Supplement S1: Search strategies for all included databases

The overall search concepts:

Concept 1:	**Concept 2:**	**Concept 3:**
head and neck cancer	influencing factors	physical activity

- Medline, APA PsycINFO, CINHAL via EBSCOhost

Concept 1:	TI ((head OR neck) N3 (neoplasm* OR cancer* OR tumo#r*)) OR AB ((head OR neck) N3 (neoplasm* OR cancer* OR tumo#r*)) OR TI ((oral cavity OR pharyn* OR laryn* OR lip*) N3 (neoplasm* OR cancer* OR tumo#r*)) OR AB ((oral cavity OR pharyn* OR laryn* OR lip*) N3 (neoplasm* OR cancer* OR tumo#r*)) OR "head and neck cancer" or "oral cancer" or "oropharyngeal cancer" or hnc
	AND
Concept 2:	(DE "Sedentary Behavior") OR (DE "Health Behavior") OR (DE "Health Belief Model") OR view* or belief* or perspective* or attitude* OR facilitator* OR barrier*
	AND
Concept 3:	(DE "Physical Activity") OR (DE "Physical Fitness") OR (DE "Athletic Training") OR (DE "Exercise") OR "physical activity" or exercise or fitness or "physical exercise"

- Embase

Concept 1:	('((head or neck) near/3 (neoplasm* or cancer or tumor* or tumour*)):ti,ab,kw' OR 'head and neck tumor'/exp OR `oral cavity` or pharyn* or laryn* or lip* near/3 neoplasm* or cancer* or tumor* or tumour*:ti,ab,kw')
	AND
Concept 2:	('attitude to health'/exp OR 'health belief model'/exp OR belief*:ti,ab OR perspective*:ti,ab OR perception*:ti,ab OR attitude*:ti,ab OR view*:ti,ab OR barrier*:ti,ab OR facilitator*:ti,ab)
	AND
Concept 3:	('physical activity'/exp OR 'activity, physical':ti,ab OR 'physical activity':ti,ab OR 'exercise'/exp OR 'biometric exercise':ti,ab OR 'effort':ti,ab OR 'exercise':ti,ab OR 'exercise capacity':ti,ab OR 'exercise performance':ti,ab OR 'exercise training':ti,ab OR 'exertion':ti,ab OR 'fitness training':ti,ab OR 'fitness workout':ti,ab OR 'physical conditioning, human':ti,ab OR 'physical effort':ti,ab OR 'physical exercise':ti,ab OR 'physical exertion':ti,ab OR 'physical work-out':ti,ab OR 'physical workout':ti,ab OR 'sedentary lifestyle'/exp OR 'sedentary behavior':ti,ab OR 'sedentary behaviour':ti,ab OR 'sedentary life style':ti,ab OR 'sedentary lifestyle':ti,ab OR 'healthy lifestyle'/exp OR 'healthy life style':ti,ab OR 'healthy lifestyle':ti,ab OR 'sport'/exp OR 'sport':ti,ab OR 'sports':ti,ab)

Schmocker M, *et al. BMJ Open* 2024; 14:e083852. doi: 10.1136/bmjopen-2023-083852

- Scopus

Concept 1:	(TITLE-ABS-KEY ("head and neck cancer" OR hnc OR "oral cancer" OR "oropharyngeal cancer") OR TITLE-ABS-KEY ((head OR neck OR "oral cavity" OR pharyn* OR laryn* OR lip*) W/3 (neoplasm* OR cancer* OR tumor* OR tumour*))
	AND
Concept 2:	TITLE-ABS-KEY (belief* OR perspective* OR perception* OR attitude* OR view* OR barrier* OR facilitator*)
	AND
Concept 3:	TITLE-ABS-KEY ("physical activy" OR exersice OR "physical exercise" OR "physical fitness" OR "sedentary behavior" OR "sedentary behaviour" OR "health* behavior" OR "health* behaviour" OR "healthy lifestyle" OR "healthy lifestyle" OR "behavior change" OR "behaviour change"))

