

Arab American University-of Palestine

Faculty of Graduate Studies

Assessment of Knowledge, Attitude, Practices, and willingness to provide oral health care among oncology departments' staff in the West Bank Area

By

Reem Sudqi Daghlass

Supervisor

Dr. Shahenaz Najjar

Supervisor-Co

Dr. Elham Kateeb

This Thesis was submitted in Partial Fulfillment of the Requirements for the Master's Degree in Health Informatics.

February 2022

© Arab American University- 2011.All rights reserved

Approval Form

i

Assessment of Knowledge, Attitude, Practices, and Willingness to provide oral health care among oncology departments' staff in the West Bank Area

By

Reem Sudqi Daghlass

This thesis was defended successfully on 16/2/2022 and approved by:

Committee Members

1. Supervisor: Dr.Shahenaz Najjar

- 2. Co-Supervisor:Dr.Elham Kateeb
- 3. Internal Examiner: Dr .Mahmoud Mudalal
- 4. External Examiner: Dr.Amira Shaheen

Elham k

Signature

Declaration

This thesis was submitted in partial fulfillment of the requirements for the Master's degree in Health Informatics.

I declare that the content of this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Reem Sudqi Daghlass

Signature

tes

Date: 16/2/2022

Dedication

I want to dedicate this work to my soul mate daughter" Joud", as she supported and stood up with me all the time, to the strong hands and pure souls in my life.

Acknowledgments

I extend my sincere thanks and gratitude to all the persons who supported and encouraged me during my master's studies, despite the obstacles and difficulties that I faced during my research journey; it was completed, thanks to God and the grace of my professors Dr. Shahenaz Najjar and Dr. Elham Kateeb.

Abstract

Introduction

As the prevalence of cancer cases is increasing in Palestine, and the treatment of cancer affects oral health resulting in severe oral complications, good oral care is critical for preventing and minimizing oral complications through cancer therapy. The study aims to assess knowledge, attitude, practices, and willingness of health care providers about oral health care (before, during, and after) cancer therapy.

Materials and Methods

This study was a descriptive cross-sectional study using self-administered closed-end questionnaires among 166 health care providers in the oncology department. Data was collected from seven Palestinian hospitals that provide services to cancer patients in West Bank between 15 April to 30 June 2021, and the response percentage was (90.9%). The questionnaire was designed using many previous studies and published articles. The validity of the questionnaire was checked by presenting it to academic supervisors and specialists in the field of the study. The data analysis was performed by using Statistical Package for Social Science (SPSS) version 20. Frequencies and percentages were calculated for all variables. To test the hypothesis, a One Way ANOVA Test was conducted to check the differences between groups. Post Hoc (Tukey's test) was conducted to find the source of difference

between groups, and Independent Sample T-test was conducted to check the differences between groups for nominal variables.

Results

The number of respondents to the questionnaire was 151 with a response rate of (90.9%). Males represented (51%) of the sample whereas females represented (49%). The age of most respondents (41.7%) was between 40-49 years. In regard to their academic qualifications, (58.9%) of respondents had a Bachelor degree. The sample consisted of (50.3 %), nurses, (15.9%) resident doctors, (11.3%) medical oncologists and radiotherapy technicians, (6.6%) hematologists, (3.3%) oral and maxillofacial surgeons, and (1.3%) radiation oncologists. Most health care providers had a good knowledge level (55.6%) regarding oral health care and oral complications. Also, most of them had fair attitude level (60.3%) and (44.4%) had fair practice level regarding the oral health and cancer therapy course. Also 60.3% of participants had good willingness to get more information about oral health during cancer therapy, provide oral health instructions for cancer patients and follow oral health care protocols during cancer therapy.

According to our study's results significant relation was found between knowledge score and age of participants, and between education level and position of staff in the hospital with P=.001. Also, the knowledge score was significantly associated with the position in the department (P=.028). However, no statistical significant associations were found between attitude score and demographic feature and working experience. Regarding practice score and gender there was a statistically significant association between them P=0.04. In addition,

education level was associated significantly with practice score P= 0.002, moreover the practice was significantly associated with the employment status and position in the department (P=.046, P=.026 respectively). Willingness was also influenced significantly with employment status P=.052. Finally, our study showed a strong positive relationship between knowledge & practices, knowledge & willingness, and practices & willingness.

Conclusion

Oral health care must be integrated with the cancer treatment plan and provided by knowledgeable and professional health care providers, to minimize patients suffering during cancer treatment, therefore educational programs, and training courses addressing oral healthcare for cancer patients are required, to improve knowledge among oncology professionals to provide comprehensive patient care.

Table of Contents

Abstra	act	1
Table	of Contents	4
List of	f Tables	
List of	f Figures	
List of	f Appendices	
Chapt	er 1: Introduction	
1.1	Problem Statement	
1.2	Purpose of the Study	13
1.3	Significance of the Study	
1.4	Research Questions	14
1.5	Hypothesis	15
1.6	Overview of the Study	
Chapt	er 2: Background and Literature Review	17
2.1	Introduction	17
2.2	Types of Cancer Therapy	
2.3	Most Common Oral Complications	
	2.3.1 Infections	
	2.3.2 Mucosal Changes	
	2.3.3 Salivary Changes	
	2.3.4 Musculoskeletal	
	2.3.5 Teeth and Gingival Tissues	
2.4	International Oral Health Protocols Before, During, and After Cancer The	rapy 28
	2.4.1 Recommendations before Cancer Therapy	
	2.4.2 Recommendations during Cancer Therapy	

	2.4.3 Recommendations after Cancer Therapy	37
2.5	Oral Health Care (KAP), and Willingness among Health Care Providers	39
2.6	Guidelines and Protocols Adoption	39
2.7	Adopting Oral Care Guidelines for Cancer Patients	41
2.8	Oral Health Care (KAP) among Specialists and General Practitioners	42
2.9	Oral Health Care (KAP) Among Nurses	43
Chapt	er 3: Methodology	45
3.1	Introduction	45
3.2	Study Design	45
3.3	Site and Settings	47
3.4	Study Subjects:	48
3.5	Site Sample and Sampling Techniques	50
3.6	Questionnaire Administration:	50
3.7	Ethical Consideration	52
3.8	Study Tool	52
3.9	Operational Definitions	54
	3.9.1 Demographic Characteristics (3 questions):	54
	3.9.2 Background Information (6 questions):	55
	3.9.3 Questions about Care Provided (7 questions):	56
	3.9.4 Knowledge	58
	3.9.5 Attitudes	58
	3.9.6 Practices	59
	3.9.7 Willingness to Provide Oral Health Care	59
3.10) Scales Reliability	60

3.1	1 Questionnaire Validity	. 60
3.1	2 Data Collection	. 61
3.1	3 Statistical Processing	. 61
Chap	ter 4: Results	. 63
4.1	Introduction	. 63
4.2	Uni-variable Data Analysis	. 63
	4.2.1 Section A: Demographic Data:	. 63
	4.2.2 Section B: Background Information	. 64
	4.2.3 Section C: Questions about Care Provided	. 66
	4.2.4 Section D: Knowledge Questions	. 68
	4.2.5 Section E: Attitude Questions	.71
	4.2.6 Section F: Practice Questions	. 73
	4.2.7 Section G: willingness	. 75
4.3	Health Care Provider Total (KAP) and Willingness Scores, and Level	.77
4.4	Bi-Variable Analysis	. 78
	4.4.1 Relations between Staff's (KAP) and Willingness Scores and Demographic	
	Characteristics (Age, Gender, and Educational Qualifications)	. 78
	4.4.2 Relations between Staff's (KAP) and Willingness Scores and Background	
	Information (Experience)	. 81
4.5	Correlation between (KAP), and Willingness.	. 88
Chap	ter 5: Discussion, Conclusion and Recommendations	. 89
5.1	Introduction:	. 89
5.2	The Level of (KAP), And Willingness among Health Care Providers in the	
On	cology Department Regarding Oral Health for Cancer Patients	. 91
	5.2.1 Knowledge Level	. 91
	5.2.2 Attitude Level	.92
	5.2.3 Practice Level	.94

 5.2.4 Willingness Level	6
and Oral Health Care (KAP) and Willingness	7
531 Knowledge	7
5 3 2 Attitude	, 8
5 3 3 Practice	8
5 3 4 Willingness	9
5.4 The Relationships between Oral Health Care (KAP) and Willingness among	
Health Care Providers	0
5.5 Study Limitations	1
5.6 Future Research Directions	1
5.7 Conclusion	2
5.8 Recommendations	2
Appendices	4
Abstract In Arabic	l
Bibliography	4

List of Tables

TABLE 3. 1 STUDY POPULATION IN GOVERNMENTAL HOSPITALS	49
TABLE 3. 2 STUDY POPULATION IN PRIVATE HOSPITALS	49
TABLE 3. 4 STUDY SAMPLE IN GOVERNMENTAL HOSPITALS	51
TABLE 3. 5 Study Sample in Private Hospital	51
TABLE 3. 6 RELIABILITY COEFFICIENTS OF QUESTIONNAIRE'S SECTIONS	60

TABLE 4. 1 DEMOGRAPHIC CHARACTERISTICS OF SAMPLES' RESPONDENTS 64	4
TABLE 4. 2 THE DESCRIPTIVE STATISTICS FOR BACKGROUND INFORMATION	5
TABLE 4. 3 THE DESCRIPTIVE STATISTICS FOR THE GENERAL QUESTIONS 6	7
TABLE 4. 4 ORAL HEALTH KNOWLEDGE QUESTION FROM (1-5). 64	9
TABLE 4. 5 ORAL HEALTH KNOWLEDGE QUESTION FROM 6-9 7	1
TABLE 4. 6 ORAL HEALTH ATTITUDE 7	2
TABLE 4. 7 ORAL HEALTH PRACTICE 74	4
TABLE 4. 8 THE WILLINGNESS AMONG HEALTH CARE PROVIDERS REGARDING ORAL HEALTH	Η
Care	6
TABLE 4. 9 KNOWLEDGE, ATTITUDE, PRACTICE AND WILLINGNESS SCORE	7
TABLE 4. 10 KNOWLEDGE ATTITUDE, PRACTICE, AND WILLINGNESS LEVEL	8
TABLE 4. 11 RELATIONS BETWEEN STAFF'S (KAP) AND WILLINGNESS SCORES AND AGE	
USING ONE WAY ANOVA TEST	9
TABLE 4. 12 Relations between Staff's (KAP) and Willingness Scores and Gender	
BY USING INDEPENDENT SAMPLE T TEST	0
TABLE 4. 13 RELATIONS BETWEEN STAFF'S (KAP) AND WILLINGNESS SCORES AND	
EDUCATIONAL QUALIFICATION BY USING ONE WAY ANOVA TEST	1
TABLE 4. 14 RELATIONS BETWEEN STAFF'S (KAP) AND WILLINGNESS SCORES AND THEIR	
WORKING YEARS IN THE PROFESSION	2
TABLE 4. 15 RELATIONS BETWEEN STAFF'S (KAP) AND WILLINGNESS SCORES AND THEIR	
EMPLOYMENT STATUS USING INDEPENDENT SAMPLE T TEST	3
TABLE 4. 16 RELATIONS BETWEEN STAFF'S (KAP) AND WILLINGNESS SCORES AND THEIR	
WORKING HOURS IN THE HOSPITAL, BY USING ONE-WAY ANOVA	4

TABLE 4. 17 RELATIONS BETWEEN STAFF'S (KAP) AND WILLINGNESS SCORES AND WORKI	NG
YEARS IN ONCOLOGY DEPARTMENT BY USING ONE-WAY ANOVA	85
TABLE 4. 18 RELATIONS BETWEEN STAFF'S (KAP) AND WILLINGNESS SCORES AND THEIR	
POSITION IN THE HOSPITALS BY USING ONE-WAY ANOVA	86
TABLE 4. 19 KNOWLEDGE MEAN AMONG HEALTH CARE PROVIDERS BY USING POST HOC	
(TUKEY'S) TEST	86
TABLE 4. 20 RELATIONS BETWEEN STAFF'S (KAP) AND WILLINGNESS SCORES AND THEIR	
POSITION IN THE DEPARTMENT, BY USING ONE-WAY ANOVA	87
TABLE 4. 21 CORRELATION BETWEEN (KAP) AND WILLINGNESS	88

List of Figures

FIGURE 1. THE CONCEPTUAL FRAMEWORK	FIGURE 1. THE CONCEPTUAL FRAMEWORK	.4	7
------------------------------------	------------------------------------	----	---

List of Appendices

APPENDIX 1. ARAB AMERICAN UNIVERSITY THESIS APPROVAL	
APPENDIX 2. THE MINISTRY OF HEALTH APPROVAL	
APPENDIX 3. AL-NAJAH UNIVERSITY HOSPITAL APPROVAL	
APPENDIX 4.ISTISHARI ARAB HOSPITAL APPROVAL	
APPENDIX 5. AUGUSTA VICTORIA HOSPITAL APPROVAL	
APPENDIX 6. THE RESEARCH TOOL (QUESTIONNAIRE)	

Chapter 1: Introduction

Cancer is a group of diseases caused by abnormally dividing cells that grow and invasive the body, cancer treatment requires one or more forms of therapy, it depends roughly on the type of cancer and the stage of diagnosis, surgery may be appropriate in low-risk cases, whereas a combination of treatment is needed in complicated cases (Elena Dickens, 2018).

Oral complications from cancer therapy causing significant pain, compromised nutrition, prolonged hospitalization, and bloodstream infections which lead to treatment delays and impact the delivery of optimal cancer treatment (Männle, 2019). The incidence of oral complications depends on the patient's cancer diagnosis (type), patient age, level of oral health, and cancer therapy type, dose, and frequency of drug administration.

Good oral care is critical for preventing and minimizing oral complications of cancer treatment (Dr. Allan Hovan, 2018), and requires multidisciplinary team coordination, knowledge, and understanding the significance of oral care and the use of available services to meet the oral needs effective (Samim F, 2016) (Herve Y Sroussi1, 2017) (Pai RR, 2019).

Oncology staff is responsible for the first oral assessment by using a standardized referral form to the dental team who must evaluate the oral care before treatment, during, and after cancer therapy (Health T. R., 2018) and provide the appropriate treatment on time, while unnecessary treatment is prevented or delayed (Samim F, 2016) (Isabel Lanzós 1, 2015)

Health care providers must be aware of the diagnosis, prognosis, and approach of cancer patient treatment, they need to understand the changes that occur due to cancer therapy, and this reflects

their knowledge, attitude, and practice (KAP) so existing knowledge, attitudes, and practices of health care providers should be assessed for assurance of the effectiveness of oral care for cancer patients. (Ongole, 2019) In Palestinian hospitals the oral health care must be integrated with the oncologist treatment plan and provided by knowledgeable and professional care providers, to minimize patients suffering from the various type of cancer treatment. Approved protocols and guidelines for oral health care through cancer therapy course must contain three main baselines:

1-Oral health care before cancer therapy

2-Oral health care during cancer therapy

3-Oral health care after cancer therapy (European Oral Care in Cancer Group Oral Care Guidance and Support), (www.cancer.gov, 2020).

1.1 **Problem Statement**

As the prevalence of cancer cases is increasing in Palestine and the treatment of cancer affects oral health resulting in severe oral complications, oral health assessment for cancer patients is critical and must be integrated with the cancer therapy plan as one of the priorities of the whole patient care and provided by knowledgeable and professional care providers, to minimize patients suffering from the various type of cancer treatment (Health T. R., 2018).

Existing knowledge, attitudes, and practices of health care providers should be assessed for assurance of the effectiveness of oral health care for cancer patients through cancer therapy

course; no previous studies have been conducted in Palestine to evaluate oral health care knowledge, attitude, practices, and willingness among health care providers. In this study, we will assess the oral health care knowledge, attitude, and practices among health care providers through cancer therapy, besides their willingness to follow oral health care guidelines and protocols through cancer therapy.

1.2 Purpose of the Study

Assess knowledge, attitude, and practices(KAP) of health care providers about oral health care (before, during, and after) cancer therapy, and their willingness to provide oral healthcare and to follow oral health care guidelines and protocols through cancer therapy.

1.3 Significance of the Study

Cancer therapy causes oral complications and side effects that affect the physical, psychological, and social status of the patient. (European Oral Care in Cancer Group Oral Care Guidance and Support). Health care providers need to understand the changes that occur due to cancer therapy.

There is a big need for national guidelines to avoid morbidity, improve patient quality of life, increase survival rate and reduce financial costs. Many studies were conducted on cancer therapy and its effect on oral health worldwide and described health care providers knowledge, attitude, and practice (KAP) regarding oral health care through cancer therapy course, while our

study is the first in Palestine to investigate the knowledge, attitude, and practices of health care providers about oral health care before, during, and after cancer therapy and evaluate the willingness of different health care providers to provide oral healthcare and follow oral health care guidelines and protocols through cancer therapy.

The study will serve as a baseline to develop national cancer therapy guidelines tailored to the Palestinian context and will provide information that can support future research for the oral health of cancer patients.

1.4 **Research Questions**

- 1. What is the level of knowledge, attitudes, practice, and willingness among health care providers (HCP) in the oncology department regarding oral health for cancer patients?
- 2. What are the relationships between HCP demographic variables (age, gender, and level of education), working experience, and oral health care knowledge, attitudes, practice, and willingness among health care providers in the oncology department?
- 3. What are the relationships between oral health care knowledge, attitudes, practice and willingness among health care providers in the oncology department?

1.5 Hypothesis

- Health care providers in the selected hospitals have insufficient knowledge about oral health care of patients going under cancer therapy.
- 2. Health care providers in the selected hospitals have unfavorable attitudes towards their basic role regarding oral complications through cancer therapy.
- Health care providers in the selected hospitals usually do not provide necessary oral health care for cancer patients.
- 4. Health care providers in the selected hospitals are not willing to follow oral health care guidelines and protocols through cancer therapy.
- 5. Oral health care knowledge, attitudes, practices among health care providers, and their willingness to provide basic oral health care is not influenced by demographic characteristics and working experience.

1.6 **Overview of the Study**

The study was a descriptive cross-sectional study using self-administered closed-end questionnaire which was conducted between 15 April to 30 June 2021, among all health care providers in the oncology departments from seven selected Palestinian hospitals.

- Four Governmental Hospitals:
 - 1. Alwatani Hospital.

- 2. Al- Hussein Governmental Hospital, "Beit Jala".
- 3. Rafidia Hospital.
- 4. Palestinian medical center.
- Three Private Hospitals:
 - 1. Al-Najah National University Hospital
 - 2. Istishari Arab Hospital
 - 3. Augusta Victoria Hospital.

Chapter 2: Background and Literature Review

2.1 Introduction

Different modalities are used for cancer treatment such as radiotherapy (RT), chemotherapy (CT), Bone marrow transplantation (BMT), and surgery, the selection of cancer therapy type depends mainly on the type of cancer and the stage of diagnosis, surgery may be appropriate in low-risk cases, whereas a combination of treatment is needed in complicated cases (Elena Dickens, 2018). In general, all approaches used affect oral health and lead to oral complications, the National Cancer Institute reported the oral complications developed in most patients receiving radiotherapy, while (10%) of patients receiving adjuvant chemotherapy, (40%) of patients with primary chemotherapy, (80%) of patients under go myeloablative therapy Chemotherapy (BMT) (www.cancer.gov, 2020).

