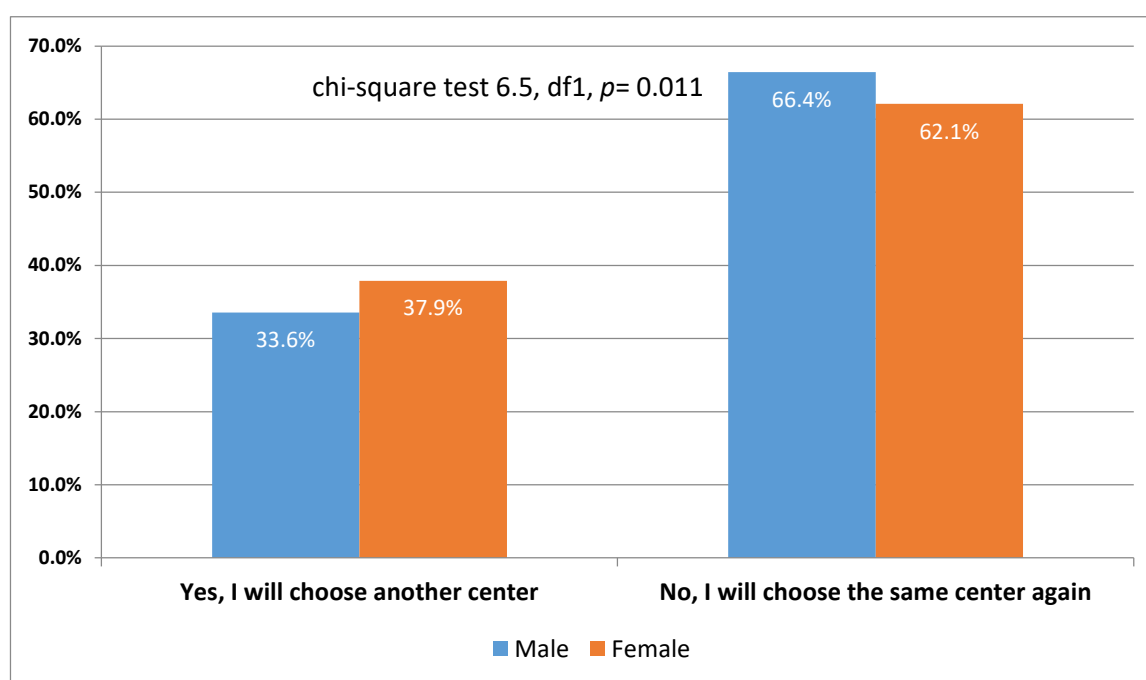


Figure 19. Gender differences in responses to the question: In retrospect (after you have joined the program), would you choose another center for your residency training?

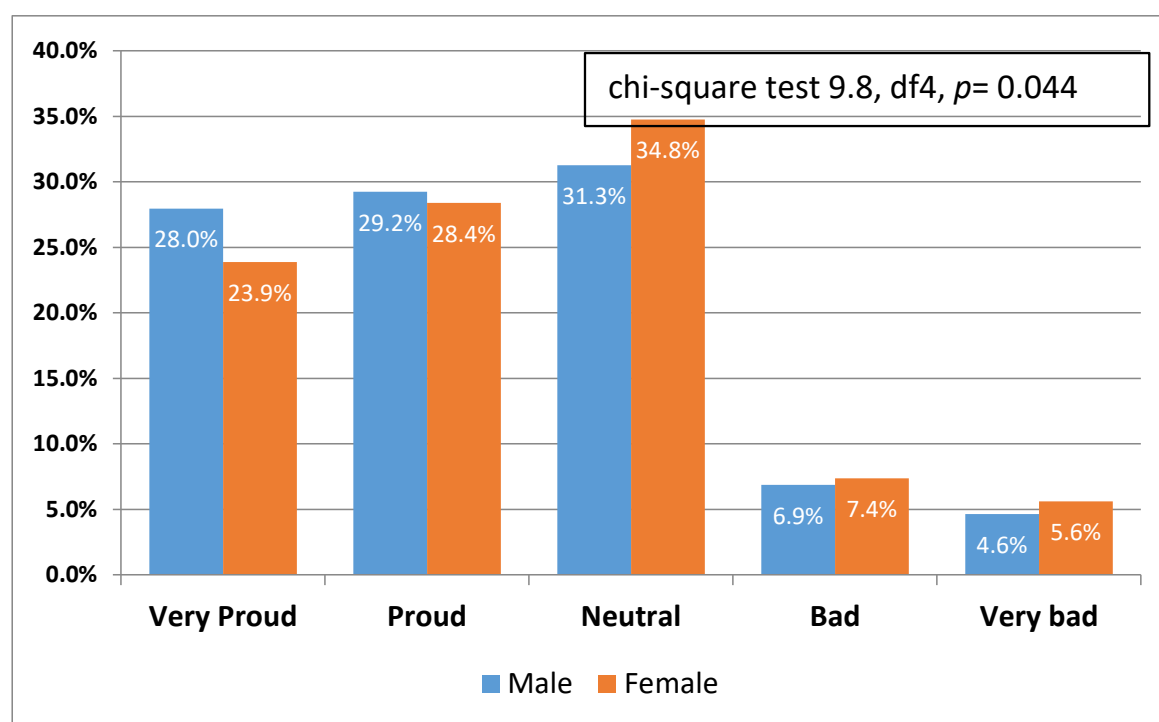


Figure 20. Gender differences in responses to the question: How “proud” or “bad” do you feel about being a trainee in your (current Training Center)?

Female residents seem to be more likely to switch Training Centers than males. In Figure 19 below, there is a graphical representation of this finding.

Overall, residents feel proud to have been members of their current Training Center. There were no huge gender-based differences found. It is also important in our future research to understand the reasons why about 10% of residents are unhappy in their current Training Centers. It is a key

priority of our future research to identify unhappy residents and to provide flexible mechanisms for their support and psychological enhancement (see Figure 20 below).

In this section, we provided some initial assessments of the attitudes of residents relating to their Training Program. It seemed that there is a rather fair satisfaction level of residents towards their Training Programs, and a lot of space for improvements. We also suggest that we should use the various rates of the relevant questions as benchmarks for future analysis, monitoring, and control. They can also serve as strategic objectives from improvements. We do believe it is feasible to set the increase of relevant satisfaction components for the Training Programs by 5–10% for the next two years as an objective through reflective strategic actions carried out by the SCFHS.

In the next section, we focus on one more key objective of our research study, which is to investigate the degree of burnout of residents as expressed by themselves in our survey. We intend to interpret the key facts of this situation and to make significant recommendations in the Discussion section.