- The Cochrane Library

Concept 1:	#1	MeSH descriptor: [Head and Neck Neoplasms] this term only
	#2	(head OR neck) NEAR/3 (neoplasm* OR cancer* OR tumor* OR tumour*)
	#3	("oral cavity" OR pharyn* OR laryn* OR lip*) NEAR/3 (neoplasm* OR cancer* OR tumor* OR tumour*)
	#4	#1 OR #2 OR #3
Concept 2:	#5	belie* OR perspective* OR perception* OR attitude* OR view* OR barrier* OR facilitator*
	#6	MeSH descriptor: [Health Belief Model] this term only
	#7	MeSH descriptor: [Attitude to Health] this term only
	#8	MeSH descriptor: [Health Behavior] this term only
	#9	MeSH descriptor: [Healthy Lifestyle] this term only
	#10	MeSH descriptor: [Sedentary Behavior] this term only
	#11	#5 OR #6 OR #7 OR #8 OR #9 OR #10
Concept 3:	#12	MeSH descriptor: [Exercise] this term only
	#13	"physical activity"
	#14	MeSH descriptor: [Sports] this term only
	#15	MeSH descriptor: [Physical Fitness] this term only
	#16	MeSH descriptor: [Sedentary Behavior] this term only
	#17	MeSH descriptor: [Health Behavior] this term only
	#18	MeSH descriptor: [Healthy Lifestyle] this term only
	#19	"behavior change" OR "behaviour change"
	#20	#12 OR #13 OR #14 #15 OR #16 OR #17 OR #18 OR #19
Final search:	#21	#4 AND #11 AND #20

Supplement 2: Details of included studies

Year & first author	**Study participants**	**Study type & design**	**Study aim**	**Quantitative outcome measures** (relevant for scoping review)	**Main findings** (relevant for scoping review)
2008 Björklund	**n= 8** persons with HNC; 1-9 months post diagnosis male: 4, (age range: 52 to 83, mean: 63.3) female: 4 (age range: 61–69, mean: 65.8)	**Qualitative** study with semi-structured interviews	To shed light on health promotion from the perspective of individuals living with head and neck cancer	*not applicable*	Main theme was regaining control and empower oneself: by dialogue with one's inner self, by contact with social network and by means of contact with the environment
2008 Duffy	**n= 283** newly diagnosed HNC patients male : 220 (77.7%), female: 63 (22.3%), mean age: 59,4 years (SD± 11.1)	**Quantitative**, prospective, cohort study, written survey, and medical record audit	To analyse 5 health behaviours (smoking, problem drinking, nutrition, physical activity, and sleep) of HNC patients in the first year after diagnosis	- Physical Activity scale for the Elderly (PASE) - demographics - clinical measures	*Factors significantly associated with lower PA levels at baseline and 1-year:* - lower sleep scores - older age - not being married - having moderate to severe comorbidities - having cancer of the oral cavity *Factors associated with lower baseline PA scores:* - having stage III or IV cancer *Factors associated with lower 1-year PA scores:* - while having a feeding tube
2008 Rogers L.	**n= 59** HNC patients during and after treatment; mean age 58 years (SD± 12.8); male: 83% female: 17%,	**Quantitative, cross-sectional** study utilizing chart review and self-administered questionnaires	To determine the most frequent and important PA barriers reported by head and neck cancer patients	- demographic and medical variables - Godin Leisure-Time Exercise Questionnaire - Social cognitive theory constructs: confidence, barrier (for coping) self-efficacy, Task self-efficacy - Perceived PA barriers, - PA enjoyment - social support - role model exposure - depression (Center for Epidemiologic Studies Depression Scale) - symptom index (FACT: functional assessment of cancer treatment questionnaire)	*The strongest correlates of PA:* - enjoyment (r = 0.41; p = 0.002) - symptom index (r = −0.36; p = 0.006) - alcohol use (r = 0.36; p = 0.007) - task self-efficacy (r = 0.33; p = 0.013) - perceived barriers (r = −0.27; p = 0.047) - comorbidity score (r = −0.27; p = 0.042) Enjoyment and symptom index had independent associations with PA.
2009 Rogers L.	**n= 90** HNC patients 33% <4 months since treatment, 67% >4	**Quantitative, cross-sectional** chart review and	To determine the prevalence of specific exercise counseling	- exercise counseling & program preferences, - QoL,	- lack of preference was the most frequent option for counseling source (66%), counseling delivery (47%), and exercise variability (52%)