These oral complications will increase the morbidity and may alter the course of treatment. On the other hand, it will increase the physical, emotional, and financial costs (Pai RR, 2019).Two main factors play important role in developing these oral complications, one is associated with the patient, and the other is related to the treatment regimen. Patient-related factors include tumor diagnosis, patient gender, age, oral health condition before cancer therapy, and the level of oral care during therapy, the second factor is the type of therapy and frequency of drug administration (www.cancer.net, 2020) (www.cancer.gov, 2020) (Rapone B. N., 2017).

The most oral complication from chemo /radiotherapy is mucositis (97%), and xerostomia which are considered to be predisposing factors to oral infection and all other complications (European Oral Care in Cancer Group Oral Care Guidance and Support)), while Graft versus host disease (GVHD) is the most and serious complication of hematopoietic stem cell transplantation both acute and chronic GVHD. (Maria Margaix-Muñoz 1 J. V.-G.-R., 2015).

2.2 **Types of Cancer Therapy**

• Radiotherapy (RT)

RT is commonly used as the primary choice of treatment, because of its low cost and its effectiveness for approximately (60%) of cancer patients.(Jarosz-Biej M1, 2019) (www.cancer.gov, 2020), it can be used as a primary treatment or as an adjuvant with other types of treatments such as chemotherapy and surgery (Rajamanickam Baskar1, 2012).

Many side effects of radiotherapy arise near the middle and end of the treatment course and persist for the first few weeks following treatment depending on the dosage of radiotherapy and the duration of treatment, the results may be mild or more alarming (Milia2, 2015).

As stated by HaiMingWong (90% -100%) of patients have oral and facial tissues complications developed by radiation therapy to the head, the main oral tissues affected by RT are:

- 1. Xerostomia
- 2. Oral Mucositis (OM)
- 3. Osteoradionecrosis (ORN)
- 4. Temporomandibular joint (TMJ)
- 5. Muscle trismus. (HaiMingWong1, 2014)
- Chemotherapy (CT)

Chemotherapy can be used as a primary method of treatment with a single drug or multiple drugs together, (Jerome P. Rothstein, 2015) mostly it is used with a combination treatment regimen with surgery or radiation therapy (www.cancer.org, 2020) to eradicate micro metastasis and eliminate recurrence, or to shrink the tumor before surgery, and it can be palliative chemotherapy used to improve symptoms (Elena Dickens, 2018), (www.cancer.org, 2020), (Jerome P. Rothstein, 2015).

Approximately (70%) of cancer patients are treated with chemotherapy, and (40%) of these patients develop oral manifestations (Deise Berger Velten, 2017) as a result of cancer treatment, most oral and facial tissues affected are :

- 1. Mucositis
- 2. Infection (bacterial, fungal, and viral)
- 3. Bleeding, as a result of neutropenia and thrombocytopenia (HaiMingWong1, 2014)

• Bone Marrow Transplantation (BMT)

Hematopoietic stem cell transplantation (HSCT) is the administration of healthy hematopoietic stem cells in patients who have bone marrow failure syndromes, hematological malignancies, and congenital immune deficiencies (Karam Khaddour 1, 2020) (T.M.Haverman, 2014) before transplantation cytotoxic doses of systemic chemotherapy or systemic radiotherapy is subjected to establish deep myelosuppression, to renew the hematopoietic system (Joel B. Epstein, et al., 2012) (Maria Margaix-Muñoz 1 J. V.-G.-R., 2015).

Literature reported the infection (bacterial, fungal, and viral), graft versus host disease (GVHD), and bleeding are the most common oral complications from this type of cancer treatment (HaiMingWong1, 2014) (Stephen, 2020).

2.3 Most Common Oral Complications

2.3.1 Infections

Local and systemic immunity reduced in treated cancer patients and leads to oral microbes' imbalance in the oral ecosystem, (K Anjali, 2020) ,(25%–50%) of the total infections are related to chemotherapy oral infections, pain, fever, and development of lesions are indicators of infection. The most susceptible areas are gingival mucosa, teeth, and salivary gland (HaiMingWong1, 2014).

Bacterial Infection

It happens most frequently in combination with a dental or periodontal infection that can get worse during cancer treatment (Firoozeh Samim1, 2016).

The incidence of the bacterial infection increases the risk of oral viral and fungal infection in BMT recipients (Stephen, 2020), as reported by Adankie, the prevalence of bacterial infection was (19.4%) among 216 cancer patients (Adankie1, 2018)

• Fungal Infection

Salivary gland hypo functions, and local tissue damage caused by chemotherapy or radiotherapy and the use of broad-spectrum antibiotics, can be important predisposing factors in cancer patients for developing oral candidiasis (Dr. Allan Hovan, 2018), it was found(7.5%),(39.1%) and (32.6%) before, during, and post HNC therapy, respectively (Herve Y Sroussi1, 2017).

• Viral Infection

Herpes virus orofacial infection is widespread in immunocompromised patients, the discomfort pain is prevalent and can compromise oral intake and eventually lead to dehydration (Dr. Allan Hovan, 2018).

No primary and secondary herpes simplex viruses have been shown to reactivate after RT in HNC patients, whereas these viruses are usually activated after leukemia and lymphoma chemotherapy and during hematopoietic cell transplantation (HCT)(Firoozeh Samim1, 2016) (Joel B. Epstein, et al., 2012).

2.3.2 Mucosal Changes

• Mucositis (OM)

Mucositis is the most predominant oral complication in cancer therapy (Nemes J1, 2018), oral mucositis (OM) appears as painful ulcerative and erythematous lesions of the oral mucosa (Goda Daug elait e 1, 2019) (Goda Daug elait e 1, 2019) it appeared in (85-100%) of treated patients from RT or chemo/ radiotherapy in head and neck cancer (Jerónimo Pachón Ibáñez1, 2017) (Novaes CD, 2019) and healing occurs within 4 to 6 weeks (Joel B. Epstein, et al., 2012).

On the other hand, chemotherapy results in sever OM with a high incidence rate estimated (40%) in standard dose, while in high dose MO reachs up (70% to 80%), and the healing occurs during 1-2 weeks (Joel B. Epstein, et al., 2012) (Nemes J1, 2018).

• Graft Versus Host Disease (GVHD)

Graft-versus-host disease (GVHD) a multi-organ disease and a major complication of allogeneic hematopoietic stem cell transplantation (AHCT) that affects many organs, including the mouth (G. Jaguar1, 2019) (Dr. Allan Hovan, 2018).

In a paper for Maria Margaix-Muñoz reported the acute form of GVHD is observed in (50%-70%) of all patients with allogeneic transplants, while chronic GVHD is observed in (30%-50%) (Maria Margaix-Muñoz 1 J. V.-G.-R., 2015). oral manifestation of acut GVHD grows 3 weeks after transplantation (Stephen, 2020), while the chronic form of GVHD occures within the first three years following transplantation .

The primary symptom associated is an allergy to foods, beverages, and oral hygiene items, (Nathaniel Treister, 2012), mouth opening obstruction from sclerosis, chronic and acute gingivitis, erythema ,mucositis and pain (Maria Margaix-Muñoz 1 J. V.-G.-R., 2015) also swelling of the salivary gland with or without pain (Nathaniel Treister, 2012), Patients with salivary gland chronic GVHD are at risk of Xerostomia and secondary infectious complications may be developed (Nathaniel Treister, 2012) (Dr. Allan Hovan, 2018).

2.3.3 Salivary Changes

Xerostomia

Saliva plays important roles in the homeostasis of the oral system (Joel B. Epstein, et al., 2012), xerostomia is a subjective symptom of dry mouth due to decrease salivary flow (Choi1, 2020) caused by radiotherapy and chemotherapy, radiotherapy with high-energy X-rays influences (80%) of patients who require radiotherapy as primary therapy(Milia2, 2015).

An early research was to describe the incidence of some oral complication following chemotherapy the study was among 50 women with breast cancer, xerostomia was documented in 34 patients (65.4%) after administration of chemotherapy (Shruthi Acharya1, 2017).

Patients with xerostomia develop different problems such as dental caries, oral infections, (Alessandro Villa, 2015), mucosal sensitivity and mucositis, fissures in the tongue and lips, enlargement of the parotid gland, dysgeusia, halitosis and difficulty in speaking and swallowing

food (Joel B. Epstein, et al., 2012) (Firoozeh Samim1, 2016) (Rapone B. N., 2017) (Firoozeh Samim1, 2016) (Alessandro Villa, 2015).

2.3.4 Musculoskeletal

• Osteoradionecrosis (ORN)

Osteoradionecrosis (ORN) is the consequence of ischemic necrosis of the bones (Joel B. Epstein, et al., 2012) ORN clinically presents as a painful and denuded osseous region with purulent drainage and frequently progresses to the development of fistula (to the mucosal or skin surface), (Strojana, 2017) (Davis, Hanley, & Cooper, 2020) later stages it can be associated with swelling ,infection and bone fracture (Soutome1, 2018). The mandible is the most commonly affected site which can be lasted for more than 8 weeks (Cesar A. Migliorati, 2019)

High dose RT which lasts for 3 months or more, poor oral health before radiotherapy, postradiation teeth extraction and association of the tumor with bone, are the key risk factors for the development of ORNs (Strojana, 2017). (Joel B. Epstein, et al., 2012).

• Medication-Related Osteonecrosis of the Jaws (MRONJ)

The use of bisphosphonate (BPs) and denosumab (Dmab) recently has been reported to be associated with MRONJ's development (Cesar A. Migliorati, 2019)

Sven Ottoa reported that more than (90%) of MRONJ cases occur in patients with cancer and bone metastasis who receive bisphosphonate (BP) and denosumab (Dmab) as bone-modifying agents (BMA), (Sven Ottoa, 2018) (Soutome1, 2018).

• Trismus

Normal mouth opening varies between individuals within a range of 40–60 mm studies have shown that trismus occurred when mouth opening is less than 35 mm, (Elhassan2, 2017)

Trismus may result from high dose RT exposure to the temporomandibular joint (TMJ) area (Joel B. Epstein, et al., 2012), perhaps trismus is the third most burdensome side-effect of oncological treatment (Strojana, 2017). (Lalla RV & Group, 2017) . Literature documented the prevalence of trismus is (6%) to(86%) after RT or surgery to the head and neck region (Michela Buglionea, 2016).

• Orofacial Pain (OFP)

Orofacial pain is frequently present at initiation of cancer therapy, (Epstein & Hong, 2011) (Herve Y Sroussi1, 2017) studies demonstrate increased pain intensity in HNC patients who received combined modality therapy (Epstein & Hong, 2011). Neglected dental and periodontal conditions before cancer treatment is the most common acute causes of OFP in HNC patients in the oral cavity, oral mucositis and Temporomandibular disorders (TMD) cause musculoskeletal pain, oral infection is also a popular acute adverse reaction of combined chemotherapy and radiotherapy (Herve Y Sroussi1, 2017).

Romero-Reyes in his systematic review from 52 study reported the pain as a consequence of cancer therapy is a very unfortunate problem, (59%) of cancer patients presented pain with anticancer treatment, (33%) after cancer treatment (Romero-Reyes, 2016).

2.3.5 Teeth and Gingival Tissues

• Increased Dental Demineralization and Caries

Dental caries is the result of a lack of balance in demineralization - remineralization of the patients' teeth, cancer patients will be at high risk of dental caries mainly due to hyposalivation following radiotherapy. (Herve Y Sroussi1, 2017) (Joel B. Epstein, et al., 2012) (Ezra E. W. Cohen, et al., 2016).

However, radiation-related caries grows faster and are more likely to have non-classical teeth surfaces compared to conventional caries (Isabel Lanzós 1, 2015) (Kudkuli J, 2020).

Sequelae of dental caries associated with pain, infection of the jaw bone, that will increase the risk of osteoradionecrosis (Joel B. Epstein, et al., 2012),the prevalence of dental caries in post-radiotherapy and post-chemo- radiotherapy patients was (24%) and (21.4%), respectively as reported by Isabel Lanzós ((Isabel Lanzós 1, 2015).

• Gingival Bleeding

Gingival Bleeding is related to chemotherapy which is a manifestation of thrombocytopenia secondary to hematopoietic tissues suppression commonly cancer patients suffer from anemia, thrombocytopenia (platelet count < 150,000/uL), leukopenia (white cell count <4400/uL) and neutropenia (neutrophils below 1000 cells/ μ L) due to the effects on blood cell production by either cancer therapy or the malignancy (Lopez-Silva CP W. T., 2019).

Laboratory tests can be used to determine the risk of bleeding such as thrombocyte and bleeding time that give the dentist a clear image of the size, consistency and function of platelets. (HaiMingWong1, 2014).

• Gingivitis and Gingival Enlargement

Gingival enlargement has been observed after cancer therapy, including loss of attachment at the radiation sites, this may behave the same pathogenesis mechanism for mucositis or as results of the shift in oral microflora (Singh, 2011).

• Periodontal Infections

Periodontitis is a chronic infectious and inflammatory disease, that is characterized by loss of tissue that protects and supports the tooth and the alveolar bone (V. Talevi1, 2019).

The risk of periodontal disease increased in patients receiving RT specially near the jaws and dependent on radiation dose ,because the development of hyposalivation and oral microflora shifting (Herve Y Sroussi1, 2017) (Joel B. Epstein, et al., 2012). In the radiation field, loss of gingival attachment may be associated with dental infections, teeth loss and osteonecrosis, this condition is usually not painful at first, then rapid weakening of teeth ligaments and tissue that support the tooth leads to deep periodontal pockets formation which ended in tooth loss (Ezra E. W. Cohen, et al., 2016)(Joel B. Epstein, et al., 2012).

2.4 International Oral Health Protocols Before, During, and After Cancer Therapy.

Good oral care is critical for preventing and minimizing oral complication of cancer, (Dr. Allan Hovan, 2018) through cancer therapy to improve patient life quality and increase survival rate. (Murphy, 2018) so this requires the oncology team's knowledge (Herve Y Sroussi1, 2017) and understanding the significance of dental care and use available services to meet oral needs effectively, so the implementation of basic oral care protocols and guidelines is obligatory in cancer therapy plan which is carried out by integrated corporation between trained and experienced oncology team with dental professionals (Samim F, 2016) to provide the appropriate treatment on time, while unnecessary treatment is prevented or delayed (Samim F, 2016) (Isabel Lanzós 1, 2015)

This section will include a review of evidence-based recommendations and guidelines related to oral health management for cancer patients before, during and after cancer therapy.

2.4.1 Recommendations before Cancer Therapy

Particular attention must be given to oral tissues before cancer therapy (Samim F, 2016) it is very ethical and critical to inform the patients about the type of treatment and possibility of oral complications besides the importance of early detection and diagnosis to prevent delays in the delivery of effective cancer treatment (Männle, 2019),in general before radiotherapy,

chemotherapy and myelosuppressive therapy begins it is better to refer the patient to a dentist for oral examination and treatment (Health O. P., 2009) (Isabel Lanzós 1, 2015), the desired objective is the absence of symptomatic oral disease, so it's critical to remove the acute and chronic infections that may need future surgery (Samim F, 2016) anti-infective agents can be provided to prevent infections especially for those who are immunocompromised or hematological cancers patients (European Oral Care in Cancer Group Oral Care Guidance and Support, 2019)

The incidence, duration and severity of oral complications are less with patients who have performed oral hygiene protocols compared with who doesn't follow and perform oral care protocols (Isabel Lanzós 1, 2015) (Dr. Allan Hovan, 2018)(Samim F, 2016)(Jerome P. Rothstein, 2015).

The correct brushing technique should be personalized for each patient, as well as the explanation of the importance of sodium fluoride gel (1.1%) application daily for 5 minutes starting on the first day of RT (Isabel Lanzós 1, 2015), and using some antimicrobial mouthwashes (AKKAŞ, 2019)

It is necessary, to advice the patient not to wear the prosthesis throughout cancer therapy, or at least not to wear it at night during cancer therapy (Health O. P., 2009), also orthodontic treatment must be discontinued, good nutrition and adequate fluid intake also critical before cancer therapy (Dr. Allan Hovan, 2018), (Health O. P., 2009).

29

• Infection

Anti-infective prophylaxis and good oral hygiene is necessary for patients who are at risk of infection (European Oral Care in Cancer Group Oral Care Guidance and Support, 2019). Acyclovir and valcyclovir are accepted and effective for the prevention of herpes simplex virus (HSV) (Firoozeh Samim1, 2016), topical antifungal for milder forms of candidiasis can be useful specially with patients receiving high-dose steroids (Cancer, 2015) (HaiMingWong1, 2014) The concurrent use of antibacterial oral rinses (such as 0.12% aqueous chlorhexidine) is often recommended to prevent secondary bacterial infection (Dr. Allan Hovan, 2018).

• Mucositis

All sharp and ill-fitting prostheses should be removed (Isabel Lanzós 1, 2015), oral hygiene and dietary instruction must be provided to patients also (HaiMingWong1, 2014). Antimicrobial, anti-inflammatory agents, mouth rinses (saline and bicarbonate, lubricants) and Benzydamine (Pharixia) oral rinse has been reported to be effective in preventing severe oral mucositis in patients receiving radiotherapy (Dr. Allan Hovan, 2018) ice chips (cryotherapy) may be supportive for the prevention of extreme oral mucositis (Dr. Allan Hovan, 2018), (Spencer W. Redding, 2005).

Low-level laser therapy (LLLT) has recently gained significant attention for both the prevention and treatment of oral mucositis (Dr. Allan Hovan, 2018) (HaiMingWong1, 2014).

• Graft Versus Host Disease

Acute GVHD prevention drug therapy does not affect chronic GVHD (Maria Margaix-Muñoz 1 J. V.-G.-R., 2015) (Stephen, 2020) (Karam Khaddour 1, 2020), it's important to all patients be advised about the importance of maintaining good oral hygiene, and using oral mouthwashes. (Nathaniel Treister, 2012)

• Xerostomia

Fluid intake should be increased in patients with xerostomia, preferably with acidic juices to promote the secretion of saliva, meals should be moist, smooth, and humidifiers should be used at night, also, most patients can benefit from using artificial saliva (European Oral Care in Cancer Group Oral Care Guidance and Support, 2019) to keep the mucosa hydrated. (Isabel Lanzós 1, 2015), patients should avoid highly acidic foods, foods high in sugar, caffeine, and alcohol (Dr. Allan Hovan, 2018), methods commonly used to shield the salivary glands from radiation, such as submandibular gland surgical transference, intensity-modulated radiotherapy (IMRT) (BARBIERI, 2020).

• Osteonecrosis

The occurrence of ORN can be minimized by keeping optimal oral hygiene (Cesar A. Migliorati, 2019) and oral pre-treatment strategies to reduce the probability of requiring any future extractions (Dr. Allan Hovan, 2018) and avoid surgical resection of the jaw, moreover treatment of existing oral disease to eliminate the need for intrusive procedures (extraction) and inflammatory dental disease or infection during and after RT (Herve Y Sroussi1, 2017) but if
extractions necessary it should be completed at least 2 weeks before starting radiotherapy. (Yumiko Kawashitaa, 2020)

• Trismus

Clinical guidelines indicate that RT-associated trismus may be prevented through active , passive, and supportive stretching of mastication muscles during RT (Dr. Allan Hovan, 2018) , active therapy with devices that apply resistance to the jaw during exercise reduces trismus and can improve the range of movement (Joel B. Epstein, et al., 2012) (Health O. P., 2009) .