4.6. Special Analysis of Trainees' Satisfaction Related to Burnout

Burnout is always referred to the literature as a key component of residents' dissatisfaction in their medical Training Programs. It is a factor with diverse direct and indirect psychological effects, and also linked with depression and anxiety. In this section, we provide our key findings related to various aspects of burnout (see Table 10, below).

Table 10. Overview of burnout rates.

Burnout	Rate
Always	28.2%
Sometimes	38.5%
Rarely	15.6%
It depends	13.7%
Never	4.0%

In response to the question “How frequently do you feel “burned out” and unable to cope anymore?”, 28.2% of trainees believe they “always” feel this way, 38.5% “sometimes” have this feeling, 15.6% feel it rarely, 13.7% said it depends, while approximately 4% “never” feel burned out (see Figure 21 below). This is a major finding of our research that poses critical questions for managerial decisions and key responsive actions. The too high rate of burnout seems to be one of the negative catalysts for the snapshot of the trainees' satisfaction in residents' Training Programs. Almost two third of residents feel that they experience a significant rate of burnout in their lives that has a key impact on their professional conduct and their lives. We intend in the near future to run a survey based on structural equation modeling in order to understand the cause and effect relations of burnout and also to measure the impact of the high level of burnout to different aspects of residents' personal and professional lives. We also present some key recommendations in the Discussion section.

Concerning the burnout rate of residents, there is not a gender-based uniform pattern. In Figure 22, there is a detailed overview of gender differences related to burnout. Once again, the high rate of burnout for males and females alike is a major finding of our survey and needs further study. It seems to be one of the core components of trainees' dissatisfaction. The SCFHS must focus on this finding and initiate actions and plans to provide residents with psychological relief and increase their courage and physical capabilities.

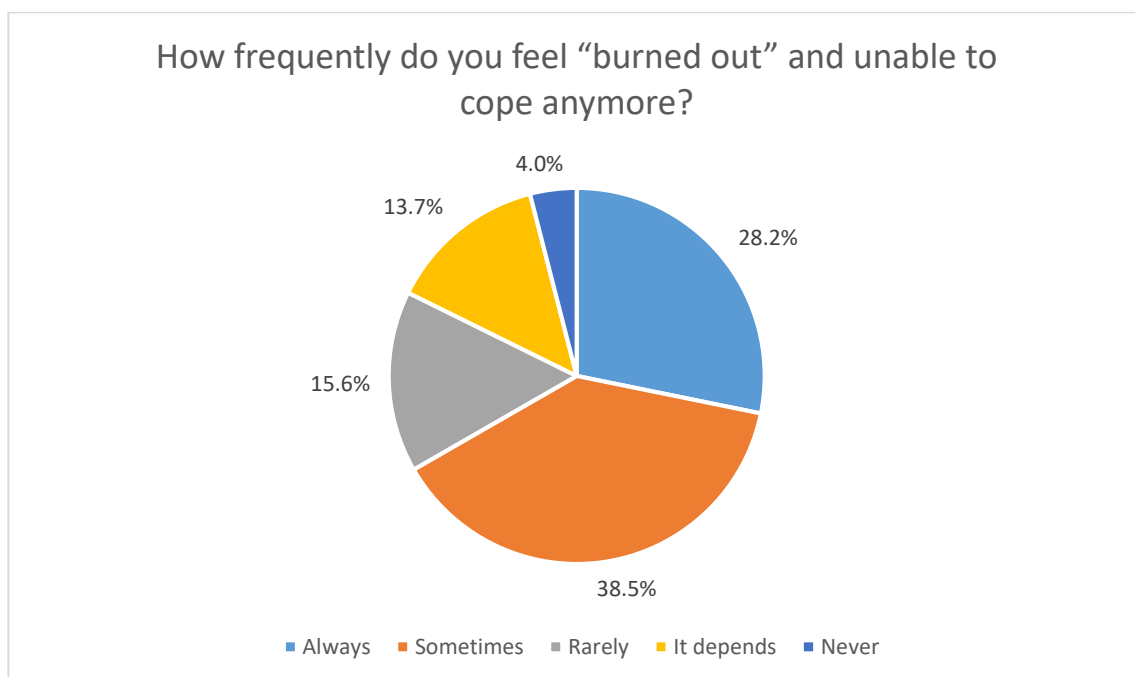


Figure 21. Responses to the question: How frequently do you feel “burned out” and unable to cope anymore?

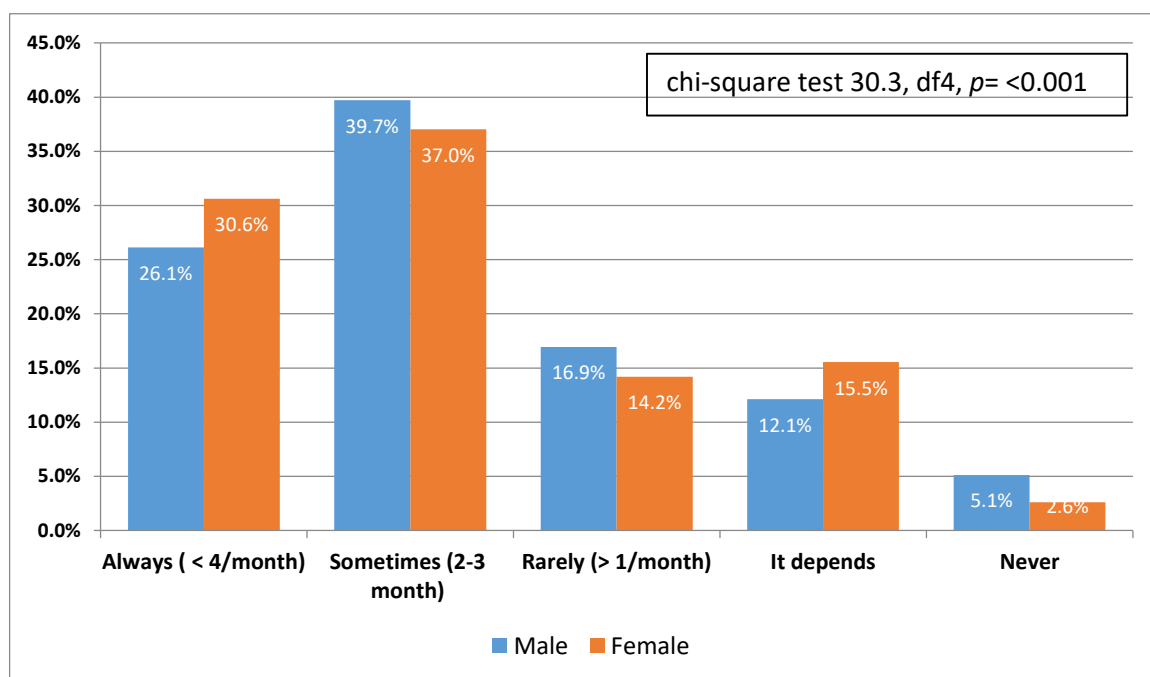


Figure 22. Gender differences in responses to the question: How frequently do you feel that you are “burned out” and “cannot cope anymore” due to work stress?