	months since treatment male:70 (78%) female: 20 (22%); age groups: <65 n = 58 (65%), >65 n= 32(35%)	self-administered survey	and programming preferences and to determine differences in these preferences based on quality of life, symptom severity, depression, and rural residence	- symptom severity, - depression, - rural residence, - demographic, medical and lifestyle covariates, - PA (Godin leisure time activity questionnaire)	- popular specific preferences included outdoors (49%), morning (47%), and alone (50%) - significant adjusted associations occurred for patients' interest with lower functional well-being, alone with higher functional well-being, and morning with higher total quality of life and emotional, social, and functional well-being - no significant associations occurred with symptoms, depression, or rural residence
2015 Rogers L.	**n= 101** (67 returned the 2. survey= 66%) mean months since diagnosis 26.4 (SD± 43.9); mean age: 60 years (SD± 12); male: 73%	**Quantitative**, cross-sectional, self-administered survey	Determine psychometric properties of different scales and perform item reduction to shorten the scales and to examine cross-sectional and prospective associations between the tested constructs and self-reported leisure-time exercise.	- barriers self-efficacy - perceived barriers interference - outcome expectations enjoyment, and - goal setting - Godin Leisure-Time Exercise Questionnaire	reduces items for barrier interference: - lack of interest, motivation, time, enjoyment, stamina (tire easily), - weather, no equipment, facilities or space to exercise, - pain or discomfort, fatigue, dry mouth or throat - exercise is not a prioroty, - family or work responsibilities, reduced items for outcome expectations: - improvement of overall physical health, - improving overall health - giving a higher energy level - increasing flexibility, Barriers self-efficacy and goal setting were significantly associated with meeting recommendations at baseline.
2015 Zhao	**n= 18** (intervention: 11, controls: 7), HNC patients beginning first-line chemo-radio therapy without surgery; age 57 years (SD± 7)	**Quantitative**, pilot controlled trial	Primary aim: to assess the benefits of a resistance and walking exercise intervention on muscle strength, functional mobility, and self-reported quality of life. Secondary aim: to assess other key endpoints (e.g. self-reported and actual activity and barriers to exercise).	- muscle strength - functional mobility - QoL, - body mass index - Physical Activity scale for the Elderly (PASE) - Actigraph (objective measure for PA) - barriers to exercise (34 items) - smoking, alcohol, diet - chemotoxicity	Most barriers showed no differences in change between groups, except at 7 weeks: - "lack of interest in exercise" as a barrier tended to be unchanged in the intervention group but was significantly more of a barrier in the controls ($p < .05$) - "exercise being classified as boring" was also more of a barrier in the controls than in the intervention group ($p < .05$).
2016 Henry	**n= 29** patients with HNC diagnosis within the past 3 years with maximum variability sampling; male: n: 23 (79%), age 65 (SD± 10)	**Qualitative**, focus group interviews	To better understand the needs and experiences of HNC patients about five health behavioural change (HBC) topics (tobacco use, alcohol	*not applicable*	Patient engagement was the main theme: - being proactive in rehabilitation - being informed by the medical team, in an optimistic & flexible way - seeking support when needed *Primary motivators for positive health behaviours:* - return to normal life and reclaim function.