• Increased Dental Demineralization And Caries

It is advised to implement an effective oral health management plan, involving early detection of caries by dental follow-up visits every 6 months to preserve oral health, also consideration should be given to using antiseptic chlorhexidine to minimize cariogenic microbial loads, and to enhance salivary production (Herve Y Sroussi1, 2017).

Calcium, phosphate and fluoride are essential to promote remineralization (Joel B. Epstein, et al., 2012) also advice the patient to rinse teeth with baking soda and water solution several times and after vomiting. (Health O. P., 2009) (Isabel Lanzós 1, 2015), dietary and oral hygiene treatment is a vital part of patient care prior to, during, and after head and neck RT (Herve Y Sroussi1, 2017). (Yumiko Kawashitaa, 2020).

• Gingival Enlargement, And Bleeding

Patients must be educated to clean the teeth with a soft toothbrush with warm water (Health O. P., 2009), and mouth rinses with 0.12% chlorhexidine (Isabel Lanzós 1, 2015). Its better all gingival lesions should be subjected to histopathological examination to exclude metastasis, so provide effective care at an early stage is critical (Singh, 2011).

• Periodontal Infections

The assessment should include full periodontal examination (clinical and radiographical). Periodontal debridement maintenance and oral hygiene instruction with mouth rinses with 0.12% chlorhexidine (Isabel Lanzós 1, 2015).

2.4.2 Recommendations during Cancer Therapy

It is critical that oncologists and other physicians communicate with qualified dental professionals to initiate the necessary care in a timely manner (Kawashita Y, 2020), cancer patients may discontinue basic oral hygiene due to discomfort and pain, doing and this will increase the risk of oral complications, therefore practitioners should make recommendations that are tailored to the patient's specific (Dr. Allan Hovan, 2018), the main objective of maintaining periodic evaluations during and after cancer treatment, is to prevent or reduce the severity of potential oral complications associated with treatment. (Ferreira, 2018) (Jawad H, 2015)

• Infection

Bacterial Infection

The infection is usually localized to the oral mucosa and can be treated with a combination of penicillin and metronidazole, the practice of careful oral hygiene is critical. If it is difficult to brush the teeth using chlorhexidine-containing mouthwash is recommended. (HaiMingWong1, 2014)

Fungal Infection

Systemic antifungal are more preferable in immune-compromised more than topical antifungal which contains high sugar concentration that increases the development of dental careies ,and have clear evidence to avoid and treat oral candidiasis ,moreover fungal culture is very important to select a specific drug for patients (Firoozeh Samim1, 2016) (Isabel Lanzós 1, 2015)

Viral Infection

Applying topical anti-viral agent for local infection in low-risk patients (Cancer, 2015), while systemic antiviral drug as acyclovir and valcyclovir are accepted as equally effective for the treatment of herpes simplex virus (Firoozeh Samim1, 2016).

Mucositis

Oral hygiene maintenance is the core of treatment, Chlorhexidine oral rinses have been shown in several studies to reduce oral mucositis, (Spencer W. Redding, 2005) (Cancer, 2015), moreover the advantage of coating agents is to cover the ulcerated tissue of mucositis, acting as an intraoral bandage, some can contain topical anesthetics, which are short-acting, but the effective role is long-term coverage. (Goda Daug[•]elait[•] e 1, 2019) Prostaglandins and steroids that are tested to reduce mucositis, (Spencer W. Redding, 2005).

Several studies show the benefit of using low-level laser therapy (LLLT) and Glutamine amino acid to reduce and treat mucositis (HaiMingWong1, 2014) (Isabel Lanzós 1, 2015) (Elad, 2015), one of the strategies widely used by oncologists is the use of ice chips in the mouth every 30 minutes to treat oral mucositis. (Spencer W. Redding, 2005) (HaiMingWong1, 2014) (Dr. Allan Hovan, 2018).

• Graft Versus Host Disease

The main goal of oral chronic GVHD therapy is the reduction of symptoms, the resolution of painful lesions, prevention, and treatment of secondary complications, Lichenoid lesions generally respond to topical or systemic steroid therapy (Dexamethasone, Clobetasol),ultraviolet light therapy reportedly has benefits in the treatment of the severe, and nonresponsive lesions. (Stephen, 2020) (Dr. Allan Hovan, 2018), it's important to educate the patients how to maintain good oral hygiene. (Nathaniel Treister, 2012).

Xerostomia

The treatment of xerostomia is usually palliative ,wetting of oral surfaces, and calcium replacement, and use of antimicrobial rinses can be safe and efficient in alleviating dry mouth symptoms and reducing the risk for infection, (Firoozeh Samim1, 2016) (Choi1, 2020).

For patients with dry mouth, it is advisable to melt ice chips in the mouth for comfort and advise them to avoid hard and spicy food, also artificial saliva spray can be effective and mouth moisturizing gel (HaiMingWong1, 2014) (Health O. P., 2009) ,recently Low-level laser therapy, appears to have good outcomes (Fernanda Aurora Stabile Gonnelli1, 2016).

• Ostenecrosis (ORN) And Medication-Related Osteonecrosis Of The Jaws (MRONJ)

Hyperbaric oxygen (HBO) is known to be an adjunctive treatment for ORN and MRONJ, typically in conjunction with surgery, and has been associated with better success rates than surgery alone (Davis, Hanley, & Cooper, 2020), (Isabel Lanzós 1, 2015), recently use of anti-radiation fibrosis and low- level laser therapy can be beneficial (Herve Y Sroussi1, 2017).

• Trismus

Conservative treatment involves: moist heat application to the affected muscles, antiinflammatory, and muscle relaxant drugs, patient education to maintain good oral hygiene with the good dirty regime (Health O. P., 2009) (Dr. Allan Hovan, 2018).

Advise patients to exercise jaw muscles 3 times every day (Isabel Lanzós 1, 2015), patients with a history of jaw disorders need to be closely monitored (Dr. Allan Hovan, 2018) (Herve Y Sroussi1, 2017).

• Orofacial Pain (OFP)

It's advised to use topical anesthetics and systemic pain relievers such as benzocaine or viscous lidocaine (Health O. P., 2009). Oral Rinses containing 0.5 % doxepin may be useful in treating oral mucosal pain, or rinses containing 2 % morphine will keep pain under control in the most serious cases (Isabel Lanzós 1, 2015).

• Dental, Gingival and Periodontal Complications

During oral cancer therapy, any tooth in the irradiated field is at risk of developing radiation caries, which can quickly progress to periapical disease (Villa A, 2018), so patients must be closely monitored on a regular basis, ideally every three months to maintain good oral hygiene and to perform prevention, early detection, and management of radiation caries. Studies have reported daily applications of 0.12% chlorhexidine mouth rinses and 1% neutral sodium fluoride gel can reduce radiation caries (Palmier NR, 2020).

If the patient complains from acute dental pain during chemotherapy, consulting with the oral health team to prepare dental treatment, blood count operation must be performed 24 hours before any dental procedure ,if the platelet count less than 75,000 / mm, or irregular clotting factors are present postpone the dental procedures, some prophylaxis antibiotics are required before any dental procedures especially if the patient has central venous catheters (Herve Y Sroussi1, 2017).

2.4.3 Recommendations after Cancer Therapy

Oral complications caused by cancer treatment can be serious and impair not only the quality of life, but also impact the cancer therapy outcome ,effective control of oral infection, mucositis, xerostomia , dental and periodontal disease, necrosis of soft tissue , bone, and temporomandibular joint disorders should be an important part of post-cancer treatment to

37

resolve long-term and late complications, and treat the oral condition that had been delayed (Firoozeh Samim1, 2016) (Isabel Lanzós 1, 2015) (Yumiko Kawashitaa, 2020)

Education of patients to report new early oral symptoms is critical after cancer; consultations may be helpful to perform more efficient follow-up care that should be as an integrated part of an individualized survivorship provided by the entire multidisciplinary team. (Brands M, 2021)

Follow-up dental appointments should be personalized and individualized based on patient needs, check-ups are recommended at least twice a year, although a schedule of every 2-3months might be suggested in some cases (Firoozeh Samim1, 2016), patients should maintain good oral hygiene, such as tooth brushing with soft or super soft toothbrushes, fluoride gel applications and fluoride toothpastes, diets and supplements high in carbohydrates, as well as sucrose-sweetened drugs should be avoided, or should be taken with meals when required to promote energy intake, and maybe better after oral hygiene is undertaken (Firoozeh Samim1, 2016)

Hyperbaric oxygen (HBO) is considered to be an adjunctive therapy for ORN, generally in combination with surgery, and has been associated with better success rates than surgery alone and lowers the risk of ORN following dental extraction in the irradiated region. (Firoozeh Samim1, 2016) (European Oral Care in Cancer Group Oral Care Guidance and Support, 2019).

Studies reported following cancer treatment, the prevalence of dental caries in post-chemo-RT patients was (24 %) and (21.4 %), respectively and the use of fluoride products reduces caries, besides the use of Chlorhexidine rinses that decrease microbial concentration (Firoozeh Samim1, 2016)

Physical treatment for trismus, manual stretching and joint distraction should be continued after cancer therapy (Isabel Lanzós 1, 2015).

2.5 Oral Health Care (KAP), and Willingness among Health Care Providers

Our study assessed the oral health care KAP and willingness among health care providers in oncology departments, according to the studies and theories of behaviors there is an association between knowledge (K), attitude (A) and practice (P), in which knowledge can influence behavior directly and indirectly. (Wang4, 2019)

KAP surveys focused primarily on assessments to evaluate the improvements of human knowledge, attitudes and practices. (Ramen Haloi, 2014), and recognize awareness gaps, cultural values, and behaviors that can promote the understanding and intervention for outcome improvement (WHO), (Ramen Haloi, 2014).

2.6 **Guidelines and Protocols Adoption**

A series of previous studies have highlighted the oral health protocols and guidelines for cancer therapy, approved protocols and guidelines for oral health care through cancer therapy course, must contains three main baselines:

- 1. Oral health care before cancer therapy
- 2. Oral health care during cancer therapy

3. Oral health care after cancer therapy

(Navdeep Kumar2, 2019) (National Cancer Control Program, 2019), ((Sharour, 2019).

The clinical guidelines and protocols that must be followed and should be a part of the treatment plane provided by a multidisciplinary approach for oral management through cancer treatment to maintain good oral health which is essential for the good quality of life. (Nicole Croyère, 2012)`

Thus, a multidisciplinary team of physicians, including oncologists, oncologist nurses, general practitioners and dental specialists as well as dental hygienists, social workers, nutritionists and related health professionals must all work together to achieve highly successful preventive and therapeutic results (Rapone B. N., 2017) (Barasch, 2014).

Study performed by Dang , to assess dental practice correlations ,dentists noted that rarely or never received contacts from the oncology team during referrals regarding cancer therapy ,however, the majority of dentists (74.6 %) always provided treatment recommendations to the oncology team regarding dental procedures (Dang, 2016).

Systematic review was in 2019 about MRONJ management, based on academic research and clinical experience, the author summarized how oncologists play a vital role in each and every step of early cancer diagnosis, pre-cancer treatment assessment, care management during bone-modifying agent treatment, and care management after bone-modifying agent treatment , oral health evaluation of the patient should be performed prior to starting therapy, and a dental treatment plan should be developed and followed in collaboration with the patient's dentist. (Yuan, 2021).

40

2.7 Adopting Oral Care Guidelines for Cancer Patients

Unfortunately adoption of these guidelines not easy and face many barriers such as, health care professional awareness gaps or, lack of oral care evidence and information (McGuire, 2003) (Thomas Costello, 2008), lack of accepted universal protocols for oral health evaluation and documentation which lead to different oral care approach through cancer therapy, moreover absence of integrated and collaboration work between health care providers (McGuire, 2003) (Dang, 2016)., lack of guidelines is the most likely explanation for the variability of care, which leads to a critical problem in inpatient management practices. (Raber-Durlacher, 2005), studies reported the lack of appropriate equipment, insufficient recourses and lack of time will hinder the delivery of adequate and timely oral care (Thomas Costello, 2008) (Dang, 2016).

In general there are problems in health care providers understanding and attitude toward oral health care, studies showed advancement in all aspects of oral health care and knowledge after participants received guidelines and training program (Nicole Croyère, 2012), the lack of knowledge is a significant barrier to the provision of evidence-based oral care for cancer patients (Ramen Haloi, 2014).

2.8 Oral Health Care (KAP) among Specialists and General Practitioners

Study was performed to assess the current knowledge regarding (MRONJ) among physicians, dentists, and nurses ,the findings presented a notable lack of knowledge regarding MRONJ among dental surgeons and physicians, and especially among nurses, while the experienced professionals and specialists in the field usually have a greater understanding of the dentist's role in MRONJ prevention, diagnosis, treatment, and patient care (Fregnan, 2020).

Improved health professional training and communication could lead to better patient care and more effective implementation of clinical care guidelines, collaboration should be between all the entire health care team (oncology team with the working dentist), Patel established a questionnaire-based study in 2012 to evaluate knowledge and practice of dental management of HNC patients across all members of the American Society for Radiation Oncology (ASTRO) and dentists,(25%) of radiation oncologists and (10%) of dentists said they did not treat HNC patients due to a lack of adequate training, and (55%) of dental respondents said they did not adequately trained to treat patients who had head and neck radiation therapy,(81%) of respondents reported lack of time between the initial dental consultation and the begins of radiation was cited as a major barrier to provide dental treatment prior to radiotherapy, with inadequate communication between health care providers being the most frequently cited cause (Patel Y, 2012).

2.9 Oral Health Care (KAP) Among Nurses

Patients receiving chemotherapy and radiotherapy require nurses with sufficient experience and knowledge in oral health to take care of them; however, education and expertise in the oral care among health care providers in oncology departments received little study and research. Studies concluded nurses require more education in oral health care, and cancer therapy complication regarding oral health so there is a need for a continuing education program (Southern, 2007).

Sharour proposed a study on oncology nurses in Jordan, the respondents had an unsatisfactory knowledge standard, most of them had knowledge defects about anatomy, diagnosis, scoring and definition of mucositis, , education of the oral care and advice for patients ,despite the availability of numerous national guidelines their impact on clinical practice is restricted (Sharour, 2019).

The same results founded by Ongole study in India, the majority of staff nurses had inadequate knowledge of oral care, and insufficient knowledge gained through basic oral care education (Ongole, 2019)

Another study on 2000 members of the Oncology Nursing Society was surveyed to identify knowledge of oral care, oral health management practices ,and the factors influencing provision of oral care for patients being treated for cancer, over (75%)of respondents reported some to little oral health content in their primary education, significant correlations between years of experience, use of evidence-based protocols and oral management increased with levels of oral healthcare education and years of experience (Rebecca Tranmer, 2013), the same results reported from (Radhika) in her study in among 158 nurses working in the oncology department

to evaluate their oral care knowledge for cancer patients receiving chemotherapy and radiation therapy, the results was (51.3%) had poor knowledge whereas (55.1%) noted their knowledge through basic education in oral care is not sufficient and (72.8%) did not receive basic education in oral care of cancer patients (Radhika R Pai, 2015).

Inger Wa rdh conducted a study in 2008 to assess nursing staff's understanding of oral health care for cancer patients: 'attitudes to oral health care,' 'implementation opportunities,' and 'knowledge of importance' after completing an oral health education course with specific activities the findings of the oral healthcare intervention identified that general knowledge improvement was possible, but changing attitudes and specific knowledge about the oral cavity was difficult. (Inger Wa°rdh, 2008).

Chapter 3: Methodology

3.1 **Introduction**

The purpose of the study was to assess the oral health care knowledge, attitudes, practices, and willingness among health care providers in the oncology departments of Palestinian hospitals.

According to the previous literature, knowledge is defined as the collection, preservation, understanding, and usage of information which can be improved by education and practice (Badran, 1995). The lack of knowledge can be a significant barrier to the provision of evidence-based oral care (Sharour, 2019) (Ramen Haloi, 2014).

Attitude is defined as the feeling or position taken concerning a specific situation or entity that reflects the thoughts, believes, and considerations of an individual (Modikoe, 2017) (Ramen Haloi, 2014)(Eagly, 2007). It can be seen in previous literature that attitude is heavily influenced by knowledge. Practices are behaviors or activities that reflect knowledge and attitude (Wan, 2016). This chapter will discuss the methodology of our study in more detail.

3.2 Study Design

The study was a cross-sectional study which used a self-administered closed-end questionnaire. It was conducted between 15 April to 30 June 2021 among a universal (sample of health care providers in the oncology departments of seven Palestinian hospitals, N=(166). The conceptual framework figure (1) was constructed and describes the relationships between our variables.

The study variables are:

- 1. Independent variables
 - Demographic features (age, gender, and academic qualifications)
 - Background information (working years in the profession, employment status , working hours in the hospital, working years in the oncology department, position in the hospital and position in the department)
- 2. Dependent variables
 - Oral health knowledge, attitude, and practice of health care providers (KAP)
 - The willingness of health care providers to provide oral health care and follow oral health care protocols.



Figure 1.The conceptual framework

3.3 Site and Settings

Among oncology departments in Palestine, the main oncology departments (N= 11) were selected for our sample. They are the biggest departments, and their oncology staff usually provide oncology consultancy in all Palestinian oncology departments in the West Bank area. So, the health care providers in oncology departments in the selected departments were the unit of analysis.

The sample included:

- Four Governmental Hospitals:
 - 1. Alwatani hospital

- 2. Al- Hussein Governmental Hospital, Beit Jala
- 3. Rafidia Hospital.
- 4. Palestinian medical center
- Three Private Hospitals
 - 1. Al-Najah National University Hospital
 - 2. Istishari Arab hospital
 - 3. Augusta Victoria Hospital

3.4 **Study Subjects:**

This study included all health care providers (oncologists, hematologists, radiologists, resident doctors, maxillofacial surgeons, radiotherapy technicians and nurses) who provide services to cancer patients in the hospitals. The total number of participants was 166 distributed in the following tables (3.1), (3.2)

Governmental Hospitals (62)				
	Al-Watani Hospital	Al- Hussein Hospital	Rafidia Hospital	Palestinian-Medical Center
Cancer therapy type	Chemotherapy	Chemotherapy	Surgery to the head and neck	Chemotherapy, surgery to the head and neck
Oncologists	2	3	0	2
Hematologists	2	2	0	2
Oral & maxillofacial surgeons	0	0	4	1
Resident doctors	2	2	2	3
Nurses	11	12	3	9
Total	17	19	9	17

Table 3. 1 Study Population in Governmental Hospitals

Table 3. 2 Study Population in Private Hospitals

Private Hospitals (104)				
	Al-Najah National	Istishari Arah Hospital	Augusta Victoria	
	University Hospital	Istisliali Alao Hospital	Hospital	
Cancer thereasy correlator	Chemotherapy, bone	Chamathanan	Radiotherapy,	
Cancer merapy servicer	marrow transplantation	Chemotherapy	marrow transplantation	
Oncologists	2	2	6	
Hematologists	1	0	3	
Radiation Oncologists	0	0	2	
Resident doctors	4	2	9	
Radiotherapy technicians	0	0	21	
Nurses	8	17	27	
Total	15	21	68	

3.5 Site Sample and Sampling Techniques

All health care providers (n=166) in the oncology department of the selected hospitals were invited to participate in the study.