In Figure 23, we also summarize a very delicate factor of trainees’ satisfaction related to sexual harassment. The percentage is low related to international benchmarks but it seems that females experience verbal sexual harassment twice as frequently as males. This is also another significant key direction for future research.

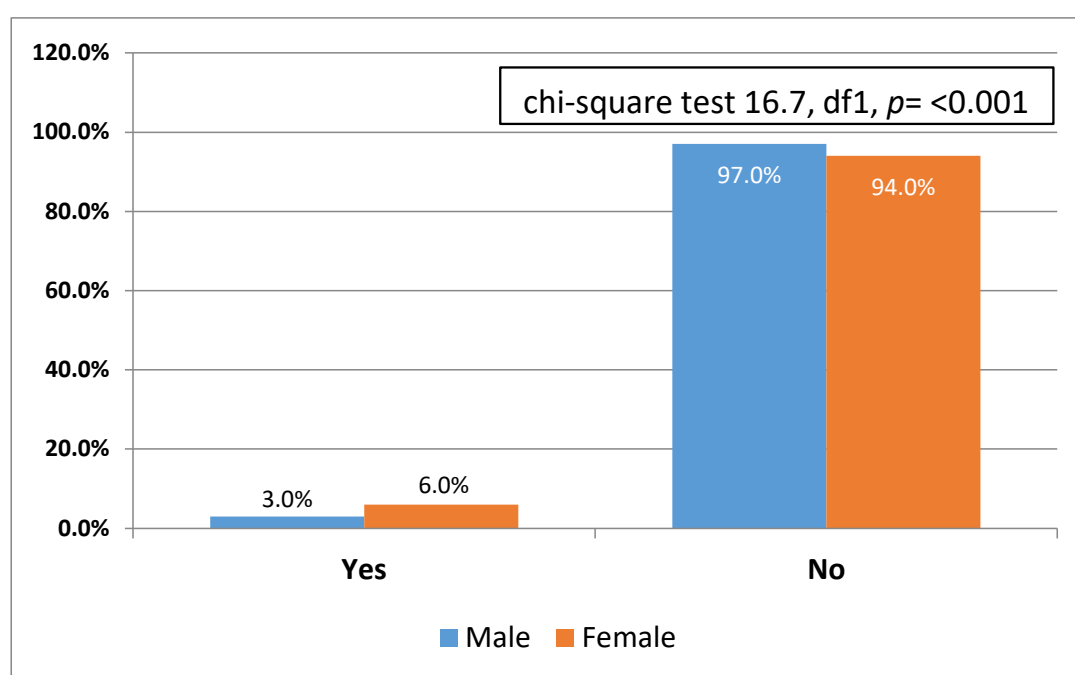


Figure 23. Gender differences in experience of verbal sexual harassment.

In the next section, we provide our key interpretations of the findings and we also contribute theoretically with a progressive model for Trainees' Satisfaction. We must provide the following significant statements for the end of this Analysis of findings section:

- Some of the collected data and their relevant analysis are only for internal use in the SCFHS. In this research paper, we focus on data and findings that can be shared publicly to promote knowledge in the domain of Sustainable Health
- Our intention in this research is to build a systematic, trusted set of benchmarks for the study of residents' satisfaction in their medical Training Programs. In future research, we intend to further study the cause and effect relationships for the key findings of this research. This seems to be a limitation factor for the current study but our current contribution remains unique, bold, and significant. Our study is one of the first to analyze resident population issues related to satisfaction at such a large scale.

5. Discussion, and Interpretation of the Key Findings of Our Research

In this section, we try to synthesize the key findings of our research. We also try to provide some key implications of our research.

5.1. Key Findings and Interpretations

In this section, we will provide an overview of the key findings of our research together with some key interpretations and propositions. This section is organized as follows. First, we present the main findings of our research. Then we discuss them, and we interpret them towards reflective actions and propositions for the SCFHS.

Analysis of Overall Job satisfaction: This is a major finding of our research. We propose to set the average benchmark of Trainees Satisfaction to 58% as a working managerial benchmark for enhancement initiatives. We also recommend that this benchmark must be monitored with a targeted increase by 5% to 10% per year for the next three years. Actions and guidelines towards this quality enhancement are proposed in the next section. The key aspects of overall job satisfaction are presented below:

- The absolute overall job satisfaction for Residents related to Medicine is 58.6%, a number which definitely allows for significant improvement and sets an initial benchmark
- The overall satisfaction for Pharmacy is similar to the one related to Medicine and equals 58.8%
- The highest rate is for the Applied Health Science trainees at almost 70%, while
- The lowest rate is related to Dentistry at 56.6%.

Analysis of Core Components (Q1–Q7) of Job satisfaction: This is a major finding of our research. We propose to set any of the core components Q1 to Q7 as working managerial benchmarks. In the table below, we emphasize that there is a strategic need for an integrated initiative to increase the rate of job satisfaction of trainees related to their academic program and the relationship with the SCFHS with a target of 15% increase per year in the next three years. A set of actions are provided in the next section. We will also proceed to conduct further research on this major finding of our current research. Currently we are designing and implementing a new survey based on structural equation modeling aiming to investigate the key hermeneutic factors for all these core parameters of Job Satisfaction. We provide some of the key aspects for the core components of job satisfaction below:

- Fellows in residency programs have an almost 8% higher satisfaction compared to junior and senior residents.
- Female participants highly rate their satisfaction gained from their interactions and co-existence with other residents and colleagues in their center (76.6%).
- They also appreciate the administrative components in their center at a fair rate (64.5%) and they are satisfied with their specialty at a good rate (62.1%).
- Their perceptions towards their Training Center and their training program at the center are also rather fair (53.3% and 56.8%, respectively).
- It seems that there are many margins for improvement of their perceptions towards their academic activities in the center, as well as their interaction and integration with the SCFHS (41% and 47.8%, respectively).
- Male participants in our survey have similar attitudes to the seven components with some minor differences. Compared to women, they rate their overall satisfaction (+1.5%), their satisfaction related to administration in their Training Center (+1.7%), and their satisfaction towards academic activities in the center (+1.2%) slightly more highly.
- Males are happier with their specialty (+4.3%) and also they value their relationship with the SCFHS more highly (+2.4%).
- Similarly to females, males seem to need further developments and enhancement in their academic activities in the center.
- The rather low degree of satisfaction of residents related to the academic activities in the training institution must initiate a debate on a strategic plan for quality enhancement.