			misuse, diet, exercise, and UV protection), as well as the barriers and facilitators to change. How to best tailor the intervention to meet the needs of HNC patients in terms of timing and content to be used in counselling.		*Barriers to patient engagement:* - emotional aspects (e.g., anxiety, depression, trauma, demoralization) - symptoms (e.g., fatigue, pain) - lack of information about HBC - healthcare providers' authoritarian approach in counselling on HBC
2017 Jackson	**n= 22**, patients during or shortly after completion of radiation therapy 82% male, mean age: 58.2 years (SD±5.6)	**Mixed-method**, self-administered retrospective questionnaires and follow-up semi-structured interviews	To examine the exercise preferences and barriers of HNC survivors and explore how these factors changed with exercise exposure.	- demographics - exercise levels - QoL - depression - symptom severity - pre- and post-exercise preferences - barriers	**Quantitative results:** *after participation in exercise intervention:* - significant decrease in typical barriers including lack of interest (p = .008), exercise not a priority (p = .039) and exercise not in routine (p = .004) - number of barriers experienced was negatively correlated with age, quality of life and minutes of resistance exercise training per week - significant increases in preference for exercising at a cancer centre (p = .031) and with other cancer survivors (p = .016) **Qualitative results:** *before participation in exercise intervention:* - preference: to exercise alone - barriers: lack of motivation, enjoyment, time and feeling anxious, cancer-related factors (including fatigue, depression) *after participation in exercise intervention:* - return to usual PA routines - preference on mode of delivery: to participate in group exercise to get information (e.g., on recovery and managing side effects) and to form a social support network and to increase motivation for exercise including the social accountability to other group members - preference on location: the hospital was considered convenient during treatment, but not afterwards
2018 Buffart	**n= 416**, median time since diagnosis 54 months (IQR 33;120); mean age: 66.6 (SD± 9.4) male: 339 (82%) female: 77 (18%)	**Quantitative**, cross-sectional survey study with self- reports of PA and social-cognitive factors (merged results of 2 studies)	To identify social-cognitive correlates of PA using the theory of planned behaviour (TPB) and demographic, clinical, and lifestyle-related correlates	- self-reported PA (PASE: PA scale for the elderly & IPAQ: International PA questionnaire) - demographic factors, - treatment related factors - alcohol consumption exercise history	- PA intention was significantly higher in HNC survivors with a history of exercising, who had a more positive attitude, subjective norm, and perceived behavioural control. - patients with higher PA intention, higher perceived behaviour control, a lower age, and without unintentional weight loss or comorbidities had higher PA behaviour. - the model explained 22.9% of the variance in PA intention and 16.1% of the variance in PA behaviour