3.6 **Questionnaire Administration:**

Questionnaires were personally delivered by the principle investigator to the head of the oncology department and the head of the nurse in the departments during the period of 15 April to 30 June 2021. The head of the departments was asked to distribute the questionnaires to their medical staff. The completed questionnaires (N=151) were dropped anonymously in a designated box. The distribution of study participants was shown in the following tables (3.3), (3.4)

Governmental Hospital (53)				
	Al Watani	Al- Hussein	Rafidia Hospital	Palestinian Medical Center
	Hospital	Hospital	Randia Hospitai	r alestinian Wedlear Center
Cancer therapy	Chamatharany	Chamatharany	Surgery to the head	Chemotherapy, surgery to
servicer	Chemotherapy	and neck		the head and neck
Oncologists	2	3	0	2
Hematologists	2	2	0	2
Oral and				
maxillofacial	0	0	4	1
surgeons				
Resident doctors	2	2	2	3
Nurses	8	9	3	6
Sample	14	16	9	14

Table 3. 3 Study Sample in Governmental Hospitals

Table 3. 4 Study Sample in Private Hospital

Private hospital (98)				
	Al-Najah National University Hospital	Istishari Arab hospital	Augusta Victoria Hospital	
Cancer therapy servicer	Chemotherapy, bone marrow transplantation	Chemotherapy	Radiotherapy, chemotherapy, bone marrow transplantation	
Oncologists	2	2	6	
Hematologists	1	0	3	
Radiation Oncologists	0	0	2	
Resident doctors	4	2	9	
Radiotherapy technicians	0	0	17	
Nurses	8	17	25	
Sample	15	21	62	

3.7 **Ethical Consideration**

Ethical approval was granted from the research and ethical committee of Arab American University of Palestine (appendix 1), the Ministry of Health (appendix 2) also private hospitals permission was obtained (appendix 3,4,5) In addition, all elements of informed consent, particularly the voluntary nature of participation, and confidentiality of responses and privacy of the respondents were mentioned in the questionnaire's cover letter. As a result, completing the questionnaire and returning it was regarded as participants' consent.

3.8 Study Tool

The study used a self-administered questionnaire modelled after validated instruments from the literature (Epstein JB, 2007) (Southern, 2007) (L, 2019) (L, 2019) (Croyère N, 2012) (Pai RR O. R., 2019) (www.nidcr.nih.gov, 2020) (Jennifer A. Suminski, 2018) (Rebecca Tranmer, 2013) (Barker, 2005) (Isabel Lanzós 1, 2015) (Pai RR O. R., 2019) (Pai RR O. R., 2019) (www.nidcr.nih.gov, 2020) (UK_OM_Guidelines, 2015) (www.cancer.gov, 2020) (www.nidcr.nih.gov, 2020) (www.nidcr.nih.gov, 2020) (www.nidcr.nih.gov, 2020) (www.nidcr.nih.gov, 2020) and biostatistics.

The study tool (Appendix 6) consisted of 52 closed ended questions which were divided into the following seven parts:

- Demographic characteristics (3 questions) included: age, gender, and academic qualifications
- Background Information (6 questions) included: working years in current profession, employment status, working hours per week in hospital, working years in oncology department, position in the hospital and position professional in department.
- Questions about care provided (7 questions) included: type of cancer therapy provided in department, the existence of dental services in the department, the types of dental services provided in the hospital, the existence of oral health care protocols provided in hospital for cancer patients before starting therapy, oral health protocols or guidelines for medical staff before starting therapy in the hospital, level of confidence in diagnosing oral complications related to cancer therapy ,and level of confidence in providing oral health advice to cancer patients.
- Knowledge questions (9 questions) this part consisted of 9 closed-ended questions about the risk factors of oral complications for cancer patients, knowledge of oral complications in radiotherapy, knowledge of oral complications in chemotherapy , knowledge of oral complications result from bone marrow transplantation, knowledge of oral infections result from cancer therapy in general, the presence of knowledge of the recommended pretreatment oral screening before starting cancer therapy , the presence knowledge about oral complications resulted from training courses , updating of the knowledge about oral complications resulting from cancer therapy by training courses, reading articles, and check medical protocols, and the learning about oral complications.

- Attitude questions (7 questions) the participants were asked to rate their level of agreement with the following seven statements :oral health care is not a priority through cancer treatment course, oral health care should be integrated with cancer therapy course, poor oral hygiene causes complications in the patient's general health, acute oral/dental pain treatment affects cancer therapy continuity, oral health education and training programs for a health care provider in the oncology department is important, following oral health protocols through cancer therapy will decrease oral complications as a result of the therapy, It's important to learn about oral health during undergraduate training.
- Practice questions (16 questions) this section assessed health care providers practices related to oral healthcare before, during and after cancer therapy (appendix 6).
- Willingness questions (4 questions) this section assessed the health care providers level of willingness to provide oral health care to their patients through four statements: getting more information about oral health during cancer therapy, getting training courses about oral health care in cancer therapy, providing oral health instructions for cancer patients, following oral health care protocols during cancer therapy.

3.9 **Operational Definitions**

3.9.1 Demographic Characteristics (3 questions):

- Gender was coded as 1 for male and 2 for female
- Age was coded as 1= (20-29), 2= (30-39), 3= (40-49), 4= (50-59) and 5= (>60 years).
 These categories were followed based on previous literature.

 Academic qualifications were categorized as follows :(1=diploma degree, 2= bachelor's degree, 3=master's degree,4= residency program, 5= specialists). Coding was done from one to five respectively.

3.9.2 Background Information (6 questions):

Working years in the current profession: codes were given from one to six respectively for the intervals :(1= less than 1 year ,2=1 to 5 years ,3=6 to 10 year,4=11 to 15 years ,5=16 to 20 years ,6=21 years or more). Then, frequency and percentage were calculated of each group

Employment Status: codes were given one for part-time and two for full time. Frequency and percentage were calculated of each group.

Working hours per week in the hospital: codes were given from one to five respectively (1=less than 20 hours per week, 2=20 to 39 hours per week, 3=40 to 59 hours per week, 4=60 to 79 hours per week, 5=80 hours per week or more). Then, frequency and percentage were calculated of each group.

Working years in oncology departments: codes were given from one to six respectively (1=less than 1 year ,2=1 to 5 years ,3=6 to 10 year,4=11 to 15 years ,5=16 to 20 years ,6=21 years or more). Then, frequency and percentage were calculated of each group.

Staff position in the hospital: codes were given from one to seven respectively to calculate frequency and percentage of each group (1=medical oncologists, 2=hematologists,

3=radiologists, 4=oral and maxillofacial surgeons,5= resident doctors, 6=nurses, 7=radiotherapy technicians).

Profession position in the department: codes were given from one to three respectively, to calculate frequency and percentage of each group (1=head of department, 2=senior staff, and 3=junior staff).

3.9.3 Questions about Care Provided (7 questions):

1. Type of cancer therapy provided in the hospital: codes were given from one to five respectively to calculate frequency and percentage of the following groups:

- 1=Radiotherapy, Chemotherapy, Bone marrow transplantation, and general Surgery.
- 2=Chemotherapy.
- 3=Chemotherapy, Bone marrow transplantation
- 4=Chemotherapy, Surgery to the head and neck.
- 5=Surgery to the head and neck
- 2. Dental services available in the hospital for cancer patients: yes, answer was coded with one and no answer was coded with zero.
- 3. If the answer in the previous question is yes, the types of dental services provided in the hospital were coded from one to five as follows.
- 1= Educational oral care.
- 2= Preventive oral care.
- 3= Pretreatment screening evaluation.

- 4= Dental treatment during cancer therapy.
- 5= Dental care after cancer therapy.
- 4. Specific oral health protocols or guidelines for cancer patients before starting therapy in the hospital were codes as zero for No answer, one for Yes answer and three for Unsure.
- 5. The existence of orientation programs on oral health care for cancer patients were categorized zero for No answer, one for Yes answer and three for Unsure answer.
- 6. Level of confidence in diagnosing oral complications related to cancer therapy was rated on a five-point Likert scale as follows
- 1= Not confident
- 2= Slightly confident
- 3= Somewhat confident
- 4= Fairly confident
- 5= Completely confident
- 7. Level of confidence in providing appropriate oral health advice to cancer patients was rated on a five-point Likert scale as follows
- 1= Not confident
- 2= Slightly confident
- 3= Somewhat confident
- 4= Fairly confident
- 5= Completely confident

3.9.4 Knowledge

For each statement in the first five knowledge questions answers were true, false and I don't know. Coding was done by giving one for true, and zero for false, and I do not know. The total number of all statements was 20. Questions 6 - 9 were coded by one for the true answer, and zero for false. The total knowledge score was calculated by the sum of each question score from 1-5 and from 6-9 separately then divided by the total number of questions. The minimum value was 0.1 and maximum value was 0.9 for the first five questions.

The level of knowledge was classified into poor, fair, and good or sufficient based on the knowledge score for the first five questions, Intervals were done from 0-.0.9 and connected each interval from value between 0-100, so according to this value we considered 0-25 was poor knowledge level, 25-50 was fair knowledge level and 50-100 was good or sufficient knowledge level.

3.9.5 Attitudes

This part described participates opinions about oral health care importance through cancer therapy, adoption of oral health protocols, and importance of oral health education and training programs. The statements in the five-point Likert scale were coded from one to five: 1: strongly disagree, 2: disagree, 3: neutral, 4: agree and 5: strongly agree.

The total score was calculated by the sum of each question score and divided by total questions for each section. The minimum value was 2.29 and the maximum value was 5, intervals were done from 1-5 and connected each interval from value between 0-100. So, according to this

value we considered 0-25 was poor attitude level, 25-50 was fair attitude level and 50-100 was good or sufficient attitude level.

3.9.6 Practices

It described the oral health related practices and behaviours of the health care providers. This part consisted of 16 questions that are rated on a five-point likert scale; never :1, rarely :2, sometime :3, usually :4 and always:5.

The total score was calculated by the sum of each question score and divided by total questions for each section. The minimum value was 1 and the maximum value was 5, intervals were done from 1-5 and connected each interval from value between 0-100. So, according to this value we considered 0-25 was poor practice level, 25-50 was fair practice level and 50-100 was good or sufficient practice level.

3.9.7 Willingness to Provide Oral Health Care

This section described health care provider's willingness to provide oral health care, willingness statements were rated as follows: not willing at all:1, somehow not willing, :2, neutral :3, somehow willing :4very willing:5. The total score was calculated by the sum of each question score and divided by total questions for each section. the minimum value was 00 and the maximum value was 5, intervals were done from 1-5 and connected each interval from value between 0-100. So, according to this value we considered 0-25 was poor willingness level, 25-50 was fair willingness level and 50-100 was good or sufficient willingness level.

3.10 Scales Reliability

The study included four scales; knowledge, attitudes, practices, and willingness. The internal consistency of the scale was assessed by the extraction reliability coefficient (Cronbach's alpha) as shown in table (3.5). The reliability of these scales was acceptable as follows:

Section's Title	Ν	Reliability coefficient	
		5	
	• •	A 	
Knowledge Q 1- Knowledge Q 5	20	0.77	
Attitude questions	7	0.92	
runde questions	/	0.72	
Practice questions	16	0.92	
1			
Willingness questions	4	0.86	

Table 3. 5 Reliability Coefficients of Questionnaire's Sections

3.11 **Questionnaire Validity**

The self-reported questionnaire modeled after validated instruments from previous literature. The questionnaire was designed using many previous studies, and published articles such as (Epstein JB, 2007) (Nicole Croyère, 2012) (Nicole Croyère, 2012) (Rebecca Tranmer, 2013) (Jennifer A. Suminski, 2018) (Sharour, 2019) and international oral Manuals and protocols as UK_OM_Guidelines. (2015). The final version of the questionnaire was validated by nine experts in public health, oral pathology, medical oncology and biostatistics. The experts were: Dr.Jomans Jarradat, Dr. Mahoumod Mudalal, Dr. Mahoumod Abu Taa, Dr. Dirar Edbas, Dr. Areej Alkhateb, Dr. Farah Alkhateeb, Dr, Ali Abu Hantash, Dr. Mohammad Jarradat, and Dr. Fisal Awrtani. They verified the questionnaire's accuracy, wording, and references. Finally, the questionnaire was modified according to their suggestions.

3.12 **Data Collection**

After checking the reliability and validity of the study tool in the period from February to April 2021, the questionnaire was distributed to the medical staff at the selected hospital from 15 April to 30 June 2021.

Health care providers in the oncology department completed the questionnaire as required. The response rate was (90.9%) of the distributed questionnaires. Data was entered and analyzed using the (SPSS 20) by the principal investigator.

3.13 Statistical Processing

All data was entered into Excel. Then, data analysis was performed by using Statistical Package for Social Science (SPSS) version 20. Frequencies and percentages were calculated for

categorical variables. Mean, median and standard deviation were calculated for continuous variables.

In order to test the hypothesis, One Way ANOVA Test was conducted to check the differences between numerical data and categorical groups. If a difference was found, a Post Hoc (Tukey's test) was used to find the source of difference between groups. Independent sample T-test was used to check the differences in means between groups in binary Chapter 4: Results

4.1 **Introduction**

Completed questionnaires were collected from health care providers in oncology department. We received 151 questionnaires from the selected hospitals. This chapter displayed a description of the study's sample and statistical analysis to answer our research questions.

4.2 Uni-variable Data Analysis

4.2.1 Section A: Demographic Data:

The main characteristics of our study participants from the seven Palestinian hospitals in West Bank are shown in the below tables (4.1)

The results revealed that (51%) were males, and (49%) were females. Most of the participants aged between 40-49 years (41.7%), and (58.9%) had Bachelor's degree level. More details on the academic qualifications can be

found in table (4.1).

Variable	classifications	Frequency	Percentage (%)
	Male	77	51%
Gender	Female	74	49%
	20-29	13	8.60%
	30-39	62	41.10%
Age	40-49	63	41.70%
-	50-59	11	7.30%
	>60	2	1.30%
	Specialist	34	22.50%
	Residency program	11	7.30%
Academic Qualifications	Master's degree level	10	6.60%
	Bachelor's degree level	89	58.90%
	Diploma degree level	7	4.60%
Total	-	151	100.00%

Table 4. 1 Demographic Characteristics of Samples' Respondents

4.2.2 Section B: Background Information

The results showed that (39.7%) of the respondents have 1-5-year experience in their current profession, while (54%) of the respondents had 1-5-year experience years in oncology department, also the analysis for working hours per week among respondents showed (64.9%) were working 40 to 59 hours per week, and (91.4%) of respondents were working as fulltime.

The participants were consisted of (50.3 %) nurses, (15.9%) resident doctors, (11.3%) medical oncologists and radiotherapy technicians, (6.6 %) hematologists, (3.3%) oral and

maxillofacial surgeons, and (1.3%) radiation oncologists, the majority of participants (49.7%) were senior staff. More details on the descriptive analysis can be found in table (4.2).

Variable	classifications	Frequency	Percentage (%)
Working years in current	> 1 year	5	3.30%
profession	1 to 5 years	60	39.70%
	6 to 10 year	50	33.10%
	11 to 15 years	16	10.60%
Employment Status	Full time	138	91.40%
Employment Status	Part-time	13	8.60%
Working hours per week	less than 20 hours	3	2.00%
in the hospital	20 to 39 hours	45	29.80%
	40 to 59 hours	98	64.90%
	60 to 79 hours	5	3.30%
Working years in the	less than one year	27	17.90%
oncology department	1 to 5 years	82	54.30%
	6 to 10 years	23	15.20%
	11 to 15 years	19	12.60%
	Medical Oncologists	17	11.30%
Position in the hospital	Hematologists	10	6.60%
	Radiation Oncologists	2	1.30%
	Oral and maxillofacial surgeons	5	3.30%
	Resident doctors	24	15.90%
	Nurses	76	50.30%
	Radiotherapy technicians	17	11.30%
Position in the department	Head of department	17	11.30%
r estaon in the department	Senior staff	75	49.70%
	Junior staff	59	39.10%

Table 4. 2 The Descriptive Statistics for Background Information

4.2.3 Section C: Questions about Care Provided

The highest participants were from the hospitals which provided Radiotherapy, Chemotherapy, Bone marrow transplantation (41.1%). There were no dental services available in the hospitals for cancer patients as reported from (84.8%), while the rest have dental services in their hospitals as educational oral care, preventive oral care, pretreatment screening evaluation, dental treatment during cancer therapy, and dental care after cancer therapy.

The study found that (84.8%) of participants didn't have specific oral health protocols and guidelines for cancer patients before starting therapy in their hospital Moreover (43%) didn't have specific orientation program on cancer patients' oral health protocols or guidelines for medical staff before starting therapy in their hospital.

The majority of participants were slightly confident in diagnosing oral complications related to cancer therapy, also (33.1%) of the participants were slightly confident in providing appropriate oral health advice to cancer patients. More details on the responses for general questions has been shown in the following table (4.3).

Variable	classifications	Frequency	Percentage (%)
Cancer therapy service	Radiotherapy, Chemotherapy, Bone marrow transplantation.	62	41.10%
provided in the hospital	Chemotherapy	51	33.80%
	Chemotherapy, Bone marrow transplantation	15	9.80%
	Chemotherapy, Surgery to the head and neck,	14	9.30%
	Surgery to the head and neck	9	6.00%
Presence of dental	No	128	84.80%
services in the hospital	Yes	23	15.20%
Type of dental services in the hospital	Educational oral care, Preventive oral care, Pretreatment screening evaluation, Dental treatment during cancer therapy, and Dental care after cancer therapy	23	15.20%
Specific oral health	Vas	0	0%
protocols or guidelines	105	120	070
for cancer patients	No	128	84.80%
before starting therapy in the hospital	Unsure	23	15.20%
Specific orientation	Yes	65	43.00%
program or oral health	No	35	23.20%
staff before starting	Unsure	51	33.80%
Confident in	Not confident	24	15.90%
diagnosing oral	Slightly confident	50	33.10%
to cancer therapy	Some confident	28	18.50%
	Fairly confident	33	21.90%
	Complete confident	16	10.60%
Confident in providing	Not confident	28	18.50%
appropriate oral health	Slightly confident	50	33.10%
patients	Some confident	22	14.60%
-	Fairly confident	37	24.50%
	Complete confident	14	9.30%

Table 4. 3 The Descriptive Statistics for the General Questions
4.2.4 Section D: Knowledge Questions

Most of health care providers knew the risk factors of oral complications for cancer patients, which result from cancer therapy [the type of oncology treatment, the patient age, the patient general health status, the patient gender and the patient oral hygiene], for example (87.4%) of participants knew the risk factor of oral complications from cancer therapy is the patient oral hygiene. Also the majority of them knew the oral complications from radiotherapy: [xerostomia and salivary changes (dry mouth), mucositis and mucosal changes, osteoradionecrosis, tempromandibular joint fibrosis, muscle trismus, and teeth decay and gum disease] (86.8%) of participants knew xerostomia and salivary changes (dry mouth) were oral complications from radiotherapy.

Regarding their knowledge for Oral complications in Chemotherapy: [Mucositis (inflammation of the mucous membranes), Infection, bleeding, and teeth decay and gum disease] (92.70%) of participants said the mucositis (inflammation of the mucous membranes) was oral complications from Chemotherapy.

The participants were aware of graft versus host disease and infection as oral complications from bone marrow transplantation, with results of (57%), (70.9%) respectively.