Some additional comments that also highlight key aspects of the interaction and integration of the trainees with the training center are summarized below:

- The trainees' satisfaction level was highest towards their program director (69.7%), followed by their satisfaction with the chief resident (69%);
- They were least satisfied with their department head (56.8%).
- More than half (51.4%) of the trainees were very likely to recommend the program in which they worked to others.
- Throughout the training, 96.1% of the trainees experienced burnout and only 3.9% reported that they did not feel it.
- Over half of the respondents were proud of their current Training Center, while one-tenth (11.7%) stated that they would choose another specialty if given a chance.
- The most common abusive behavior reported in our study sample was verbal abuse (35.8%).

- In total, 33.1% of the respondents participated in research, with 40.9% were mainly involved in collecting data and 36.3% were involved in proposal preparation.

These are another major findings of our research. We propose that the burnout rate must also be a benchmark for the SCFHS quality assurance initiative and the residency programs. The current high rate is unacceptable, and we propose systematic actions for the decrease of the absolute value by 15% per year for the next three years. We introduce also introduce one more benchmark related to research involvement, which is currently at 35%, with a recommendation for it to be enhanced by 15% per year in the next five years (see Table 11, below).

Table 11. Key Benchmarks for the Job Satisfaction of residents.

Key Benchmarks Introduced in Our Study	Current Rate	Goal Set for the Next 3 Years
Overall Job satisfaction of trainees	58%	+5–10% per year
Q1: Academic Activities in the Center	41.5%	+15% per year
Q2: Residents and Colleagues in the Center	76%	+5–10% per year
Q3: Administrative Components in the Center	65%	+5–10% per year
Q4: Training Program in the Center	58%	+5–10% per year
Q5: Specialty	64%	+5–10% per year
Q6: Training Center	52%	+15% per year
Q7: SCFHS	49%	+15% per year
Burnout Rate	90%	–15% per year
Verbal Abuse	35%	–10% per year
Research Involvement	33%	+15% per year

Note: Colored numbers refer to significant findings (for improvement or interpretation).

Our key findings can be compared with similar studies. We need though to communicate in a bold way that our research is likely the first covering such a (see Table 12, below) large population for the KSA and one of the very few with such a representative sample in residency programs. Our key findings can be associated with similar studies, even in different populations. For example, the job satisfaction rate observed in our sample can be compared with the research work of Alsubaiea and Isouard [7], in which they concluded that the job satisfaction rate that they found was fair. Also, our key findings can be associated with works like Chen et al. [8] showing that job satisfaction is associated with numerous factors including working conditions, financial rewards, and the doctor's relationships with patients. The key contribution of our work is that the job satisfaction revealed two problematic contexts: the academic program and the Training Center, as well as the need for collaboration with the supervising organization for the residency programs. This is a finding that needs further investigation, and we intend to proceed to a new research study soon.

Our research study also dealt with variables found in the research studies of Bawakid et al. [9] indirectly, since our key findings also support the need to focus on the continuous support and improvement of the working environment. We also noted that burnout is a key obstacle preventing high job satisfaction and efficiency. We also believe that participation in research and research involvement can also be compared with the key findings in the work of Soto-Rubio et al. [12], which emphasized that high emotional intelligence has a positive favorable effect on job satisfaction.

Our finding also that residents are really interested in the Academic program and the Training Center can be also compared with key findings in the research of Aoyagi et al. [13]. Our work also highlighted significant components for dissatisfaction of residents that overlaps somewhat with a study conducted by Liu et al. [14]. Our research also confirmed the key findings of [15], in which a list of factors for job satisfaction includes satisfaction towards a supervisor and satisfaction towards the administration.

Some additional elaboration on our key findings can be provided: The prevalence of burnout in medical residencies, according to the international literature, ranges from 27% to 75%, depending on the specialty [23]. However, our results revealed that 96.1% of the trainees had experienced burnout and only 3.9% reported that they did not feel it throughout the course of training. Contrary to our results, a study among 59 Dutch psychiatry residents four teaching hospitals found that only 7% of their respondents met the criteria for burnout, which is very low [24]. Additionally, in Brazil, the prevalence of burnout was 27.9% among medical residents, which is also low [25].

In 2012, a survey was conducted to determine the extent of burnout in the United States, and 68.2% of medical students were found to have high and intermediate levels of burnout [26]. In a study in Canada, 79.2% of dermatologists were found to have a moderate-to-high burnout rate [27]. Another study conducted at the Massachusetts General Hospital, United States, revealed that burnout was prevalent in 28% of medicine and psychiatry residents [28]. Additionally, a survey conducted in the United States found that 69% of residents working in 20 different programs in 2014 experienced burnout [29].

According to a narrative review conducted by Dyrbye et al., which included articles published between 1990 and 2015, 45–56% of residents experienced burnout [30]. Moreover, Jaggi et al. performed a meta-analysis of 35 studies in 2014, which revealed that there is a mean prevalence of 33.1% of students and residents who reported experiencing sexual harassment [31]. Eight out of ten other studies reported that between 45% and 93% of residents had experienced some form of inappropriate behavior during their residency training on at least one occasion [32]. The most common abusive behavior reported in our study sample was verbal abuse, followed by physical, sexual (verbal), and sexual (physical) abuse (4.5%, 4.4%, and 1.8%, respectively). Fnaiss et al. performed a meta-analysis of 51 studies across multiple disciplines and countries in 2014 and revealed that 59.4% of trainees have experienced bullying, with verbal harassment being the most common form of abuse (63%) [32].

In Figure 24 below, we synthesize the various findings of our research and we present an initial framework for the Trainees satisfaction as a basis for advanced decision making.

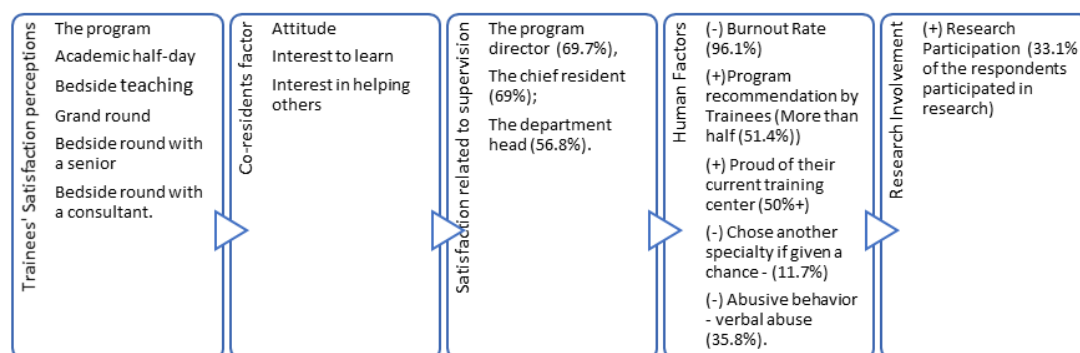


Figure 24. An integrative model for understanding Trainee satisfaction with Residency Training Programs.