2018 Midgley	**n= 437**, median time since diagnosis 43 months (IQR 30;58) median (IQR) age at survey 66 (IQR 60;73) years, male: 74% of respondents *> same sample as Rogers 2019*	**Quantitative**, postal questionnaire survey	To establish exercise preferences, barriers, and perceived benefits among HNC survivors and to investigate the level of interest in participating in an exercise program, as well as factors associated with between-subject differences in the level of interest.	- exercise preferences - perceived exercise benefits - exercise barriers - Godin leisure time exercise questionnaire - University of Washington quality of life questionnaire - interest in participating in an exercise program	- most common exercise preferences: frequency of three times per week; moderate-intensity; 15–29 min per bout. - most popular exercise types: walking (68%), flexibility exercises (35%), water activities/swimming (33%), cycling (31%), and weight machines (19%). - most common preferences where to exercise: at home (55%), outdoors (46%) and health club/gym (33%). - perceived exercise benefits relating to improved physical attributes were commonly cited, whereas potential social and work-related benefits were less well- acknowledged. - most common exercise barriers: dry mouth or throat (40%), fatigue (37%), shortness of breath (30%), muscle weakness (28%) difficulty swallowing (25%), shoulder weakness and pain (24%).
2019 Rogers S.	**n= 437**, median time since diagnosis 43 months (IQR 30;58) median (IQR) age at survey 66 (IQR 60;73) years, male: 74% of respondents *> same sample as MIdgley 2018*	**Quantitative**, postal questionnaire survey	To analyse patients' responses to the activity and recreation domains of the University of Washington Quality of Life Questionnaire (UW-QoL), and to relate them to clinical characteristics, intensity of leisure-time exercise/week, perceived barriers that interfere with exercise, and feeling able to participate in an exercise programme.	- Godin leisure time exercise questionnaire - UW-QoL questionnaire - clinical characteristics	- the main influencing factors were site (oropharynx), advanced stage (stage (T3-4), invaded nodes), radiotherapy and chemotherapy, composite flap, gastrostomy tube, and coexisting conditions - low (worse) scores in the UW-QoL activity and recreation domains were associated with little time spent exercising, low-intensity exercise, more barriers to exercising, and a lack of preference. - scores for both activity and recreation were lower in those who had had radiotherapy or chemotherapy, and who currently had a feeding tube or other medical conditions
2020 Felser	**n= 12**, long time survivors, > 5 years (n:8) <5 yrs n: 4); age mean 68 (range: 52-81); female: 6, male: 6	**Quantitative**, feasibility study	To evaluate the feasibility and impact of a low- to medium-intensity exercise intervention on physical function and QoL	- feasibility outcomes: intervention completion - fatigue - active ROM - mouth opening - flexibility - fall risk (short physical performance battery) - 6 minute walk test - demographic parameters - QoL	- 10 out of 12 participants completed the intervention (83%) with an average attendance rate of 83% - participants showed significant improvements in selected physical functions (better head rotation and walking distance, Qo) - Reasons for non-participation: lack of interest and distance to training facility and others (e.g. overlap with work, care/supervision of relatives/children)
2022 Daun	**n= 20** (n= 10 surgical HNC patients; n= 10 HCPs)	**Qualitative** research, embedded in a	To understand patient and HCP perspectives on the role of	*not applicable*	Four main themes: - assessments are acceptable and necessary

	HCP n=10 (4 male, 6 female) surgeon: 4 (40%), oncology nurse: 2 (20%), physio: 1 (10%), unit manager: 1 (10%), clinical nurse educator: 1 (10%), unit nurse/research assistant: 1 (10%)	feasibility study, semi-structured interviews	multiphasic exercise prehabilitation considering unique needs across the surgical timeline for HNC patients		- value of exercise and its importance in clinical care (perception of exercise for physical and psychosocial outcomes) - the components of an ideal multiphasic exercise prehab program (the need for individualization; considering frequency, intensity, time and type of exercise) - key factors support implementation (education for patients and HCPs, the role of HCPs, need for a culture shift in cancer care)
2022 Hanika	**n= 20**, post-treatment HNC patients male: 14 (70%) female: 6 (30%), age at interview: 45-50: n=1 (5%), 51-60: n=5 (25%), 61–70 n=7 (35%) , 71–80 n=6 (30%) 81+: n=1 (5%)	**Qualitative** study with interviews	To explore health-related behavioural changes (PA, smoking, alcohol consumption, diet) if any, adopted by HNC survivors, further identifying barriers and motivators to achieving health recommendations.	*not applicable*	- most participants (80%) made lifestyle changes following HNC treatment. - most prevalent changes: diet and alcohol intake - motivators: reducing cancer risk and ill-health, treatment side-effects - barriers: lack of motivation, support and misinformation, treatment side-effects - knowledge of health behaviours: widespread recognition of the “5 a day” message, and harm of smoking. Other public health recommendations were less well-known; most participants (98%) were unaware of current alcohol guidelines, PA was overestimated
2022 Kok	**n= 34**, HNC patients during chemoradiotherapy; median age: 58 years (IQR 35;70) male: 27 (79.4%), female: 7 (20.6%),	**Quantitative**, feasability study	Primary aim: To assess the feasibility of a tailored exercise programme for HNC patients during chemo-radiotherapy. Secondary aim: To assess changes from pre- to post-intervention	- feasibility outcomes: adherence, recruitment, retention, compliance - Secondary: muscle strength, body composition, QoL, fatigue, 6MWT, hand grip strength, 30second chair stand test - Reasons for declined participation, reasons for drop out	- overall adherence: 54%, - recruitment rate: 36% - retention rate 65% - compliance to the supervised intervention protocol: 66% - attendance to supervised sessions declined after treatment completion - shortly after treatment a high number of sessions were missed