The majority of our participants didn't know that cancer therapy causes oral Bacterial, Viral, and Fungal infection with a percentage of (88.1%), (81.5%), (98%) respectively.

Regarding knowledge on pretreatment oral screening (63.6%) of our participants had the knowledge of the recommended pretreatment oral screening before starting cancer therapy, and (51.0%) reported their knowledge about oral complication was not from training courses, while (62.3%) of them updated their knowledge about oral complications resulting from cancer

therapy by training courses, reading articles, and check medical protocols. Finally (13.2%) of the participants did not learn about oral complications at all. Table (4.4) and (4.5) highlighted more details on knowledge questions.

Table 4. 4 Oral Health Knowledge Question From (1-5).

		False/don't
Knowledge research questions	True	know
1. Indicate which of the following choices are considered risk factors of		
oral complications for cancer patients. [Type of oncology treatment]	83.4%	16.6%
1. Indicate which of the following choices are considered risk factors of		
oral complications for cancer patients. [Patient gender]	46.4%	53.6%
1. Indicate which of the following choices are considered risk factors of		
oral complications for cancer patients. [Patient general health status]	73.5%	26.5%
1. Indicate which of the following choices are considered risk factors of		
oral complications for cancer patients. [Patient oral hygiene]	87.4%	12.6%
1. Indicate which of the following choices are considered risk factors of		
oral complications for cancer patients. [Patient age]	79.5%	20.5%
2. Indicate which of the following oral complications are in radiotherapy		
[Xerostomia and Salivary Changes (dry mouth)]	86.8%	13.2%
2. Indicate which of the following oral complications are in radiotherapy		
[Mucositis and Mucosal changes (inflammation of the mucous		
membranes)]	86.1%	13.9%

2. Indicate which of the following oral complications are in radiotherapy		
[Osteoradionecrosis]	57.0%	43.%
2. Indicate which of the following oral complications are in radiotherapy		
[Tempromandibular joint fibrosis]	56.3%	43.7%
2. Indicate which of the following oral complications are in radiotherapy		
[Muscle trismus]	60.9%	39.1%
2. Indicate which of the following oral complications are in radiotherapy		
[Teeth decay and gum disease]	82.8%	17.2%
3. Indicate which of the following oral complications are in		
chemotherapy. [Mucositis (inflammation of the mucous membranes)]	92.7%	7.3%
3. Indicate which of the following oral complications are in		
chemotherapy. [Infection]	78.8%	21.2%
3. Indicate which of the following oral complications are in		
chemotherapy. [Bleeding]	70.9%	29.1%
3. Indicate which of the following oral complications are in		
chemotherapy. [Teeth decay and gum disease]	80.1%	19.9%
4. Indicate which of the following oral complications result from Bone		
marrow transplantation. [Graft versus host disease(GVHD)]	57.0%	43%
4. Indicate which of the following oral complications result from Bone		
marrow transplantation. [Infection]	70.9%	29.1%
5. Indicate which kind of oral infections result from cancer therapy in		
general. [Bacterial]	11.9%	88.1%

5. Indicate which kind of oral infections result from cancer therapy in		
general. [Viral]	18.5%	81.5%
5. Indicate which kind of oral infections result from cancer therapy in		
general. [Fungal]	2.0%	98%

Table 4. 5 Oral Health Knowledge Question from 6-9

Knowledge research questions	True	False
6. I have the knowledge of the recommended pretreatment oral screening		
before starting cancer therapy	63.6%	36.4%
7. My knowledge about oral complication resulted from training courses	49.0%	51.0%
8. I update my knowledge about oral complications resulting from cancer		
therapy by training courses, reading articles, and check medical protocols	62.3%	37.7%
9. I did not learn about oral complications at all	13.2%	86.8%
-		

4.2.5 Section E: Attitude Questions

This section consisted of seven statements regarding attitude with a five-point Likert. Our results found that (60.9%) of all respondents perceived oral health care as not a priority through cancer treatment course, and (47.0%) of our participants were neutral about integration of oral health care with cancer therapy course. Moreover (32.5%) disagreed with the statement" Poor oral hygiene causes complications in the patient's general health". The majority of the participants (78.1%) have neutral attitude with the statement "Oral health education and training programs for a health care provider in the oncology department is important" and (60.9%) of

the participants where neutral with the statement "Following oral health protocols through cancer therapy will decrease oral complications as a result of the therapy". More details are shown in the following table (4.6)

Table 4. 6 Oral Health Attitude

Attitude statements	Strongly disagree	Disagree	Neutral	Agree	Strongly
1. Oral health care is not a priority through	uisugiee	Disugree	Tteutiai	ngice	ugree
cancer treatment course.	3.3%	60.9%	12.6%	7.3%	15.9%
2. Oral health care should be integrated with					
cancer therapy course.	0.0%	10.6%	47.0%	3.3%	39.1%
3. Poor oral hygiene causes complications in					
the patient's general health.	1.3%	32.5%	9.9%	26.5%	29.8%
4.Acute oral/dental pain treatment affects					
cancer therapy continuity	0.0%	27.2%	2.6%	39.1%	31.1%
5. Oral health education and training					
programs for a health care provider in the					
oncology department is important.	2.7%	6.0%	78.1%	5.3%	7.9%
6. Following oral health protocols through					
cancer therapy will decrease oral					
complications as a result of the therapy.	2.0%	1.3%	60.9%	4.0%	31.8%
7. It's important to learn about oral health					
during undergraduate training.	6.6%	20.5%	8.7%	34.4%	29.8%

4.2.6 Section F: Practice Questions

This part assessed the practice of health care provider regarding oral health in cancer patients through 16 questions with Likert scale. Clear results are shown in the table (4.7).

Participants were usually (41%) provided oral health consultations to patients before starting cancer therapy. They sometimes (30.5%) coordinated between the oncology team and dentists when the dental pain occurred, and they documented oral complications, in the patient's file. On practices with regards to patients, sometimes patients were informed of oral complications, by (32.5%) of health care staff, also (35.1%) of participants sometimes asked cancer patients about the history of oral or dental problems. Only (35.1%) of staff instructed patients to maintain good oral hygiene levels through the cancer therapy course, and (35.8%) advised patients to stop orthodontic treatment during the course of radiotherapy or chemotherapy.

Moreover, they rarely (27.2%) advised patients to use fluoride supplementation, while (38.4%) of the staff recommended mouthwash or mouth rinse during therapy (normal saline, and chlorhexidine), and (29.8%) they sometimes provided prophylactic antifungal during cancer therapy, also sometimes (37.7%) they used prophylactic antibiotics before dental referral, and sometimes (46.4%) they used antiviral drugs during chemotherapy. More details on oral practices regarding palliative measures and specific exercises can be found in the following table (4.7).

Table 4. 7 Oral Health Practice

Practice research questions	Never	Rarely	Sometime	Usually	Always
1. Do you provide oral health consultations to					
patients before starting cancer therapy?	8.6%	14.6%	21.2%	41.1%	14.5%
2. If the patient during cancer treatment complained					
about acute dental pain, do you coordinate between					
the oncology team and dentist?	10.5%	9.3%	30.5%	27.2%	22.5%
3. Do you document oral complications, when it					
happens, in the patent's file?	9.9%	9.3%	30.5%	26.5%	23.8%
4. Do you inform the patient of oral complications,					
which happen from cancer therapy?		8.6%	32.5%	24.5%	29.1%
5. Do you ask cancer patients about the history of					
oral/dental problems?	7.3%	6.6%	35.1%	33.1%	17.9%
6. Do you instruct patients to maintain good oral					
hygiene levels through the cancer therapy course?	2.7%	2.6%	33.8%	35.1%	25.8%
7. Do you advise patients to stop orthodontic					
treatment during radiotherapy or chemotherapy?		19.2%	19.2%	35.8%	13.9%
8. Do you advise patients to use Fluoride					
supplementation?	21.2%	27.1%	19.2%	25.2%	7.3%
9. Do you recommend mouthwash or mouth rinse					
during therapy (normal saline, Chlorhexidine)?	4.6%	11.9%	23.2%	21.9%	38.4%

10. Do you provide prophylactic antifungal during					
cancer therapy?	9.3%	15.9%	29.8%	27.2%	17.8%
11. Do you use prophylactic antibiotics before					
dental referral?	11.3%	13.2%	37.7%	32.5%	5.3%
12. Do you use antiviral drugs during					
chemotherapy?	9.2%	15.2%	46.4%	23.2%	6.0%
13. Do you recommend palliative measures for dry					
lips and use mouth lubricants (lip balm or lip cream,					
Water-soluble lubricants, drink water frequently)?	4.0%	13.8%	33.8%	33.8%	14.6%
14.Do you recommend palliative					
measures/medications for oral pain related to					
mucositis	4.0%	13.9%	31.1%	35.8%	15.2%
15. Do you inform the patients to make jaw					
exercises to minimize mouth opening restriction?	12.5%	25.2%	27.2%	27.8%	7.3%
16. Do you advise patients to have follow-up dental					
appointments after cancer therapy?	4.6%	11.3%	21.2%	42.4%	20.5%

4.2.7 Section G: willingness

The final section was to analyze the willingness of health care providers in the hospitals; we found that (36.4%) of participants were somehow willing to get more information about oral health during cancer therapy, and (44.4%) were willing to get training courses about oral health care in cancer therapy. In addition, (43.0%) of the participants were somehow willing

to provide oral health instructions for cancer patients and (47.7%) of them were somehow willing to follow oral health care protocols during cancer therapy. All the willingness results are listed in table (4.8).

	Not willing	Somehow		Somehow	Very
Willingness research questions	at all	not willing	Neutral	willing	willing
1. Getting more information					
about oral health during cancer					
therapy.	2.6%	4.0%	21.9%	36.4%	35.1%
2. Getting training courses about					
oral health care in cancer					
therapy.	2.0%	10.6%	17.2%	44.4%	25.8%
3. Providing oral health					
instructions for cancer patients.	3.4%	6.6%	13.2%	43.0%	33.8%
4. Following oral health care					
protocols during cancer therapy.	4.0%	4.0%	10.5%	47.7%	33.8%

Table 4. 8 The Willingness among Health Care Providers Regarding Oral Health Care

4.3 Health Care Provider Total (KAP) and Willingness Scores, and Level.

The mean of knowledge, attitude, practice, and willingness total scores were calculated by the sum of the responses for all respondents and divide by the total number of questions for each section. The minimum and maximum scores and St. Deviation were also calculated. The main results are shown in table (4.9).

Variable	Minimum	Maximum	Mean	Std. Deviation
Knowledge score	0.10	0.90	0.64	0.17
Attitude score	2.29	5.00	3.42	0.58
Practice score	1.00	5.00	3.35	0.76
Willingness score	1.00	5.00	3.92	0.86

Table 4. 9 Knowledge, Attitude, Practice and Willingness Score

The level of knowledge, attitude, practice, and willingness was classified into poor, fair, and good or sufficient based on their scores, Intervals were done and connected each interval from value between 0-100, so according to this value we considered 0-25 was poor level, 25-50 was fair level and 50-100 was good or sufficient level, in table (4.10) we classified the respondent's knowledge, attitude, practice, and willingness as poor, fair, and good/sufficient.

Variable	Poor	Fair	Good or Sufficient
Knowledge level	12.6%	31.8%	55.6%
Attitude level	17.9%	60.3%	21.9%
Practice level	32.5%	44.4%	23.2%
Willingness level	12.6%	27.2%	60.3%

Table 4. 10 Knowledge Attitude, Practice, and Willingness Level

4.4 **Bi-Variable Analysis**

4.4.1 Relations between Staff's (KAP) and Willingness Scores and Demographic Characteristics (Age, Gender, and Educational Qualifications).

Relations between Staff's (KAP) and Willingness Scores and Age

By using one-way ANOVA test, significant relation identified between knowledge score and age. To check the source of differences, Post Hoc (Tukey's) Test was used, the knowledge score was highest among the age more than sixty years, while, attitude, practice and willingness scores

were not significant with age. Healthcare provider's attitude, practice and willingness were not affected by participants age as reported in table (4.11).

Variable	Source of Variance	Mean Square	F	Sig.
Knowledge	Between Groups	0.061		0.07
score	Within Groups	0.029	2.15	
Attitude score Between Groups		0.97	0.96	0.43
Attitude score	Within Groups	0.46		
Prostico scoro	Between Groups	0.19	0.33	0.85
Flactice score	Within Groups	0.59		
Willingness	Between Groups	0.88	1.19	0.31
score	Within Groups	0.74		

Table 4. 11 Relations between Staff's (KAP) and Willingness Scores and Age Using One Way ANOVA test

Relations between staff's (KAP) and willingness scores and gender.

Using Independent sample t test, we found a statistically significant difference between mean of oral health practice score, willingness score and gender. By comparing mean for variables, results showed that male has higher score's mean comparing to female regarding practice score, and willingness score. However, no significant differences of healthcare provider's knowledge, attitude about oral healthcare with regards to gender as shown in the table (4.12)

			T-test for Equality of Means				
Variable		Mean		t	Degree of Freedom	F	Sig
Knowledge	Male	0.64	Equal variances assumed	0.6	149	0.1	0.0
score	Female	0.64	Equal variances not assumed	0.6	148.9	0.1	0.9
Attitude score	Male	3.49	Equal variances assumed	1.38	149	1 /	0.11
Attitude score	Female	3.7	Equal variances not assumed	1.39	148.02	1.4	0.11
Prostigo sooro	Male	3.47	Equal variances assumed	ances ed 2.02 14		3 /	0.04
r lactice scole	Female	3.22	Equal variances not assumed	2.01	134.52	5.4	0.04
Willingness	Male	4.04	Equal variances assumed	1.84	149	14 9	0.06
score	Female	3.79	Equal variances not assumed	1.83	123.79	11.7	0.00

Table 4. 12 Relations between Staff's (KAP) and Willingness Scores and Gender by Using Independent Sample T Test

Relations between staff's (KAP) and willingness scores and their educational qualifications.

One-Way ANOVA was used to determine whether there was a statistically significant differences on participant's knowledge, attitude, practice and willingness scores and their educational qualifications. No significant relation between attitude scores and willingness scores with regards to educational level. However, there was a significant relationship between knowledge scores and practice scores and level of education among the healthcare providers. To check the source of differences, Post Hoc (Tukey's) Test was used; the knowledge score and practice score was highest among specialists, more details can be followed in table (4.13)

Variable	Source of Variance	Sum of Squares	Degree of Freedom	Mean Square	F	Sig
Knowledge score	Between Groups	0.52	4	0.13	4.87	0.001
	Within Groups	3.89	146	0.027		
	Total	4.41	150			
	Between Groups	0.54	4	0.135	0.38	0.817
Attitude score	Within Groups	50.72	146	0.347		
	Total	51.26	150			
	Between Groups	9.76	4	2.442	4.62	0.002
Practice score	Within Groups	77.11	146	0.528		
	Total	86.883	150			
Willingness score	Between Groups	3.166	4	0.79	1.06	0.371
	Within Groups	108.98	146	0.74		
	Total	112.14	150			

Table 4. 13 Relations between Staff's (KAP) and Willingness Scores and Educational Qualification by Using One Way ANOVA Test

4.4.2 Relations between Staff's (KAP) and Willingness Scores and

Background Information (Experience)

Relations between Staff's (KAP) and willingness scores and their working years in current

profession.

One-way ANOVA test was used; the results showed there was no significant relation between knowledge, attitude, practice and willingness scores and working years in current profession, more details can be shown in table (4.14)

Variable	Source of Variance	Sum of Squares	Degree of Freedom	Mean Square	F	Sig
	Between Groups	0.079	5	0.016	0.529	0.75
Score	Within Groups	4.335	145	0.03		
	Total	4.414	150			
A 1	Between Groups	0.365	5	0.073	0.208	0.95
Attitude score	Within Groups	50.895	145	0.351		
	Total	51.26	150			
	Between Groups	1.276	5	0.255	0.432	0.82
Practice score	Within Groups	85.606	145	0.59		
	Total	86.883	150			
*****	Between Groups	3.287	5	0.657	0.876	0.49
score	Within Groups	108.861	145	0.751		
	Total	112.148	150			

Table 4. 14 Relations between Staff's (KAP) and Willingness Scores and Their Working Years in the Profession

Relations between staff's (KAP) and willingness scores and their employment status.

Using Independent sample t test reported significant relation between practice score and willingness score regarding participants employment status, by comparing the mean for variables, we found the part time employee had higher mean than fulltime.

Knowledge, attitude, practice and willingness scores and employment status see table (4.15)

			T-test for Equality of Means				
Variable		Mean		t	Degree of Freedom	F	Sig
Knowledge	full time	0.63	Equal variances assumed	1.035	149	0.202	0.33
score part time	part time	0.69	Equal variances not assumed	0.6	14.2	0.202	0.55
Attitude full		3.4	Equal variances assumed 1.172 149		0.062	0.238	
score pa tin	part time	3.6	Equal variances not assumed	1.23	14.5	0.002	0.238
Practice full 3		3.3	Equal variances assumed	1.876	149	0 226	0.046
score p ti	part time	3.7	Equal variances not assumed	2.175	15.423	0.330	0.040
Willingness	full time	3.8	Equal variances assumed	1.606	149	1 47	0.052
score	part time	4.3	Equal variances not assumed	2.092	16.636	1.4/	0.032

Table 4. 15 Relations between Staff's (KAP) and Willingness Scores and Their Employment Status Using Independent Sample T Test

Relations between staff's (KAP) and willingness scores and, working hours in the hospital.

One-way ANOVA test results showed significant relation willingness scores and working hours in the hospital per week, Post Hoc (Tukey's) Test was used. To check the source differences, healthcare providers who worked between 20-39 hours per week had the highest mean of willingness comparing to others.

Also our findings reported no significant relation between knowledge, attitude, practice and working hours in the hospital, more data found in table (4.16)

Variable	Source of Variance	Sum of Squares	Degree of Freedom	Mean Square	F	Sig
Knowledge score	Between Groups	0.25	3	0.08	1.2	0.3
	Within Groups	9.92	147	0.06		
	Total	10.18	150			
Attitude score	Between Groups	0.56	3	0.18	0.284	0.83
	Within Groups	71.08	147	0.48		
	Total	71.64	150			
Practice score	Between Groups	0.22	3	0.07	0.127	0.94
	Within Groups	86.65	147	0.59		
	Total	86.88	150			
Willingness score	Between Groups	5.35	3	1.78	2.5	0.06
	Within Groups	106.79	147	0.72		
	Total	112.14	150			

Table 4. 16 Relations between Staff's (KAP) and Willingness Scores and Their Working Hours in the Hospital, By Using One-Way ANOVA

Relations between staff's (KAP) and willingness scores and working years in oncology departments

Also, no significant relation was found between staff's knowledge, attitude, practice and willingness scores and working years in oncology departments. More details can be followed in table (4.17)

Variable	Source of Variance	Sum of Squares	Degree of Freedom	Mean Square	F	Sig
Knowledge	Between Groups	0.025	3	0.008	0.275	0.83
score	Within Groups	4.389	147	0.03		
	Total	4.414	150			
Attitude	Between Groups	0.407	3	0.136	0.392	0.75
score	Within Groups	50.853	147	0.346		
	Total	51.26	150			
Practice	Between Groups	2.114	3	0.705	1.222	0.304
score	Within Groups	84.769	147	0.577		
	Total	86.883	150			
Willingness	Between Groups	0.008	3	0.003	0.003	1
score	Within Groups	112.14	147	0.763		
	Total	112.148	150			

Table 4. 17 Relations between Staff's (KAP) and Willingness Scores and Working Years in Oncology Department by Using One-Way ANOVA

Relations between staff's (KAP) and willingness scores and their position in the hospital

No significant relation between staff's attitude, practice and willingness scores and their position in their hospital as shown in table (4.18). However, knowledge score was found significant according to the position in the hospital. To check the source differences Post Hoc (Tukey's) Test was used. Medical Oncologist had the highest mean of knowledge comparing to others. More details about knowledge means among health care providers can be found in table (4.19).