We provide a 5-pillar model abstraction for the interconnected variables of Trainee satisfaction in residence programs. This can be used as the basis for more sophisticated enhancement of the quality of training and decision making. It can be also used as the basis for specifying key performance indicators focused on trainee satisfaction.

Table 12. Respondents per Survey.

Reference	Authorship	Details of the Survey
[7]	Alsubaie et al.	Involved 2362 nurses in Saudi Arabia Includes 4 studies.
[8]	Chen et al.	Study was conducted of 39 doctors from five township hospitals in Guangxi Zhuang, China
[9]	Bawakid et al.	Study of 237 FPs working in primary healthcare centers under the Saudi Ministry of Health that was conducted in two regions (Jeddah and Eastern region).
[10]	Zhang SX et al.	A sample of 304 healthcare staff (doctors, nurses, radiologists, technicians, etc.) in China.
[11]	Leskovic et al.	Conducted in spring 2013 (n = 556) and spring 2020 at the peak of the pandemic in Eastern Europe (n = 781) in Slovenia.
[12]	Soto–Rubio et al.	Involved 125 nurses in Spain.
[13]	Aoyagi et al.	Narrative synthesis which showed study estimates that ranged from 23.1% to 95.8% rates of high willingness to work, depending on context. Meta-analyses of specific factors showed that for male HCWs, physicians, and nurses, full-time employment, perceived personal safety, awareness of pandemic risk and clinical knowledge of influenza pandemics, role-specific knowledge, pandemic response training, and confidence in personal skills were statistically significantly associated with increased willingness to work
[14]	Liu et al.	Questionnaires were administered to 897 doctors from Eleven tertiary public hospitals in Shanghai, China.
[15]	Platis et al.	A questionnaire was distributed to 246 nurses in Greece.
[16]	Chao et al.	Involved 344 licensed professionals in 1 rural regional hospital in Taiwan.
[17]	Maissiat et al.	This study was conducted with 242 employees of a municipality of Rio Grande do Sul, Brazil.
[18]	Pandey et al.	This study involved 177 accredited social health activists in India.
[19]	Labrague et al.	This study involved 261 frontline nurses in the Philippines.

Each of these pillars is related positively or negatively with significant components of satisfaction.

- • • *Trainees' Satisfaction perceptions:* In the first pillar, the Training Program itself together with modes of academic development and supervision are valued as positive factors for residents' perceptions. The following areas have been highlighted as critical for the trainees' perceptions towards the program and supervision.
 - *The program*
 - *Academic half-day*
 - *Bedside teaching*
 - *Grand round*
 - *Bedside round with a senior*
 - *Bedside round with a consultant.*
- • • *Co-residents factor:* another critical component for trainees' satisfaction is related to co-resident features, with very positive contribution to satisfaction from the following dimensions:
 - *Attitude*
 - *Interest in learning*
 - *Interest in helping others*

- • • *Satisfaction related to supervision*: the third significant component of trainees' satisfaction is related to the professional relationship and appreciation of supervision.
 - *The program director (69.7%),*
 - *The chief resident (69%);*
 - *The department head (56.8%).*
- • • *Human Factors*: The human factors integrate different aspects of human personality and behavior. The key component of dissatisfaction is the burnout rate and also verbal abuse and willingness to choose another specialty if given a chance. Positive enablers are the feelings of being proud to be part of a Training Center and the likelihood to recommend their center based on their experience and satisfaction.
 - *(-) Burnout Rate (96.1%)*
 - *(+) Program recommendation by Trainees (More than half (51.4%))*
 - *(+) Proud of their current Training Center (50%+)*
 - *(-) Would choose another specialty if given a chance—(11.7%)*
 - *(-) Abusive behavior—verbal abuse (35.8%).*
- • • *Research Involvement*: The last but not least important component of satisfaction is related to the quality and the significance of undertaken research during resident training.
 - *(+) Research Participation (33.1% of the respondents participated in research)*

5.2. Strategic Propositions and Managerial Implications

As depicted in the previous section, continuous improvement on residency programs and related job satisfaction can be orchestrated through reflective actions and initiation of a strategic plan. The benchmarks that presented can be used as a managerial tool for enhanced job satisfaction. Furthermore, here are some additional strategic propositions:

- The multidimensional enhancement of the academic activities in Training Centers is required. For this purpose, we intend to initiate a new survey for the required actions and the suggestions of administrators and trainees. A task force can deal in a professional way with the enhancement of the academic and research activities of residents in the academic programs.
- The cultivation of a trusted relationship between the residents and the SCFHS also needs to be promoted. It is necessary to update communication channels and to increase the awareness of residents for the added value and its contribution to their careers. The SCFHS must provide continuous communication channels and reinforcement services to residents.
- The enhancement of the Training Centers and a continuous improvement process and strategy over time are needed. It is a recommendation to use the benchmarks of this study as managerial tool for enhancing satisfaction rates over time for the next 5 years by 5–10% per year. This is a bold requirement that needs further investigation, planning, and implementation.
- It seems from all the different disciplines that there is a need for focused strategic actions targeted towards:
 - The multidimensional enhancement of the academic activities in a Training Center. For this purpose, we intend to initiate a new survey focusing on the required actions and the suggestions of administrators and trainees.
 - The cultivation of a trusted relationship between the residents and the SCFHS. It is necessary to update communication channels and to increase the awareness of residents to increase the added value and its contribution to their careers.
 - The enhancement of the Training Centers and a continuous improvement process and strategy over time. It is a recommendation to use the benchmarks of this study as managerial

tool for enhancing satisfaction rates over time for the next 5 years by 5–10% per year. This is a bold requirement that needs further investigation, planning, and implementation.

- The development of an institution wide initiative for the enhancement of the Training Centers in all of their aspects. In the next section of our survey, we provide numerous additional qualitative features of the perceptions of the residents towards their Training Center. We do believe that one of the main findings of our research is related to the average perceptions of respondents towards their Training Center and their academic activities. These two aspects jointly summarize most of the core components for the residents' experiences and behavior.
- From this short overview of satisfaction with the Training Program, it is highly recommended to use the current benchmarks of the Useful as it is, and the Useful but needs improvement rate responses as an initial point for improving the satisfaction rate over the next two years by 20%.
- It is necessary to enhance the research and academic life and practices of residents.
- The too high rate of burnout seems to be one of the negative catalysts for this snapshot of the trainees' satisfaction in residents' Training Programs. Almost two third of residents feel a significant rate of burnout in their lives, with a key impact on their professional conduct and their lives. We intend in the near future to run a survey based on structural equation modeling in order to understand the cause and effect relations of burnout and also to measure the impact of the high level of burnout on different aspects of residents' personal and professional lives. We also present some key recommendations in the Discussion section.
- It seems that one third of respondents do not build a strong bond with their selected Training Center. This finding requires further investigation. We must reveal the interpretive factors for this attitude amongst residents. The absolute rate at almost one third is rather high and means that several residents are not satisfied with their current Training Center.
- It is also important in our future research to understand the reasons for making about 10% of residents unhappy in their current Training Centers. It is a key priority of our future research to identify unhappy residents and to provide flexible mechanisms for their support and psychological enhancement (see Figure 19 above).