2022 Rogers S.	**n= 22**
	25 interviews held, data of 22 interview transcripts used: male: 13 female:9; age: <50= 3, 50–64= 13, >65= 6
	
	> stratified sample of Midgley 2018/Rogers 2019
		Qualitative, semi-structured telephone interviews that took place after the postal survey	To get additional insight into how and why HNC patients would be interested in participating in an exercise programme.	*not applicable*	Main themes:
					- perceived benefits:
					  - psychological: making you feel better;
					  - Health benefits: keeping fit
					  - social aspects
					- barriers to exercise:
					  - treatment side effects
					  - lack of time
					  - other health conditions
					- advice to others:
					  - exercise should be individualized to own capabilities
					  - do what feels good
					  - exercise in social groups or have someone accompany them during exercise

2022 Sealy	**n= 9** patients before surgery with curative intent; female: 4 male: 5 median age: 65 (IQR 52;67)	**Mixed-method** study, interviews and questionnaires	to explore HNC survivors' views on PA, including their self-perceived PA level, and to compare these with objectively measured PA.	- the Exercise Self-Efficacy Scale (ESES) questionnaire - self-reported PA (part ESES) - objectively measured PA (senseWearPro3), - stage of change - exercise screening instrument - Exercise Self-Regulation Questionnaire (SRQ-E) - relative autonomy index (RAI)	**Quantitative findings:** - moderate to very high confidence in self-efficacy to exercise - low level of internalized regulation of PA - 6 out of 8 participants were considered mostly sedentary - 5 participants met the minimum of 21min of PA at 3 MET intensity - self-perceived PA level is higher than actually measured PA - only 1 participant met the recommended guideline for PA **Qualitative findings:** 5 main themes of PA perception: - barriers and problems prioritizing PA - PA is part of day-to-day life - no need to increase PA (lack of intention) - PA is associated with positive feelings or effects - limited social support and persuasion

2023
Ntoukas
	n= 9
	HNC patients, time since neck dissection surgery: <5 years: 3 (33%), ≥5 years: 6 (67%); mean age: 63 years (SD ±11), male :7 (78%), female: 2 (22%)
		Quantitative, single-arm feasibility study	To test the feasibility and safety of a heavy lifting strength training program and to examine the preliminary efficacy for improving muscular strength, physical functioning, and patient-reported outcomes	- Godin Leisure Time Exercise Questionnaire (GLTEQ)
				- perceived benefits, barriers, and motivation for the program
					- median attendance: 96%
					- no barriers interfered severely with training participation
					- perceived benefits included:
					  - physical fitness & muscular strength
					  - improvement of fatigue and overall QoL
					  - sense of control over their health
					- weight lifted increased for squat/leg press, bench press, deadlift
					- no adverse events were reported
					- participants were motivated to continue with the training after the study
					- motivation was high at baseline and remained high post-intervention

2024 Kok	**n= 14** (2 lost to follow up for post intervention interviews) male: 11 female: 3 mean age: 57 years (SD± 8.7) *> subsample of Kok 2022*	**Qualitative**, semi-structured interviews pre and post intervention of a feasibility study (Kok 2022)	To gain insight into preferences and expectations of patients with HNC before and after participating in an exercise intervention during chemo-radiotherapy & to identify factors influencing adherence, retention, and compliance from a patients' perspective	*not applicable*	Five main themes: - planning and time management - treatment toxicity - motivation to exercise - exercise intervention - supervision by a physiotherapist. Barriers: - intensity of treatment schedule - treatment toxicity Facilitators: - physical and emotional benefits, - social support, - simplicity of intervention - home-based setting of intervention

HBC: health behaviour change; HCP: health care professionals; HNC: head and neck cancer; IQR: interquartile range; PA: physical activity; QoL: quality of life; SD: standard deviation