Variable	Source of Variance	Sum of Squares	Degree of Freedom	Mean Square	F	Sig
Knowledge score	Between Groups	0.83	6	0.138	5.56	0.001
	Within Groups	3.58	144	0.025		
Attitude score	Between Groups	0.61	6	0.1	0.29	0.9
	Within Groups	50.64	144	0.35		
Practice score	Between Groups	5.973	6	0.995	1.77	0.1
	Within Groups	80.91	144	0.562		
Willingness score	Between Groups	4.19	6	0.698	0.93	0.47
	Within Groups	107.959	144	0.75		

Table 4. 18 Relations between Staff's (KAP) and Willingness Scores and Their Position in the Hospitals by Using One-Way ANOVA

Table 4. 19 Knowledge Mean among Health Care Providers by Using Post Hoc (Tukey's) Test

Position In Hospital	Number	Mean	Std.Deviation
Medical Oncologists	17	0.74	0.13
Hematologists	10	0.73	0.16
Radiation Oncologists	2	0.71	0.21
Resident doctors	24	0.7	0.12
Oral and maxillofacial surgeons	5	0.67	0.17
Nurses	76	0.61	0.15
Radiotherapy technicians	17	0.48	0.21
Total	151	0.64	0.17

Relations between staff's (KAP) and willingness scores and their position in department

Knowledge, and practice scores were significant regarding position in the department. To check the source differences Post Hoc (Tukey's) test was used. Knowledge and practice scores means were found higher among head of department than seniors and juniors. However attitude and willingness scores were not significant with regards to position in the department see table (4.20).

Table 4. 20 Relations between Staff's (KAP) And Willingness Scores and Their Position in the Department, by using One-Way ANOVA

Variable	Source of Variance	Sum of Squares	Degree of Freedom	Mean Square	F	Sig
Knowledge score	Between Groups	0.2	2	0.1	3.65	0.028
	Within Groups	4.2	148	0.02		
Attitude score	Between Groups	0.78	2	0.39	1.15	0.31
	Within Groups	50.47	148	0.34		
Practice score	Between Groups	4.16	2	2.08	3.72	0.026
	Within Groups	82.71	148	0.55		
Willingness score	Between Groups	3.13	2	1.56	2.12	0.123
-	Within Groups	109.01	148	0.73		

4.5 Correlation between (KAP), and Willingness.

Person's correlation was used to assess the potential relationship between Knowledge& attitude, knowledge& practices, knowledge & willingness, attitude & practices, attitude & willingness, and practices & willingness scores. A strong positive correlation between Knowledge & practices, Knowledge & willingness, and practices & willingness as shown in table (4.21)

Variable		Knowledge score	Attitude score	Practice score	Willingness score
Knowledge	Pearson Correlation	1	0.06	0.179^{*}	0.169*
score	Sig. (2-tailed)		0.466	0.028	0.038
Attitude score	Pearson Correlation	0.06	1	0.01	-0.004
	Sig. (2-tailed)	0.466		0.902	0.964
Practice score	Pearson Correlation	0.179*	0.01	1	.216**
	Sig. (2-tailed)	0.028	0.902		0.008
Willingness	Pearson Correlation	0.169*	-0.004	0.216**	1
score	Sig. (2-tailed)	0.038	0.964	0.008	
	N	151	151	151	151

Table 4. 21 Correlation between (KAP) and Willingness

Chapter 5: Discussion, Conclusion and Recommendations

5.1 **Introduction:**

This chapter discusses the findings of the study, which aimed to assess the oral health care knowledge, attitudes, practices, and willingness among health care providers in the oncology department in governmental and private Palestinian hospitals using a self-constructed questionnaire. We found the medical staff had good willingness level (60.3%). They revealed the willingness to get more information about oral health during cancer therapy through training courses, and educational programs. Also, they had the willingness to provide oral health instructions and advice to cancer patients about oral health. Moreover, they expressed the desire to follow oral health care protocols and guidelines during cancer therapy. Also, the participants had a sufficient level of knowledge regarding to oral health and oral complications from cancer therapy, but they had a fair attitude level and practice or behavior level. Our findings were influenced by gender, age, employment status, working hours in the hospital, educational level, position in the hospital, and position in department.

This study found that there were no specific oral health protocols and guidelines in place about oral health care for cancer patients and medical staff before, during and after cancer therapy in most of the hospitals assessed in our study. In addition, there were no orientation programs specific to oral health care for cancer patients targeting medical staff in oncology departments in the current sample, as reported from Ongole study in India the protocol should be modified to be more appropriate for performing good oral care in the cancer department, according to 86.7 % of the respondents. The rest said there was no oral care protocol or policy for cancer patients (Ongole, 2019).

The majority of participants were "slightly confident" in diagnosing oral complications related to cancer therapy and providing appropriate oral health advice to cancer patients in contrast to a study in the USA among Pediatric Oncology and Hematology Nurses in which over 70% of participants were said to be a really confident in examining the oral pain, giving oral hygiene instructions, and addressing the importance of getting regular professional dental care. (Perry AD, 2015).

The highest participants were from the hospital which provided Radiotherapy, Chemotherapy, Bone marrow transplantation (41.1%) while other hospitals only provided limited cancer therapy services, and as such the medical staff was small there.

One hundred twenty-eight (84.8%) of the participants reported they didn't provide oral health care services to cancer patients as part of their duties, while the rest had dental services in their hospitals as educational oral care, preventive oral care, pretreatment screening evaluation, dental treatment during cancer therapy, and dental care after cancer therapy. These hospitals were governmental hospitals and contained a maxillofacial department. So, the corporation and consultation will be facilitated between oncology department and maxillofacial department in the same hospital or from other hospitals.

5.2 The Level of (KAP), And Willingness among Health Care Providers in the Oncology Department Regarding Oral Health for Cancer Patients.

5.2.1 Knowledge Level

Most health care providers (55.6%) had a good knowledge level; they knew the risk factors of oral complications for cancer patients which resulted from cancer therapy. Also, the majority of them knew the type of oral complications from cancer therapy. These findings supported the results found in the survey among in the USA in 2015 and a study in Jordan in 2019, which showed that all (100%) of respondents were aware of potential oral complications associated with cancer treatment as well as oral health care advice for patients (Perry AD, 2015) and (48.5%) had a satisfactory level of knowledge regarding oral health (Sharour, 2019). In contrast to results found in India in which the majority of staff nurses had inadequate knowledge of oral care (Ongole, 2019).

Moreover, our results demonstrated that (63.6%) of medical staff in our sample knew the recommended pretreatment oral screening before starting cancer therapy as oral health international guidelines and recommendations, in contrast to Araújo findings in Brazil which indicated that (78.9%) of staff was unfamiliar with oral care guidelines and lacked specific knowledge that should be provided to patients (Araújo, 2015).

Also, our results showed that (49.0%) of participants said that their knowledge about oral complications was gained from training courses. These results agree with results from study in

Singapore in which most of the participants (81.4%) reported that they had obtained their oral care knowledge from their training courses (Chan EY, 2012). Additionally, a previous study in Ireland showed that the majority of nurses (71%) garnered oral care training during their basic training, but it was only for a short time, while only (11%) had obtained updates since qualifying (Costello T, 2008), in contrast to later study from Jordan among oncology nurses in which (96.4%) of the participants didn't receive education and training courses during their career (Sharour, 2019).

Our participants (62.3%) updated their knowledge about cancer related oral complications regularly through either training courses or reading recent articles. This finding was supported by study results in the USA among oncology nurses which showed that (75%) of the respondents received three hours or less of education and training regarding to oral health care to update their oral health information (Perry AD, 2015).

Moreover ,(13.2%) of our staff didn't learn about oral complications at all, higher results were found in the previous studies by Rebecca Tranmer in 2013, and Radhika R Pai in 2015 ,in which (75%) and (72.8%) of their respondents respectively had little oral health content in their primary education (Rebecca Tranmer, 2013) (Radhika R Pai, 2015).

5.2.2 Attitude Level

The majority of current participants had a fair attitude towards oral health (60.3 %). In this study, the medical staff (23.2%) believed that oral health care was necessary through cancer therapy course and that the implementation of basic oral care protocols and guidelines was obligatory in cancer therapy plan.

92

Moreover, (34.4 %) of medical staff in our sample believed that" poor oral hygiene induces complications in the patient's overall health", while in a previous study in 2012 performed by Chan EY in Singapore found that more than (80%) of participants believed that good oral health care had a significant impact on patient's clinical outcomes (Chan EY, 2012)

Thirteen point two percent of our sample reported the oral health education and training programs for a health care providers in the oncology department were important, while in Ongole's study, he reported (81%) of his respondents expressed the a need for continuing education in oral care (Ongole, 2019) . In an earlier study of 100 oncology nurses in Ireland, (94.5%) of all respondents emphasized the importance of continuing education regarding oral health for cancer patients.(Southern, 2007).

The results of our study showed (35.8%) of staff believed that oral health protocols through cancer therapy will minimize oral complications related to cancer therapy. These complications can be serious and impairing to the patient's quality of life and the cancer therapy outcome (Firoozeh Samim1, 2016).

The importance of oral health integration with cancer therapy plan was emphasized by (42.4 %) of the current medical staff, which was supported by findings from study among medical staff from 20 radiation oncology centers in India in which all oncologists strongly believed in dental consultation for patients undergoing radiotherapy that will improve quality of life for cancer patients (Mainali A, 2011).

5.2.3 Practice Level

In general, (23.2%) respondents had good practice level; they were aware of clinical oral health care guidelines for cancer patients and knew the strategies and recommendations through cancer therapy course among patients. This agrees with the results reported in a study conducted by Barker in 2005 among 212 MASCC/ISOO members around the world with different dental and medical backgrounds (Barker, 2005). It is very ethical and critical to inform the patients about the type of treatment and possibility of oral complications besides the importance of early detection and diagnosis to prevent delays in the delivery of effective cancer treatment (Männle, 2019),(32.5%) of our respondents informed and communicated with patients about oral complications through cancer therapy, higher rates from southern study in 2007 which the majority of staff (65.3%) always informed the patients about oral complications could result from cancer therapy (Southern, 2007).

According to our study results, the practice level was fair in (44.4%) of our sample which was inadequate; and this leads to less than optimum oral care provision to cancer patients (Radhika R Pai, 2015). This could be due to the lack of clear and obligatory protocol for oral health care before, during and after cancer therapy in oncology departments included in our sample. Literature cited the following reasons for oncology departments that minimize the application of knowledge and the adoption of beliefs and thoughts based on clinical guidelines and oral health protocols such as: Health care professional awareness gaps (McGuire, 2003) (Costello T, 2008), lack of accepted universal protocols for oral health evaluation and documentation which lead to different oral care approach through cancer therapy, moreover absence of integrated ,collaboration work, and inadequate communication between health care providers

(McGuire, 2003) (Patel Y, 2012) (Dang, 2016),moreover the lack of appropriate equipment, insufficient recourses and lack of time between initial oral health consultation and the start of cancer therapy that will hinder the delivery of adequate and timely oral care (Costello T, 2008) (Patel Y, 2012) (Dang, 2016).

The finding of Patel Y study in Michigan in 2012 among dentists' and Radiation Oncologists showed (10%) of the dentists and (25%) of the radiation Oncologists said they didn't treat head and neck cancer patients because they didn't have enough training, also (55%) of dentists said they lacked adequate training to treat patients who had received head and neck radiation therapy. (Patel Y, 2012).

The current findings showed that (25.8%) of our participants instructed the patients to maintain good oral hygiene levels and provided advice regarding oral health through the cancer therapy. Also, (14.6%) of them always provided oral health consultations to patients before starting cancer therapy. The same findings were found in a study among medical staff in the USA in 2015 where approximately (39%) of the survey participants provided oral hygiene instructions and management of oral complications and (31%) of respondents referred patients to dental professionals through cancer therapy. (Perry AD, 2015) , higher rates from Southern findings in which the majority of respondents (79.2%) referred patients undergoing cancer therapy to dentists (Southern, 2007),in contrast to findings reported by Sharour in 2019 in his study in which (69.3%) of the participants provided poor advice to patients regarding oral care and management. (Sharour, 2019)

5.2.4 Willingness Level

According to our study results, the willingness level was good (60.3%) ,the majority of our sample (76.8%) showed willingness to provide oral health care such as : patient's consultations with health professionals, providing oral health instructions for cancer patients to maintain good oral hygiene, like teeth brushing, using Fluoride supplements ,and using mouthwash. Also, (81.5%) had the willingness to follow oral health care protocols during cancer therapy. Moreover, (71.5%) of the medical staff showed their willingness and desire to receive education and training about oral health, and this rate was lower than a previous study which was conducted in Jordan in which (91.4%) of participants wanted to enroll in continuous oral health education programs (Sharour, 2019) and a survey in the USA in which (91%) of survey respondents expressed a desire to take continuous education courses relating the oral health care (Perry AD, 2015), also Southern in his study among 100 nurses reported the interest and willingness to update oral health knowledge from all study participants(Southern, 2007).

5.3 The Relationships between Demographic Variables (Age, Gender, and Level of Education), Background Information (Working Experience) and Oral Health Care (KAP) and Willingness.

5.3.1 Knowledge

In this study, there was significant relation identified between knowledge score and age among the participants age more than sixty years, while no significant relation was shown with gender of participants. The same results reported by Radhika in 2015, (Radhika R Pai, 2015).

Also, no significant relation was shown between knowledge score and working years in the profession, employment status, and working hours in the hospital and working years in oncology departments, in contrast to the study performed by Sharour which showed a positive relation between years of experience and level of oral health knowledge (Sharour, 2019).

On the other hand, it was found the knowledge score was affected by the education level among the healthcare providers. It was seen to be highest among specialists. This is in line with results of a study in Jordan, which revealed a positive correlation between the level of education and level of knowledge regarding oral care (Sharour, 2019).

Moreover, the knowledge score was related significantly with the position in hospital. Knowledge score was highest among medical oncologists than any other professions among participants, also, our study showed a significant difference between groups (head of department, senior, and junior) and the knowledge score.

5.3.2 Attitude

According to our study's results, there was no statistical significant associations between attitude score, demographic feature (age, gender, and education level), and working experience (working years in the profession, employment status, working hours in the hospital, working years in oncology departments, position in hospital ,and position department) among participants.

A study in 2008 in Sweden assessed nursing staff's understanding of oral health care for cancer patients that used interventions to influence attitudes to oral health care and 'knowledge of importance' it was found that general knowledge improvement was possible, but changing attitudes and specific knowledge about the oral cavity was difficult. (Inger Wa[°]rdh, 2008)

5.3.3 Practice

Data indicated there was no statistical significant associations between practice score with (age, working years in the profession, working hours in the hospital, working years in oncology departments, and position in hospital) of participants.

Significant association between practice score and gender, this difference was found related to males; in addition, education level was associated significantly with practice score among specialists. Rebecca Tranmere in her study reported that the use of oral protocols and oral

management improved as oral healthcare education and years of experience increased (Rebecca Tranmer, 2013). Medical staff can change their behavior and practices toward oral health care, and management with knowledge and experience (Sharour, 2019).

According to our findings, there was a significant relationship between participants' employment status and practice among part-time employees. Also, it showed that the head of departments had impact on oral health practice. This contrasts to study results in Jordan that reported no significant differences found among staff gender, job titles, and skill performance (Sharour, 2019).

5.3.4 Willingness

We revealed a relation between oral health willingness score and gender, in which males scoring higher than females.

Our findings showed a strong relationship between participants' willingness score and their employment status; we noticed that part-time employees were more willing to provide oral health care to cancer patients than full-time staff members.

The study provided a correlation between willingness scores and hospital working hours per week, with healthcare providers working 20-39 hours per week got the highest mean of willingness compared to others.

5.4 The Relationships between Oral Health Care (KAP) and Willingness among Health Care Providers.

The results showed a strong positive relationship between knowledge & practices, knowledge & willingness, and practices & willingness. Previous literatures cited "the practice is the behavior or the activity that reflects the development of information and the improvement of attitude (Wan, 2016) this result supported the study results performed by Ying-Siou Lin in Taiwan, in which the medical staff who performed oral care more frequently had higher scores on oral care knowledge. (Ying-Siou Lin, 2011)

Study was conducted by Burhenn as an interventional study conducted in California in 2016 among oncology nursing staff regarding elderly care for cancer patients. It was discovered that there were statistically significant increase in nurses' knowledge after the development of an educational program, while nurses' attitudes stayed the same pre- and posteducation (Burhenn PS, 2016).

Studies had shown the knowledge of oral health care through cancer therapy, as well as the use of oral care standards among oncology teams, is important in management the oral complications (Rebecca Tranmer, 2013) and provide adequate oral care for cancer patients (Radhika R Pai, 2015).

5.5 **Study Limitations**

The sample was not from all hospitals in Palestine, and hospitals in Gaza were not included., therefore generalization of results for all heath care provider in Palestine is not acceptable, moreover may some confounding factors that influenced our results especially in the practice part, which was not examined in our research. Also, may some participants answers were to appear more favorable that led to study bias, and it's difficult to determine the actual variables that influence one another in the cross-sectional studies finally, there were inadequate articles and studies examined the knowledge, attitude, practice and willingness among oncology staff.

5.6 **Future Research Directions**

Later studies must be conducted to investigate the following:

- The prevalence of oral complications among cancer patients in Palestine
- To investigate the barriers in providing oral care for cancer patients.
- Interventional studies should be performed to assess the KAP improvement after intervention among oncology staff

5.7 **Conclusion**

In general, it was found through this study that the medical staff in the oncology department had sufficient knowledge about oral health care through cancer therapy, but they didn't provide oral health care management that matches their knowledge.

Moreover, they had the desire and the willingness to follow oral health protocols and obtain more oral health information.

According to the study's findings, more oral health education during undergraduate programs is required, and introduction of continuing oral health care education programs to improve knowledge for oncology professionals.

5.8 **Recommendations**

- 1. National plan recognizing that oral health care is necessary for patients with cancer.
- 2. Increase in the awareness of the importance of oral health care providers (for cancer patients among health providers.
- 3. Development of a specific protocol including evidence-based interventions and recommendations (Barker, 2005)
- 4. Implementing strategies for adoption of oral health care standards and guidelines.
- Collaborations between experienced oncology members with other health providers (Samim F, 2016) (Health T. R., 2018)
- 6. Promote continuous training and educational updates for oncology members.