In the next section, we conclude our research with key statements and also provide the key directions for future research.

6. Conclusions, Limitations, and Future Research

Our research study is a systematic effort to understand residents' attitudes related to job satisfaction. In such a complicated research environment, we tried at a first stage to obtain a comprehensive picture of the phenomenon.

Our research study is one of the first in KSA as well as worldwide, with a special emphasis on a thorough understanding of issues affecting the job satisfaction of residents at a major scale. In comparison to other studies, we have obtained a significant achievement by obtaining almost 4000 questionnaire results from a major portion of the whole population of residents in the KSA. A key limitation of our research is that all findings and key interpretations refer to the current snapshot of the professional and academic conduct of trainees. Thus, the generalization of findings must be made while taking into consideration that we only studied residents from the Kingdom of the Saudi Arabia.

One more limitation of this survey is that we intended to develop a thorough trusted initial benchmark for various components of trainees' satisfaction. We do believe that the outcome of our intellectual effort and research methodology enabled summarizing a clear overview of trainees' satisfaction benchmarks at present. We have to admit though that especially in this study, we did not provide the same effort towards analyzing the cause and effect relations of the trainee satisfaction phenomenon. We plan to shortly run a new survey based on structural equation modeling to further inform our key findings. The ultimate objective is also to update our recently published set of Key

Performance Indicators (KPIs) for the Quality of Residents Training with an additional set of KPIs related to residents' satisfaction.

One additional limitation of our study is the disclosure of significant information. Some of the aspects and findings of our survey must be used only for internal use of the Saudi Commission of the Health Specialties, since they refer to indirect evaluation and assessment of various training centers supervised by the SCFHS. Finally, we have also to communicate that this research study refers to a certain period, and thus all the findings and conclusions must be interpreted within the given time. Any effort to extend the validity of the findings for the future must be made with special care and conditions. We do believe though that all the key findings have direct implications on the launching of revised policies for the enhancement of the Training Programs and trainee satisfaction.

We also contributed significantly by summarizing key hermeneutic factors for the job satisfaction of trainees and we also introduced some key benchmarks for the measurement of its rate. Our work contributes to the literature of job satisfaction in medical training by introducing new measurable benchmarks.

It also serves as a key methodological approach for the introduction of reflective actions in different areas of residency including the academic activities, the Training Program, the Training Center, the collegiality, the psychological load of residents, and their interactions with the administration and the residency supervising bodies.

It is also a bold contribution to Sustainable Health literature, since it promotes a vision for enhanced skills and competencies of health specialists with a balance of life and work. It is also linked to the discussion and the debate on Sustainable Development Goals as introduced by the United Nations. The Sustainable Development Goal #3—Establish Good Health and Well-Being—must also extend to health specialists. The promotion of good mental health and wellbeing of health experts must be a priority of modern societies. Within this context, our work is also directly related to the Sustainable Development Goal #4—Provide Quality Education. Our main interest in this study is to understand the conditions and requirements that make residents happy and efficient in their training and professional conduct. Last but not least, our work also contributed to the Sustainable Health Vision through the SDG #8 Create Decent Work and Economic Growth. It is a key responsibility of the SCFHS to promote the professional capacity of residents so that the Future Saudi Society will enjoy having high-skilled health experts with a strong sense of social responsibility and high efficiency.

In the near future, we intend to further extend our theoretical model in the following directions: (i) Delivery of a research study based on Structural Equation Modeling to understand the contribution of each of the factors to the Quality of Residents' Training and the effectiveness of knowledge creation [50]; (ii) the design and implementation of an innovative Artificial Intelligence enabled ecosystem for personalized training based on key assumptions of our model [51]; (iii) focused research on the key determinants and hermeneutic variables of Human Factors affecting residents' education; [iv] the integration of smart cities research and smart healthcare strategies [52,53] under the vision of the Kingdom 2030 Digital Transformation of Healthcare.

Author Contributions: The authors contributed equally to this research work and they were all involved in an integrated way in the various stages of this research including conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, writing—original draft preparation, writing—review and editing, visualization, supervision, project administration, and funding acquisition. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Acknowledgments: The authors would love to thank all of their colleagues in the Saudi Commission for Health Specialties and all of the participants in the survey.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Khoja, T.; Rawaf, S.; Qidwai, W.; Rawaf, D.; Nanji, K.; Hamad, A. Health care in Gulf Cooperation Council Countries: A review of challenges and opportunities. *Cureus* **2017**, *9*, e1586. [[CrossRef](#)] [[PubMed](#)]

2. Howe, A.; Smajdor, A.; Stöckl, A. Towards an understanding of resilience and its relevance to medical training. *Med. Educ.* **2012**, *46*, 349–356. [[CrossRef](#)] [[PubMed](#)]
3. Gregory, S.; Demartini, C. Satisfaction of doctors with their training: Evidence from UK. *BMC Health Serv. Res.* **2017**, *17*, 851. [[CrossRef](#)] [[PubMed](#)]
4. Dyrbye, L.; Shanafelt, T. A narrative review on burnout experienced by medical students and residents. *Med. Educ.* **2016**, *50*, 132–149. [[CrossRef](#)] [[PubMed](#)]
5. De Cavalcante Almeida, G.; de Souza, H.R.; de Almeida, P.C.; de Calvancante Almeida, B.; Almeida, G.H. The prevalence of burnout syndrome in medical students. *Arch. Clin. Psychiatry* **2016**, *43*, 6–10.
6. Rodrigues, H.; Cobucci, R.; Oliveira, A.; Cabral, J.V.; Medeiros, L.; Gurgel, K.; Gonçalves, A.K. Burnout syndrome among medical residents: A systematic review and meta-analysis. *PLoS ONE* **2018**, *13*, e0206840. [[CrossRef](#)]
7. Alsubaie, A.; Isouard, G. Job Satisfaction and Retention of Nursing Staff in Saudi Hospitals. *Asia Pac. J. Health Manag.* **2019**, *14*, 68–73. [[CrossRef](#)]
8. Chen, Q.; Yang, L.; Feng, Q.; Tighe, S.S. Job Satisfaction Analysis in Rural China: A Qualitative Study of Doctors in a Township Hospital. *Scientifica* **2017**, 1964087. [[CrossRef](#)]
9. Bawakid, K.; Rashid, O.A.; Mandoura, N.; Shah, H.B.U.; Mugharbel, K. Professional Satisfaction of Family Physicians Working in Primary Healthcare Centers: A Comparison of Two Saudi Regions. *J. Fam. Med. Prim. Care* **2018**, *7*, 1019–1025.
10. Zhang, S.X.; Liu, J.; Afshar Jahanshahi, A.; Nawaser, K.; Yousefi, A.; Li, J.; Sun, S. At the Height of the Storm: Healthcare Staff's Health Conditions and Job Satisfaction and Their Associated Predictors during the Epidemic Peak of Covid-19. *Brain Behav. Immun.* **2020**, *87*, 144–146. [[CrossRef](#)]
11. Leskovic, L.; Erjavec, K.; Leskovic, R.; Vukovic, G. Burnout and Job Satisfaction of Healthcare Workers in Slovenian Nursing Homes in Rural Areas during the Covid-19 Pandemic. *Ann. Agric. Environ. Med.* **2020**. [[CrossRef](#)]
12. Soto-Rubio, A.; Giménez-Espert, M.D.C.; Prado-Gascó, V. Effect of Emotional Intelligence and Psychosocial Risks on Burnout, Job Satisfaction, and Nurses' Health during the COVID-19 Pandemic. *Int. J. Environ. Res. Public Health* **2020**, *17*, 7998. [[CrossRef](#)] [[PubMed](#)]
13. Aoyagi, Y.; Beck, C.R.; Dingwall, R.; Nguyen-Van-Tam, J.S. Healthcare workers' willingness to work during an influenza pandemic: A systematic review and meta-analysis. *Influenza Respir. Viruses* **2015**, *9*, 120–130. [[CrossRef](#)] [[PubMed](#)]
14. Liu, J.; Yu, W.; Ding, T.; Li, M.; Zhang, L. Cross-sectional survey on job satisfaction and its associated factors among doctors in tertiary public hospitals in Shanghai, China. *BMJ Open* **2019**, *9*, e023823. [[CrossRef](#)] [[PubMed](#)]
15. Platis, C.; Reklitis, P.; Zimeras, S. Relation between job satisfaction and job performance in healthcare services. *Procedia Soc. Behav. Sci.* **2015**, *175*, 480–487. [[CrossRef](#)]
16. Chao, M.-C.; Jou, R.-C.; Liao, C.-C.; Kuo, C.-W. Workplace stress, job satisfaction, job performance, and turnover intention of health care workers in rural Taiwan. *Asia Pacific J. Public Health* **2015**, *27*, NP1827–NP1836. [[CrossRef](#)]
17. da Silvera Maissiat, G.; Lautert, L.; Dal Pai, D.; Patri tavares, J. Work context, job satisfaction and suffering in primary health care. *Rev. Gaúcha Enferm.* **2015**, *36*, 42–49. [[CrossRef](#)]
18. Pandey, J.; Singh, M. Donning the mask: Effects of emotional labour strategies on burnout and job satisfaction in community healthcare. *Health Policy Plan.* **2016**, *31*, 551–562. [[CrossRef](#)]
19. Labrague, L.J.; De los Santos, J.A.A. Fear of Covid-19, psychological distress, work satisfaction and turnover intention among frontline nurses. *J. Nurs. Manag.* **2020**. [[CrossRef](#)]
20. Low, Z.X.; Yeo, K.A.; Sharma, V.K.; Leung, G.K.; McIntyre, R.S.; Guerrero, A.; Lu, B.; Lam, C.C.S.F.; Tran, B.X.; Nguyen, L.H.; et al. Prevalence of burnout in medical and surgical residents: A meta-analysis. *Int. J. Environ. Res. Public Health* **2019**, *16*, 1479. [[CrossRef](#)]
21. Levin, K.H.; Shanafelt, T.D.; Keran, C.M.; Busis, N.A.; Foster, L.A.; Molano, J.R.V.; O'Donovan, C.A.; Ratliff, J.B.; Schwarz, H.B.; Sloan, J.A.; et al. Burnout, career satisfaction, and well-being among US neurology residents and fellows in 2016. *Neurology* **2017**, *89*, 492–501. [[CrossRef](#)] [[PubMed](#)]
22. Baer, T.E.; Feraco, A.M.; Sagalowsky, S.T.; Williams, D.; Litman, H.J.; Vinci, R.J. Pediatric resident burnout and attitudes toward patients. *Pediatrics* **2017**, *139*, e20162163. [[CrossRef](#)] [[PubMed](#)]
23. Moir, F.; Yelder, J.; Sanson, J.; Chen, Y. Depression in medical students: Current insights. *Adv. Med. Educ. Pract.* **2018**, *9*, 323. [[CrossRef](#)] [[PubMed](#)]