Developing cross-teaching models which dental professionals participate in teaching nursing students (Jennifer A. Suminski, 2018).
Appendices

Appendix 1. Arab American University Thesis Approval

Faculty of Graduate Studies
Study title: "Assessment of oral health care protocols, before, during and after cancer in Palestinian hospitals: Cross-sectional survey and a chart review,"
Submitted By:
Student's Name: Reem Sudqi Daghlas
Supervisor: Dr. Shahenar Najjar
Co-advisor: Dr. Elham Kateeb
Date Reviewed:
31 March 2020
Date approved:
12 May 2026
Study titled: "Assessment of oral health care protocols, before, during and after can therapy in Palestinian bospitals: Cross-sectional survey and a chart review," was re AAUP research committee for research and ethical principles and was approved on 12 N
Dr. Mohammed Omran
Dean of Graduate studies

the second se

Appendix 2. The Ministry of Health Approval

State of Palestine دولــــة فـلسطين Ministry of Health وزارة الصحة Minister's Office مكتب الوزير تولية الإستخرر 腕 حضرة الباحثة الدكتورة ريم دغلس 20/1257/ :/48-712 ثمت الموافقة على البحث المقدم من طرفكم يعقوان: Evaluation of oral health knowledge, attiudeand practice among health care providers in oncology departments in Palestinian hospitals about oral health care (before, during and after) cancer therapy: Cross-sectional survey and a chart review. على أن يتم الالتزام بالشروط والمعايير التالية: 1- الالتزام باخلاقيات البحث العلمي و المريه التامه 2- تعديد البيانات المطلوبة ومصدرها من خلال ارسال كتاب للجنة على الايميل .dr.mustafa.qawasma@gmail.com 3- تحديد الباحث الرئيسي والباحثين المشاركتين على ان يتم الاخذ بعين الاعتبار كل من ساهم في هذا البحث من وزارة صحة أو غيرها. 4- يجب الاشارة عند نشر البحث الى وزارة الصحة الفاسطينية كمصدر للمعلومات 5- يجب اخذ موافقة ثجنة البحث العلمي على نثائج البحث قبل النشر . 6- يمنع اعطاء المعلومات المقدمة من وزارة الصحة بهتف هذا البحث مع اي جهة او اشغامن وذلك تحت المسؤولية. ومن سالم الك 15.0 زبرة ورارة الصحة - نابلس - تلفين - 2023/07-10 ملكس - 09/234/77 ورارة الصحة - بام الله - خانه مجمع فلسطين الطبي تلقين - 2020/2010 فلكس - 2020/2010 مرارة الصحة - ديرة - تلفين - 2020/2010 فلكس - 2022/2010 Ministry of Health - Nablus-Tel.: 09/2384771/6 - Fax: 09/2384777 Ministry of Health -Ronallah Behind Palestine Medical Complex Tel: 02/2964183 - Fux : 02/2964182 Ministry of Health - Gaza-Tel : 08/2846949 - Fax : 08/2828/295 2

Appendix 3. Al-Najah University Hospital Approval

Arab American University	الجامعة العدبية الأمديكية
11 in an	العليات العليا
	الى من يهمه الامر
مهمة بحثية	<u>سهيل</u>
	تحية طيبة وبعد.
ليب التميلت، وبالإشارة الى الموضوع أحلامه تلمية كلية الدراسات ممل الرقم الجاممي 2018/1202 هي ملائلة ماجستير في الجنمعة بي دراسة علمية تحت الثراف ديشاهيلار نجار ود. الهام القطيب، بي المعلومات اللازمة للتراسة، علما أن المعلومات ستستغلم لغانية الرسالة بناءً على علليها.	تهديكم لكنية الدراسات العليا في الجامعة العربية الامريكية ا الحليا في الجامعة ان الطالبة ويم صدقي احمد ذغاس والتي ت العربية الامريكية في بردامج المعلوماتية المسعية، وتعمل عل ذاهل من خضرتكم الايعار امن بلزم اساعانها للعصول عا البحث فقط وسيتم التعامل معها بغاية السرية وقد العليت هذه
يل فاتق الاحترام	المعنورية وتلقنورية وتلقنورية
علية الدراسات العليا Motor	
CALLAND ALLANDIA ALLANDIA LALANDIA ALLANDIA TACUTT OF GROUNT COUNTY	C Puge 1 of 1
Jenin Tel: +970-4-2418888 Ext.:1471,1472 Ramallah Tel: +970-2-2941999 Fax: +97 E-mail: EGS:@aaup.edu ; PGS:@aau	Fax: +970-4-2510810 P.O. Box:240 0-2-2941979 Abu Qash - Near Alrehan p.edu Website: <u>www.aaup.edu</u>

Appendix 4.Istishari Arab Hospital Approval

IAH R	tesearch Application Form
e.	1671112020
ne of investigator	Reem Sudge Daghlass
bile No.	0569117213 - 0568250300
ail	Fremdaynlas2000 gmail
sected start date	2.2/11/2020
sected completion date	30/1112020
ne of Company/University	Arab American Unicersity
	Attached needed
estigator CV	ZYes DNo
dy Proposal	22Yes DNo
asent Form	DYes delNo
ta Collection Tools	ZYes DNo
ormed Consent (Arabic & English)	OYes ON0
	For COO Office
eiving Date	18/11/2020
plication completed	JaYes DNo
O Director Note nsfer Date	
O director Sig.	P. Public I Committee
	For Ethical Committee
eiving Date	Continues
Ical Committee Approval	PETYES LING
ical Committee Note	- From ducat parts of mean friends berg parmacy and controducted friends berg - Keep patyent (Dand participants
ALL COMMENTS	
ad of Ethical committee Sig.	"protection" + data
ad of Ethical committee Sig. O Note	protections - Addition
ad of Ethical committee Sig. O Note	ort of

Appendix 5. Augusta Victoria Hospital Approval



108

Appendix 6.The Research Tool (Questionnaire)

My name is Reem Sudqi Daghlas. I am a graduate student at Arab American University. My research is about "Evaluation of oral health knowledge, attitude, and practice among health care providers in oncology departments (before, during, and after) cancer therapy in Palestinian hospitals". Under supervision of Dr. Shahenaz Najjar and Dr. Elham Kateeb.

The questionnaire is closed ended consists of six sections. Please answer each section according to what you think is appropriate. Your participation is voluntary and all your answers will be anonymous and completely confidential and will be used as aggregate for research purposes only.

Thank you and appreciate you for that.

Assessment of oral health knowledge, attitude, and practice among health care providers in oncology departments (before, during, and after) cancer therapy in Palestinian hospitals: Cross-sectional survey and a chart review.

Date:

Hospital Name:

Section A: Demographic characteristics

1.Age:....

2.Gender:

*

- Male
- * Female
- 3. Academic qualifications
 - a. Diploma degree level
- b. Bachelor's degree level
- c. Master's degree level
- d. Residency program

e.Specialist

Section B: Background Information

- 1. How long have you been working in your current profession?
- a. Less than 1 year
- b. 1 to 5 years
- c. 6 to 10 year
- d. 11 to 15 years
- e. 16 to 20 years
- f. 21 years or more
- 2. Employment Status
- a. Full time
- b. Part-time
- 3. Typically, how many hours per week do you work in this hospital?
- a. Less than 20 hours per week
- b. 20 to 39 hours per week
- c. 40 to 59 hours per week
- d. 60 to 79 hours per week
- e. 80 hours per week or more
- 4. How long have you been working in oncology departments?
- a. Less than 1 year

- b. 1 to 5 years
- c. 6 to 10 years
- d. 11 to 15 years
- e. 16 to 20 years
- f. 21 years or more
- 5. What is your position in this hospital? Select ONE answer that best describes your

staff position.

- a. Medical Oncologist
- b. Hematologist
- c. Radiation Oncologist
- d. Oral and maxillofacial surgeon
- e. Resident doctor
- f. Nurse.
- g. Radiotherapy technician
- 6. What is your profession position in the department?
- a. Head of department
- b. Senior staff
- c. Junior staff

Section C: General Questions

1. What is the type of cancer therapy provided in your hospital? You may choose more than one.

- a. Radiotherapy
- b. Chemotherapy
- c. Bone marrow transplantation
- d. Surgery to the head and neck
- 2. Are dental services available in the hospital for cancer patients?
- a. Yes
- b. No

3. If the answer in the previous question is yes, what are the types of dental services provided in the hospital?

- a. Educational oral care
- b. Preventive oral care
- c. Pretreatment screening evaluation
- d. Dental treatment during cancer therapy
- e. Dental care after cancer therapy

4. Are there any specific oral health protocols or guidelines for cancer patients before starting therapy in the hospital?

- Yes
- No
- Unsure

5. Is there any specific orientation program on cancer patients' oral health protocols or guidelines for medical staff before starting therapy in the hospital?

- Yes
- No
- Unsure
- 6. How confident are you in diagnosing oral complications related to cancer therapy?
- Not confident
- Slightly confident
- Somewhat confident
- Fairly confident
- Completely confident
- 7. How confident are you in providing appropriate oral health advice to cancer patients?
- Not confident
- Slightly confident
- Somewhat confident
- Fairly confident

• Completely confident

Section D: Knowledge Questions

This section assesses your knowledge about oral complications result from cancer therapy.

1. Indicate which of the following choices are considered risk factors of oral complications for cancer patients.

Type of oncology treatment	True	false	I don't know
Patient age	True	false	I don't know
Patient general health status	True	false	I don't know
Patient gender	True	false	I don't know
Patient oral hygiene	True	false	I don't know

2. Indicate which of the following oral complications are in radiotherapy.

Xerostomia and Salivary Changes (dry	True	false	I don't know
mouth)			
Mucositis and Mucosal changes	True	false	I don't know
(inflammation of the mucous membranes)			
Osteoradionecrosis	True	false	I don't know

Tempromandibular joint fibrosis	True	false	I don't know
Muscle trismus	True	false	I don't know
Teeth decay and gum disease	True	false	I don't know

3. Indicate which of the following oral complications are in chemotherapy.

Mucositis (inflammation of the	True	false	I don't know
mucous membranes)			
Infection	True	false	I don't know
Bleeding	True	false	I don't know
Teeth decay and gum disease	True	false	I don't know

4. Indicate which of the following oral complications result from Bone marrow transplantation.

Graft versus host	True	false	I don't know
disease(GVHD)			
Infection	True	false	I don't know

5. Indicate which kind of oral infections result from cancer therapy in general.

Bacterial	Yes	No	I don't know
Viral	Yes	No	I don't know
Fungal	Yes	No	I don't know

6. I have the knowledge of the recommended pretreatment oral	True	False
screening before starting cancer therapy		
7. My knowledge about oral complication resulted from	True	False
training courses		
8. I update my knowledge about oral complications resulting	True	False
from cancer therapy by training courses, reading articles, and		
check medical protocols		
9. I did not learn about oral complications at all	True	False

This section assesses your attitude to oral complication as a result of cancer therapy.

No.	Items	Strongly	Agree	Agree	Neither	Disagree	Strongly	disagree
1	Oral health care is not a priority							
	through cancer treatment course.							
2	Oral health care should be integrated							
	with cancer therapy course.							
3	Poor oral hygiene causes complications							
	in the patient's general health.							
4	Acute oral/dental pain treatment affects							
	cancer therapy continuity.							
5	Oral health education and training							
	rograms for a health care provider in the							
	oncology department is important.							

6	Following oral health protocols			
	nrough cancer therapy will decrease oral			
	complications as a result of the therapy.			
7	It's important to learn about oral health			
	during undergraduate training.			

Section F: Practice Questions

This section assesses your actual action and procedures you provide to the patients who have oral complications from cancer therapy.

No.	Items	Always	Usually	Sometime	Rarely	Never
1	Do you provide oral health consultations to					
	patients before starting cancer therapy?					
2	If the patient during cancer treatment complained					
	bout acute dental pain, do you coordinate between					
	the oncology team and dentist?					
3	Do you document oral complications, when it					
	happens, in the patent's file?					

4	Do you inform the patient of oral complications,				
	which happen from cancer therapy?				
5	Do you ask cancer patients about the history of				
	oral/dental problems?				
6	Do you instruct patients to maintain good oral				
	hygiene levels through the cancer therapy course?				
7	Do you advise patients to stop orthodontic				
,	treatment during the course of redicthereny or				
	treatment during the course of radiomerapy of				
	chemotherapy?				
8	Do you advise patients to use Fluoride				
	supplementation?				
9	Do you recommend mouthwash or mouth rinse				
	during therapy (normal saline, Chlorhexidine)?				
10	Do you provide prophylactic antifungal during				
	cancer therapy?				
	The second se				
11	Do you use prophylactic antibiotics before dental				
	referral?				
10					
12	Do you use antiviral drugs during chemotherapy?				
		1	1	1	1

13	Do you recommend palliative measures for dry ps and use mouth lubricants (lip balm or lip cream, Water-soluble lubricants, drink water frequently)?			
14	Do you recommend palliative measures/medications for oral pain related to mucositis?			
15	Do you inform the patients to make jaw exercises to minimize mouth opening restriction?			
16	Do you advise patients to have follow-up dental appointments after cancer therapy?			

Section G: Willing Questions

This section assesses your willingness and motivation to provide oral care.

Are you willing to do the following as part of your patient care?

No.	Items	Very willing	Somehow	Neutral	Somehow not	Not willing at all
1	Getting more information about oral					
	health during cancer therapy.					
2	Getting training courses about oral					
	health care in cancer therapy.					
3	Providing oral health instructions for					
	cancer patients.					
4	Following oral health care protocols					
	during cancer therapy.					

ملخص الدراسة

مقدمة

نظرًا لتزايد انتشار حالات السرطان في فلسطين ، وتأثير علاج السرطان على صحة الفم و الأسنان الذي يؤدي إلى مضاعفات شديدة ، فإن العناية الجيدة بصحة الفم و الأسنان ضرورية لمنع وتقليل المضاعفات خلال علاج السرطان ، وهذا يتطلب تنسيق و تعاون فريق متعدد التخصصات الطبية حيث يبدأ من اختصاصي الأورام وهو المسؤول الأول عن تقييم صحة الفم و الأسنان الخاصة بمريض السرطان و تحويل المريض لطبيب الأسنان الذي يجب عليه تقديم العناية و العلاج اللازم خلال فترة العلاج .

هدف الدراسة

٣. تقييم معرفة ومواقف وممارسات مقدمي الرعاية الصحية حول رعاية صحة الفم و الاسنان (قبل وأثناء وبعد) علاج السرطان.
 ٤. تقييم مدى استعداد ورغبة مقدمي الرعاية الصحية لتقديم رعاية صحة الفم و الاسنان واتباع البروتوكولات العلمية للعناية بصحة الفم و الاسنان .

منهجية البحث

أجريت هذه الدراسة المقطعية باستخدام استبيان ذاتي لعينة شاملة (n=177))من مقدمي الرعاية الصحية في قسم الأورام حيث تم تصميم الاستبيان باستخدام عدة دراسات سابقة ومقالات منشورة، ومن ثم التحقق من صحة الاستبيان بعرضه على مشرفين أكاديميين ومتخصصين في مجال الدراسة.

جمعت البيانات من سبعة مستشفيات فلسطينية تقدم خدماتها لمرضى السرطان في الضفة الغربية ، أربعة مستشفيات حكومية وثلاثة مستشفيات خاصة في الفترة من ١٥ نيسان إلى ٣٠ حزيران ٢٠٢١ ، حيث بلغت نسبة الاستجابة (٩٠,٩٠٪). تم إجراء تحليل البيانات باستخدام الإصدار ٢٠ من SPSS. و حساب التكرارات والنسب المئوية لجميع المتغيرات. لاختبار الفرضية ، تم إجراء ممالا للتحقق من الاختلافات بين المجموعات.

بلغ عدد المستجيبين للاستبانة ١٥١ بنسبة استجابة (٩٠,٩٪). مثل الذكور (٥١٪) من العينة مقابل الإناث (٤٩٪). تراوحت أعمار معظم المبحوثين ما بين ٤٠-٤٩ سنة بنسبة (٤١,٧٪) من إجمالي العدد. أما بالنسبة لمؤهلاتهم الأكاديمية ، فقد بلغت نسبة الحاصلين على بكالوريوس (٥٩,٥٪) من المبحوثين.

النتائج

تكونت العينة من (٥٠,٣٪) ، ممرضات ، (١٥,٩٪) أطباء مقيمين ، (١١,٣٪) أطباء أورام وفنيو علاج إشعاعي ، (٦,٦٪) أطباء دم ، (٣,٣٪) جراحة الفم والوجه والفكين ، (١,٣٪) علاج الأورام بالإشعاع .

كان لدى معظم مقدمي الرعاية الصحية مستوى معرفة جيد (٥٥,٦٪) فيما يتعلق بالعناية بصحة الفم ومضاعفات الفم خلال علاج السرطان. كما كان لدى معظمهم موقف مقبول (٦٠,٣٪) تجاه رعاية صحة الفم بين مرضى السرطان فيما بلغ مستوى مقبول في السلوك و الممارسة (٤٤,٤٪) خلال دورة علاج السرطان.

كما كان لديهم استعداد و رغبة جيدة يصل إلى (٦٠,٣٪) للحصول على مزيد من المعلومات حول صحة الفم أثناء علاج السرطان ، وتقديم تعليمات عن صحة الفم لمرضى السرطان واتباع بروتوكو لات العناية بصحة الفم أثناء علاج السرطان.

كان هناك علاقة ذات دلالة إحصائية بين درجة المعرفة وعمر المشاركين الذين تزيد أعمارهم عن ٦٠ عامًا ، وعلاقة كبيرة بين درجة المعرفة ومستوى التعليم بين مقدمي الرعاية الصحية خاصة بين اطباء الاختصاص ، كما أن درجة المعرفة كانت مرتبطة بشكل كبير في نوعية التخصص و العمل لدى مقدمي الرعاية الصحية وأظهرت در استنا أيضًاعلاقة بين الموقع الاشر افي ودرجة المعرفة بين المشاركين في الدر اسة.

وفقًا لنتائج در استنا ، لم تكن هناك ارتباطات ذات دلالة إحصائية بين الموقف مع السمات الديمو غرافية (العمر والجنس والمستوى التعليمي) والخبرة العملية. كانت هناك علاقة ذات دلالة إحصائية بين السلوك و جنس المشاركين خاصة لدى الذكور ، بالإضافة إلى ذلك ، كان مستوى التعليم مرتبطًا بشكل كبير بنتيجة الممارسة بين اطباء الاختصاص ، علاوة على ذلك ، كان لدى المشاركين بدوام جزئي درجة ممارسة ودرجة استعداد أكبر من الدوام الكامل. اضافة الى ذلك فقد تأثرت الرغبة بجنس الموظفين وساعة العمل الاسبوعية في المستشفى. أخيرًا ، أظهرت دراستنا وجود علاقة إيجابية قوية بين المعرفة والممارسات والمعرفة والاستعداد والمعارسات والاستعداد.

الخلاصة

يجب أن تكون الرعاية الصحية للفم و الاسنان متكاملة و ضمن خطة علاج السرطان ويتم تقديمها من قبل مقدمي خدمات رعاية صحية على دراية ومهنية و علم ،وذلك لتقليل معاناة المرضى خلال علاج السرطان ، وبالتالي فإن البرامج التعليمية والدورات التدريبية التي تتناول رعاية صحة الفم و الاسنان مطلوبة لتحسين المعرفة بين مقدمي الخدمات الطبية لتقديم رعاية شاملة للمرضى.

Bibliography

Adankie1, a. F. (2018). Bacterial profile, antibiotic resistance pattern and associated factors among cancer patients at University of Gondar Hospital, Northwest Ethiopia. *Infection and Drug Resistance*.

AKKAŞ, L. (2019). ORAL HEALTH AWARENESS AMONG THE PARENTS OF CHILDREN UNDERGOING CANCER THER. REPUBLIC OF TURKEY MARMARA UNIVERSITY MEDICAL SCIENCES INSTITUTE.

Alessandro Villa, 1. C. (2015). Diagnosis and management of xerostomia and hyposalivation. *Ther Clin Risk Manag*.

Alfouzan, A. F. (2018). Review of surgical resection and reconstruction in head.

Arantes, D. C. (2018). Dental approach of orofacial pain in head and neck cancer patients. *Journal of clinical and experimental dentistry*,.

Araújo, S. N. (2015). Cancer patients with oral mucositis: challenges for nursing care. *Revista latino-americana de enfermagem*,.

Badran, I. G. (1995). Knowledge, attitude and practice the three pillars of excellence and wisdom: a place in the medical profession. *Eastern Mediterranean Health Journal*.

Barasch, J. B. (2014). Appropriate and necessary oral care for people with cancer: guidance to obtain the right oral and dental care at the right time. *Support Care Cancer*.

BARBIERI, T. C. (2020). Current alternatives in the prevention and treatment of xerostomia in cancer therapy. *RGO, Rev Gaúch Odontol*.

Barker, G. E. (2005). Current practice and knowledge of oral care for cancer patients: a survey of supportive health care providers.

Brands M, V. A. (2021). Follow-up after oral cancer treatment-Transition to a personalized approach. *J Oral Pathol Med*.

Burhenn PS, F. B. (2016). mproving Nurses' Knowledge About Older Adults . *Oncol Nurs Forum*.

Cancer, U. g. (2015). Mouth care guidance and support in cancer and pallitive care.

Cesar A. Migliorati, M. T. (2019). Medication-Related Osteonecrosis of the Jaws. *Oxford University Press*.

Chan EY, H.-L. N. (2012). Oral care practices among critical care nurses in Singapore: a questionnaire survey. *Appl Nurs Res.*

Choi1, J.-S. (2020). Xerostomia: An Overview . Preprints .

Costello T, C. I. (2008). Nurses' knowledge of mouth care practices. . Br J Nurs.

Croyère N, B. M. (2012). Oral care in nursing practice: a pragmatic representation. *Int J Palliat Nurs*.

Dang, R. B. (2016). Dental Practice Patterns forOral Care in Medical Oncology Patients- a Survey-Based Assessment of Massachusetts dentists. *Oral Abstract Track Three*.

Davis, D. D., Hanley, M. E., & Cooper, J. S. (2020). Osteoradionecrosis.

Deise Berger Velten, c. a. (2017). Prevalence of oral manifestations in children and adolescents with cancer submitted to chemotherapy. *BMC Oral Health*.

Deschuymer, S. N. (2018). Clinical factors impacting on late dysphagia following. *the British journal of radiology*.

Dr. Allan Hovan, D. S. (2018). ORAL CARE OF THE CANCER PATIENT. BC CANCER ORAL ONCOLOGY – DENTISTRY.

Eagly, A. H. (2007). The advantages of an inclusive definition of attitude. *American Psychological Association*.

Elad, S. R.-D. (2015). Basic oral care for hematology–oncology patients and hematopoietic stem cell transplantation recipients: a position paper from the joint task force of the Multinational Association of Supportive Care in Cancer/International Society of Oral Oncology (MASCC. *Support Care Cancer*.

Elena Dickens, s. a. (2018). Principles of cancer treatment by chemotherapy.

Elhassan2, S. Y. (2017). Trismus following diferent treatment modalities for headand neck cancer: a systematic review of subjective measures. *Eur Arch Otorhinolaryngol*.

Epstein JB, P. I. (2007). A survey of National Cancer Institute-designated comprehensive cancer centers' oral health supportive care practices and resources in the USA. *Support Care Cancer*.

Epstein, J. B., & Hong, C. (2011). A systematic review of orofacial pain in patients receiving cancer therapy. *Support Care Cancer*.

Eta E. Ashu1, 2.,.-C. (2019). Bacteria in Cancer Therapeutics: A Framework for Effective Therapeutic Bacterial Screening and Identification. *Journal of Cancer*.

European Oral Care in Cancer Group Oral Care Guidance and Support. (2019).

Ezra E. W. Cohen, M., Samuel J. LaMonte, M. F., Nicole L. Erb, B., Kerry L.
Beckman, M. C., Nader Sadeghi, M., Katherine A. Hutcheson, P., . . . Stein, K. D.
(2016). American Cancer Society Head and Neck Cancer Survivorship Care Guideline. *CA CANCER J CLIN*.

Fernanda Aurora Stabile Gonnelli1, L. F. (2016). Low-level laser therapy for the prevention of low salivary flow rate after radiotherapy and chemotherapy in patients with head and neck cancer. *Radiol Bras*.

Ferreira, C. G.-F. (2018). Guide for health professionals addressing oral care for individuals in oncological treatment based on scientific evidence. *Supportive Care in Cancer*.

Firoozeh Samim1, J. B. (2016). Oral and dental health in head and neckcancer survivors. *Cancers of theHead& Neck*.

Fregnan, W. M.-S. (2020). Current knowledge regarding medication-related osteonecrosis of the jaw among different health professionals. *Supportive Care in Cancer*.

Frowen, J. H. (2020). The prevalence of patient-reported dysphagia and oral complications in cancer patients. *Support Care Cancer*.

G. Jaguar1, P. M. (2019). Support Care Cancer.

Goda Daug[•]elait[•] e 1, *. ,. (2019). Prevention and Treatment of Chemotherapy and Radiotherapy Induced Oral Mucositis. *Medicina*.

HaiMingWong1, 2. (2014). Oral Complications and Management Strategies for Patients Undergoing Cancer Therapy. $\Box e$ Scientific World Journal.

Hamilton, C. (1991). Oral health knowledge and habits of senior elementary school students. northeastern Ontario : Pubmed.

Health, O. P. (2009). Oncology Pocket Guide to Oral Health Prevention and management of oral complications.

Health, T. R. (2018). *The Oral Management of Oncology Patients Requiring Radiotherapy, Chemotherapy and / or Bone Marrow Transplantation*.

Herve Y Sroussi1, J. B.-J. (2017). Common oral complications of head and neck cancer radiation therapy: mucositis, infections, saliva change, fibrosis, sensory dysfunctions, dental caries, periodontal disease, and osteoradionecrosis . *Cancer Medicine*.

Hijji, B. (2003). Trained nurses' knowledge and practice of oral care on three wards in acute care hospital in Abu Dhabi, UAE. *online braz j nurs*.

Hovan, A. W.-M. (2010). A systematic review of dysgeusia induced by cancer therapies. *Support Care Cancer*.

Inger Wa[°]rdh, G. P. (2008). Nursing staff's understanding of oral health care for patients with cancer diagnoses: an intervention study. *Journal of Clinical Nursing*.

Isabel Lanzós 1, D. H. (2015). A critical assessment of oral care protocols for patients under radiation therapy in the regional University Hospital Network of Madrid (Spain). *J Clin Exp Dent*.

Jarosz-Biej M1, S. R. (2019). Tumor Microenvironment as A "Game Changer" in Cancer Radiotherapy.

Jawad H, H. N. (2015). A review of dental treatment of head and neck cancer patients, before, during and after radiotherapy. *Br Dent J*.

Jennifer A. Suminski, C. R. (2018). Exploring education, attitudes, and behaviors among nurses caring for patients with breast cancer. *CLINICAL JOURNAL OF ONCOLOGY NURSING*.

Jerome P. Rothstein, D. M. (2015). Cancer Chemotherapy and Oral Care.

Jerónimo Pachón Ibáñez1, J. L. (2017). Prevention of oral mucositis secondary to antineoplastic treatments in head and neck cancer by supplementation with oral glutamine . *Nutrición Hospitalaria*.

Joel B. Epstein, D. M., Juliette Thariat, M. P., Rene-Jean Bensadoun, M. H., Andrei
Barasch, D. M., Barbara A. Murphy, M., Leanne Kolnick, M. 6., . . . Ellie Maghami, M.
F. (2012). Oral Complications of Cancer and Cancer Therapy From Cancer Treatment
to Survivorship. *A Cancer Journal for Clinicians*.

K Anjali, 1. A. (2020). Oral microbial profile in oral cancer patients before and after radiation therapy in a cancer care center – A prospective study. *journal of Oral and Maxillofacial Pathology*.

Karam Khaddour 1, C. K. (2020). *Hematopoietic Stem Cell Transplantation (Bone Marrow Transplant)*.

Kawashita Y, S. S. (2020). Oral management strategies for radiotherapy of head and neck cancer. *Jpn Dent Sci Rev*.

Koji, R. B. (2017). Radiation therapy and cancer control in developing countries: Can we save more lives? *I In nt te er rn na at ti io on na al l J Jo ou ur rn na al l o of f M Me ed di ic ca al l S Sc ci ie en nc ce es s*, 13-17.

Kudkuli J, A. A. (2020). Demineralization of tooth enamel following radiation therapy; An in vitro microstructure and microhardness analysis . *J Cancer Res Ther*.

L, A. S. (2019). A cross-sectional study on oncology nurses' knowledge and practice of oral mucositis among cancer patients in Jordan. *Int J Nurs Sci.*

Lalla RV, T. N., & Group, O. S. (2017). Oral complications at 6 months after radiation therapy for head and neck cancer. *Oral Dis.*

Lopez-Silva CP, W. T. (2019). Oral management of patients with cancer. *Fac Odontol Univ Antioq*.

Mainali A, S. K. (2011). Dental consultation in patients planned for/undergoing/post radiation therapy for head and neck cancers: a questionnaire-based survey. *Indian J Dent Res*.

Männle, K. M. (2019). Using Bee Products for the Prevention and Treatment of Oral Mucositis Induced by Cancer Treatment. *Molecules*

.

Maria Margaix-Muñoz 1, J. V.-G.-R. (2015). Graft-versus-host disease affecting oral cavity. A r. *Oral Medicine and Pathology* .

Maria Margaix-Muñoz 1, J. V.-G.-R. (2015). Graft-versus-host disease affecting oral cavity. A review. *Journal section: Oral Medicine and Pathology*.

Marwa Al Barmawi1, L. A. (2018). Measuring the Quality of Life among Head-and/or-Neck Cancer Patients with Oral Mucositis Using the Functional Assessment of Cancer Therapy-General in Jordan. *Asia-Pacific Journal of Oncology Nursing*.

McGuire, D. B. (2003). Barriers and strategies in implementation of oral care standards for cancer patients. *Support Care Cancer*.

Michela Buglionea, R. C. (2016). Oral toxicity management in head and neck cancer patients treated. *Critical Reviews in Oncology/Hematology*.

Milia2, R. P. (2015). Xerostomia induced by radiotherapy: an overview of the physiopathology, clinical evidence, and management of the oral damage. *Therapeutics and Clinical Risk Management*.

Modikoe, M. M. (2017). ORAL HEALTH-RELATED KNOWLEDGE, ATTITUDE AND PRACTICES [KAP] OF ADULT PATIENTS IN THE MANGAUNG METROPOLITAN MUNICIPALITY, SOUTH AFRICA.

MOH. (2021). health annual report palestine 2020. Palestinian ministry of health.

Nagarajkumar Yenugadhati1, 2. A.-J. (2018). Associated factors for oral health problems in a sample of Saudi cancer patients. *Cancer Management and Research*.

Nathaniel Treister, 1. C. (2012). How we treat oral chronic graft-versus-hos tdisease. *the American society of hematology*.

National Cancer Control Program, D. o.-C.-M. (2019). *Kenya National Cancer Treatment Protocols*.

Navdeep Kumar2, H. C. (2019). Dental management of a patient with head and neck cancer: a case report. *BRITISH DENTAL JOURNAL*.

Nemes J1, J. Á. (2018). Oral mucositis as the most common complication of childhood cancer therapy.

Nicole Croyère, M.-N. B. (2012). Oral care in nursing practice: A pragmatic representation. *International journal of palliative nursing*.

Nicole L Simone*1, B. P. (2007). Oral Pirfenidone in patients with chronic fibrosis resulting from radiotherapy: a pilot study. *Radiation Oncology*.

Novaes CD, M. A. (2019). Inspecting evidence between cancer therapy-induced oral mucositis and periodontitis: A narrative review. *European Journal of General Dentistry*.

Ongole, R. R. (2019). Oral care in cancer nursing: Practice and barriers. *ndian J Dent Res*.

Padovani-Junior2, A. L. (2013). Head and neck cancer: causes, prevention and treatment. *Braz J Otorhinolaryngol*.

Pai Radhika R, O. R. (2019). Oral Care Protocol for Chemotherapy- and Radiation Therapy-Induced Oral Complications in Cancer Patients: Study Protocol. 417-423.

Palmier NR, M. C.-R.-S. (2020). Radiation-related caries: current diagnostic, prognostic, and management paradigms. *Oral Surg Oral Med Oral Pathol Oral Radiol*.

PAN1, J. (2013). Oral cavity infection: an adverse effect after the. J Appl Oral Sci.

Patel Y, B. H. (2012). Survey of Michigan dentists and radiation oncologists on oral care of patients undergoing head and neck radiation therapy. *he Journal of the Michigan Dental Association*.

Paul W. Gidley. (2011). The Results of Temporal Bone Surgery for Advanced or RecurrentTumors of the Parotid Gland. *Laryngoscope*.

Pauli, N. (2015). *Treating radiation-induced trismus in head and neck cancer; Exercise intervention and risk structures*.

Perry AD, I. H. (2015). Knowledge, Perceived Ability and Practice Behaviors Regarding Oral Health among Pediatric Hematology and Oncology Nurses. *The Journal of Dental Hygiene*. R. R. Dang: Boston Children's Hospital, C. R. (2016). Dental Practice Patterns forOral Care in Medical Oncology Patients -

a Survey-Based Assessment of Massachusetts dentists. Oral Abstract Track Three.

Raber-Durlacher, G. J. (2005). Current practice and knowledge of oral care for cancer patients: a survey of supportive health care providers. *Support Care Cancer*.

Radhika R Pai, R. O. (2015). Nurses' Knowledge and Education about Oral Care of Cancer Patients Undergoing Chemotherapy and Radiation Therapy. *Indian Journal of Palliative Care*.

Rajamanickam Baskar1, 2.,.-W. (2012). Cancer and Radiation Therapy: Current Advances and Future Directions . *I In nt te er rn na at ti io on na al l J Jo ou ur rn na al l o of f M Me ed di ic ca al l S Sc ci ie en nc ce es s*.

Ramen Haloi, N. I. (2014). Kap Surveys and Oral Health: A Detailed Review. *ACM Journal of Computer Documentation*.
Rapone, B. N. (2017). Oral hygiene in patients with oral cancer undergoingchemotherapy and/or radiotherapy after prosthesis rehabilitation: protocol proposal.*ORAL & Implantology*.

Rapone, B., Ferrara, E., Santacroce, L., Cesarano, F., Arazzi, M., Di Liberato, L., . . . Nardi, G. (2019). Periodontal Microbiological Status Influences the Occurrence of Cyclosporine-A and Tacrolimus-Induced Gingival Overgrowth. *Antibiotics*.

Rebecca Tranmer, L. B. (2013). National Survey of Oncology Members' Knowledge, Education, and Patient Management Regarding Oral Care in Cancer Therapy . *Health & Interprofessional Practice* .

Romero-Reyes, M. &. (2016). Cancer and orofacial pain. *Medicina oral, patologia oral y cirugia buca*.

Samim F, E. J. (2016). Oral and dental health in head and neck cancer survivors. *Cancers Head Neck*.

Sharour, L. A. (2019). A cross-sectional study on oncology nurses' knowledge and practice of oral mucositis among cancer patients in Jordan. *nternational Journal of Nursing Sciences*.

Shruthi Acharya1, K. M. (2017). Oral changes in patients undergoing chemotherapy for breast cancer. *Indian J Dent Res*.

Simone, N. S. (2007). Oral Pirfenidone in patients with chronic fibrosis resulting from radiotherapy: a pilot study. *Radiat Oncol 2*.

Singh, V. B. (2011). A rare case of unusual gingival enlargement post radiotherapy. *Journal of Indian Society of Periodontology*.

Southern, H. (2007). Oral care in cancer nursing: nurses' knowledge and education. *JAN: ORIGINAL RESEARCH*.

Soutome1, S. (2018). Factors affecting development of medicationrelated osteonecrosis of the jaw in cancer. *PLoS ONE*.

Spencer W. Redding, D. M. (2005). Cancer Therapy-Related Oral Mucositis. *Journal of Dental Education*.

Stephen. (2020). Oral Complications Associated with Bone Marrow Transplantation. In *Holland-Frei Cancer Medicine. 6th edition*.

Straub, J. N. (2015). Radiation-induced fibrosis: mechanisms and implications for therapy. *J Cancer Res Clin Oncol*.

Strojana, P. (2017). Treatment of late sequelae after radiotherapy for head and neck. *Cancer Trea*.

Sven Ottoa, □. (2018). Medication-related osteonecrosis of the jaw: Prevention, diagnosis and. *Cancer Treatment Reviews Elsevier Ltd*.

T.M.Haverman, 1. J.-D. (2014). Oral Complications in Hematopoietic Stem Cell Recipients: The Role of Inflammation. *MediatorsofInflammation*.

Thomas Costello, I. C. (2008). Nurses' knowledge of mouth care practices. *British Journal of Nursing*.

UK_OM_Guidelines. (2015).

V. Talevi1, J. W. (2019). PERIODONTAL DISEASE-ASSOCIATED SNPS IN HEAD AND NECK CANCER IRRADIATION PATIENTS. *Support Care Cancer*. van der Molen L, H. W. (2014). Dysphagia and trismus after concomitant chemo-Intensity-Modulated Radiation Therapy (chemo-IMRT) in advanced head and neck cancer; dose-effect relationships for swallowing and mastication structures. *Radiother Oncol.*.

Villa A, A. S. (2018). Dental Management of Patients Who Have Undergone Oral Cancer. *Therapy. Dent Clin North Am*.

Wan, T. R.-M. (2016). A SYSTEMATIC REVIEW OF KAP-O FRAMEWORK FOR DIABETES. *Medical Research Archives*.

Wang4, H.-W. L.-H.-F. (2019). Knowledge, attitudes, practice and related factors of oral cancer prevention among public health nurses in Taiwan. *Eur J Cancer Care*.

Weber, C. D. (2010). Limited mouth opening after primary therapy of head and neck cancer. *Oral Maxillofac Surg*.

WHO.A GUIDE TO DEVELOPING KNOWLEDGE, ATTITUDE AND PRACTICE SURVEYS.

Ying-Siou Lin, J.-C. C.-H.-F. (2011). Critical care nurses' knowledge, attitudes and practices of oral care for patients with oral endotracheal intubation: a questionnaire survey. *J Clin Nurs*.

Yuan, P. (2021). Diagnosis and treatment of medication-related osteonecrosis of the jaws from an oncologist's perspectives]. *Chinese Journal of Stomatology*.

Yumiko Kawashitaa, . S. (2020). Oral management strategies for radiotherapy of head and neck cancer. *Japanese Dental Science Review*.

www.cancer.gov. (2020).

www.cancer.net. (2020).

www.nidcr.nih.gov. (2020).

www.who.int. (2020).