24. Raj, K.S. Well-being in residency: A systematic review. *J. Grad. Med. Educ.* **2016**, *8*, 674–684. [\[CrossRef\]](#)
25. Dyrbye, L.N.; Burke, S.E.; Hardeman, R.R.; Herrin, J.; Wittlin, N.M.; Yeazel, M.; Satele, D.V. Association of clinical specialty with symptoms of burnout and career choice regret among US resident physicians. *JAMA* **2018**, *320*, 1114–1130. [\[CrossRef\]](#)
26. Ripp, J.A.; Privitera, M.R.; West, C.P.; Leiter, R.; Logio, L.; Shapiro, J.; Bazari, H. Well-being in graduate medical education: A call for action. *Acad. Med.* **2017**, *92*, 914–917. [\[CrossRef\]](#)
27. Tawfik, D.S.; Profit, J.; Morgenthaler, T.I.; Satele, D.V.; Sinsky, C.A.; Dyrbye, L.N.; Shanafelt, T.D. Physician burnout, well-being, and work unit safety grades in relationship to reported medical errors. *Mayo Clin. Proc.* **2018**, *93*, 1571–1580. [\[CrossRef\]](#)
28. Spataro, B.M.; Tilstra, S.A.; Rubio, D.M.; McNeil, M.A. The toxicity of self-blame: Sex differences in burnout and coping in internal medicine trainees. *J. Women Health* **2016**, *25*, 1147–1152. [\[CrossRef\]](#)
29. Busireddy, K.R.; Miller, J.A.; Ellison, K.; Ren, V.; Qayyum, R.; Panda, M. Efficacy of interventions to reduce resident physician burnout: A systematic review. *J. Grad. Med. Educ.* **2017**, *9*, 294–301. [\[CrossRef\]](#)
30. Rotenstein, L.S.; Ramos, M.A.; Torre, M.; Segal, J.B.; Peluso, M.J.; Guille, C.; Mata, D.A. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: A systematic review and meta-analysis. *JAMA* **2016**, *316*, 2214–2236. [\[CrossRef\]](#)
31. Baker, K.; Sen, S. Healing medicine's future: Prioritizing physician trainee mental health. *AMA J. Ethics* **2016**, *18*, 604. [\[PubMed\]](#)
32. Jalal, S.R.; Osman, A.; Azizi, S. Additional factors influencing resident satisfaction and dissatisfaction. *Adv. Med. Educ. Pract.* **2017**, *8*, 769. [\[CrossRef\]](#) [\[PubMed\]](#)
33. Vargas-Vera, M.; Lytras, M.D. Exploiting semantic web and ontologies for personalised learning services: Towards semantic web-enabled learning portals for real learning experiences. *Int. J. Knowl. Learn.* **2008**, *4*, 1–17. [\[CrossRef\]](#)
34. Lytras, M.; Tsilira, A.; Themistocleous, M. Towards the semantic e-learning: An ontological oriented discussion of the new research agenda in e-learning. In Proceedings of the American Conference on Information Systems, Tampa, FL, USA, 4–6 August 2003; p. 388.
35. Krebs, R.; Ewalds, A.L.; van der Heijden, P.T.; Penterman, E.J.M.; Grootens, K.P. Burn-out, commitment, personality and experiences during work and training; Survey among psychiatry residents. *Tijdschr. Psychiatr.* **2017**, *59*, 87–93. [\[PubMed\]](#)
36. Gouveia, P.A.D.C.; Ribeiro, M.H.C.; Aschoff, C.A.M.; Gomes, D.P.; Silva, N.A.F.D.; Cavalcanti, H.A.F. Factors associated with burnout syndrome in medical residents of a university hospital. *Rev. Assoc. Med. Bras.* **2017**, *63*, 504–511. [\[CrossRef\]](#) [\[PubMed\]](#)
37. Dyrbye, L.N.; West, C.P.; Satele, D.; Boone, S.; Tan, L.; Sloan, J.; Shanafelt, T.D. Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. *Acad. Med.* **2014**, *89*, 443–451. [\[CrossRef\]](#)
38. Shoimer, I.; Patten, S.; Mydlarski, P.R. Burnout in dermatology residents: A Canadian perspective. *Br. J. Dermatol.* **2018**, *178*, 270–271. [\[CrossRef\]](#)
39. Porter, M.; Hagan, H.; Klassen, R.; Yang, Y.; Seehusen, D.A.; Carek, P.J. Burnout and resiliency among family medicine program directors. *Fam. Med.* **2018**, *50*, 106–112. [\[CrossRef\]](#)
40. Chaikos, D.; Chad-Friedman, E.; Mehta, D.H.; Byerly, L.; Celik, A.; McCoy, T.H., Jr.; Denninger, J.W. Risk and resilience factors associated with resident burnout. *Acad. Psychiatry* **2017**, *41*, 189–194. [\[CrossRef\]](#)
41. Holmes, E.G.; Connolly, A.; Putnam, K.T.; Penaskovic, K.M.; Denniston, C.R.; Clark, L.H.; Rubinov, D.D.; Meltzer-Brody, S. Taking care of our own: A multispecialty study of resident and program director perspectives on contributors to burnout and potential interventions. *Acad. Psychiatry* **2017**, *41*, 159–166. [\[CrossRef\]](#)
42. Dyrbye, L.N.; Thomas, M.R.; Huschka, M.M.; Lawson, K.L.; Novotny, P.J.; Sloan, J.A.; Shanafelt, T.D. A multicenter study of burnout, depression, and quality of life in minority and nonminority US medical students. *Mayo Clin. Proc.* **2006**, *81*, 1435–1442. [\[CrossRef\]](#) [\[PubMed\]](#)
43. Jagsi, R.; Griffith, K.A.; Jones, R.; Perumalswami, C.R.; Ubel, P.; Stewart, A. Sexual harassment and discrimination experiences of academic medical faculty. *JAMA* **2016**, *315*, 2120–2121. [\[CrossRef\]](#) [\[PubMed\]](#)
44. Karim, S.; Duchcherer, M. Intimidation and harassment in residency: A review of the literature and results of the 2012 Canadian Association of Internsand Residents National Survey. *Can. Med. Educ. J.* **2014**, *5*, e50–e57. [\[CrossRef\]](#) [\[PubMed\]](#)

45. Fnais, N.; Soobiah, C.; Chen, M.H.; Lillie, E.; Perrier, L.; Tashkhandi, M. Harassment and discrimination in medical training: A systematic review and meta-analysis. *Acad. Med.* **2014**, *89*, 817–827. [[CrossRef](#)] [[PubMed](#)]
46. Ten Cate, O.; Scheele, F. Competency-based postgraduate training: Can we bridge the gap between theory and clinical practice? *Acad. Med.* **2007**, *82*, 542–547. [[CrossRef](#)]
47. Kjaer, N.K.; Kodal, T.; Shaughnessy, A.F.; Qvesel, D. Introducing competency-based postgraduate medical training: Gains and losses. *Int. J. Med. Educ.* **2011**, *2*, 110–115. [[CrossRef](#)]
48. Scheele, F.; Teunissen, P.; Van Luijk, S.; Heineman, E.; Fluit, L.; Mulder, H.; Meininger, A.; Wijnen-Meijer, M.; Glas, G.; Sluiter, H.; et al. Introducing competency-based postgraduate medical education in the Netherlands. *Med. Teach.* **2008**, *30*, 248–253. [[CrossRef](#)]
49. Toussaint, N.D.; McMahon, L.P.; Dowling, G.; Soding, J.; Safe, M.; Knight, R.; Fair, K.; Linehan, L.; Walker, R.G.; Power, D.A. Implementation of renal key performance indicators: Promoting improved clinical practice. *Nephrology* **2015**, *20*, 184–193. [[CrossRef](#)]
50. Naeve, A.; Yli-Luoma, P.; Kravcik, M.; Lytras, M.D. A modelling approach to study learning processes with a focus on knowledge creation. *Int. J. Technol. Enhanc. Learn.* **2018**, *1*, 1–34. [[CrossRef](#)]
51. Spruit, M.; Lytras, M. Applied Data Science in Patient-centric Healthcare. *Telemat. Inform.* **2018**, *35*, 2018. [[CrossRef](#)]
52. Visvizi, A.; Lytras, M.D. Editorial: Policy Making for Smart Cities: Innovation and Social Inclusive Economic Growth for Sustainability. *J. Sci. Technol. Policy Mak.* **2018**, *9*, 1–10.
53. Visvizi, A.; Lytras, M.D. *Transitioning to Smart Cities: Mapping Political, Economic, and Social Risks and Threats*; Elsevier: New York, NY, USA, 2019.

Publisher’s Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).