







PAPER

To rest or not to rest—Health care professionals' attitude toward recommending physical activity to their cancer patients

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Abstract

Objective: While in the past cancer patients were advised to rest, recent research revealed various beneficial effects of physical activity, including increased treatment tolerability during cancer treatment and prolonged survival, which has led to a paradigm shift in relevant guidelines. This study examined if this paradigm shift from rest to activity has been consolidated in health care professionals' (HCP) attitude. It was investigated if the two dimensions of attitude (rest and activity) are endorsed empirically within the theory of planned behavior (TPB). Differences between physicians and nurses were examined.

Methods: Five hundred forty seven physicians and 398 nurses treating breast, prostate, or colorectal cancer patients completed a cross-sectional questionnaire. To assess attitude toward physical activity during cancer treatment, we developed a 15-item scale, which included original statements of HCP. TPB variables were assessed.

Results: A factor analysis revealed the proposed distinction of attitude into two dimensions. The activity-paradigm was stronger represented in HCP' attitude compared with rest-paradigm ($M_{\text{activity-paradigm}} = 4.1$ versus $M_{\text{rest-paradigm}} = 2.7$, $p < 0.001$). Additionally, the activity-paradigm had higher exploratory power in explaining intention to recommend physical activity in cancer patients. However, the rest-paradigm was able to explain intention to recommend physical activity over and above activity-paradigm ($\Delta R^2 = 0.05$). Nurses had higher scores on the rest-paradigm than physicians.

Conclusions: The activity-paradigm has already been consolidated in HCP' minds. However, the rest-paradigm is still present in the daily routine of oncology physicians and nurses. Addressing concerns and insecurities related to supporting cancer patients in maintaining or building up a physically active lifestyle is a very important educational task.

KEYWORDS

attitude, cancer, health care professionals, nurses, oncology, paradigm shift, physical activity, physicians, rest paradigm, theory of planned behavior

1 | BACKGROUND

Cancer patients undergoing medical treatment, such as chemo- or radiotherapy, often experience various side effects such as fatigue, which make patients feel exhausted and tired.^{1,2} In the past, health care professionals (HCP) usually advised cancer patients to rest, avoid physical effort, and save their energy for the medical treatment.³ We have coined this former prevalent view the “rest-paradigm.”

In the last two decades, interdisciplinary research on physical activity during acute treatment contributed to the view that physical activity provides various health benefits.⁴⁻⁶ For example, physical activity reduces treatment-related side effects, including dose-limiting toxicities,^{4,7} increases quality of life,⁸ and probably survival.⁹ As a consequence, a change in paradigm emerged among experts, and a new recommendation has been formulated. Cancer patients are now advised to engage in at least moderate physical activity for 150 minutes per week or more.¹⁰ We have coined this new perspective the “activity-paradigm.”

It is unclear whether the activity-paradigm has been translated into practice. Still 60% to 80% of cancer patients do not meet the physical activity recommendation.^{11,12} As cancer patients might be uncertain how to deal best with their disease, they report the wish to be advised regarding lifestyle factors by their physicians or nurses.^{12,13} It is argued that HCP play a pivotal role in promoting physical activity to cancer patients.¹⁴ Indeed, it was shown that a recommendation by HCP to be physically active is associated with a higher physical activity level among their cancer patients.¹⁵⁻¹⁷

Recent studies have shown that most HCP still do not routinely recommend physical activity to their cancer patients.¹⁸⁻²² In a qualitative study with HCP who treat cancer patients, many interviewees reported insecurities about what to recommend to their cancer patients. They worried about physical overexertion and psychological stress following a physical activity recommendation.²³ Thus, the rest-paradigm might still be present in HCP' minds.

As physicians and nurses have different tasks and roles in the cancer treatment and show differences in self-reported knowledge on physical activity,²⁴ we wanted to compare the attitude toward physical activity behavior in cancer patients of these two professions. The shift from rest-paradigm to activity-paradigm might have been consolidated to a different degree among nurses compared with physicians.²⁴

To assess the attitude of HCP toward physical activity during cancer treatment, we used the framework of the theory of planned behavior (TPB).²⁵ The TPB proposes that attitude, perceived behavioral control, and subjective norm predict an individual's intention to perform a behavior. We wanted to find out if attitude toward rest is an independent factor in explaining HCP' intention besides attitude toward physical activity. As there might be a gap between HCP' intention and actual recommendation behavior, we included an active-interest measure as a more objective behavioral criterion of intention.²⁶

In summary, the purpose of this study was to investigate if the paradigm shift from rest to activity has been consolidated in the minds

of physicians and nurses. Therefore, we investigated the endorsement of the rest- and the activity-paradigm among physicians and nurses who regularly treat cancer patients. We assumed that the activity-paradigm nowadays would be stronger reflected in the attitude of both groups than the rest-paradigm, but we also wanted to investigate if the endorsement of the two paradigms would differ between nurses and physicians. Finally, we wanted to examine the role of the two dimensions within the TPB framework. We anticipated that the rest-paradigm still plays a significant role to explain HCP' intention to recommend physical activity to their cancer patients over and above the activity-paradigm.

2 | METHODS

The study was conducted 2016/2017 within the Momentum Project Heidelberg in Germany, a cooperation project between Heidelberg University, the German Cancer Research Center, the National Center for Tumor Diseases, and the Heidelberg University Hospital (NCT02678832; approved by the ethics commission of the Faculty of Behavioral and Cultural Studies of Heidelberg University [08/15/2015 and 12/22/2016]).

2.1 | Participants

Physicians and nurses treating patients diagnosed with breast, prostate, or colorectal cancers were eligible to complete a questionnaire. Included were general practitioners, gynecologists, gastroenterologists, urologists, surgeons, medical oncologists, radiation oncologists, and oncology nurses who have regular contact with cancer patients. HCP could decide to complete the questionnaire either paper-pencil or online. Participants had to provide written or online informed consent and received €25 incentive.

2.2 | Recruitment

A mix of different recruitment strategies were pursued to recruit physicians and nurses working in practices or hospitals nationwide (see Tsiouris et al²⁷ for details).

First, a total of 1000 registered physicians ($n = 600$ general practitioners, $n = 400$ specialized practitioners) were randomly selected from the official physician registers stratified by federal state. Nonresponders were reminded after 2 weeks.

Second, to recruit hospital physicians and oncology nurses, certified breast, prostate, and colon cancer centers were randomly selected from official registers ($N = 536$ physicians and $N = 657$ nurses were addressed). The third recruitment strategy involved recruitment at medical congresses through medical journals and professional mailing lists.

2.3 | Measures

At the beginning of the questionnaire, participants were instructed to think of the following cancer patients when answering the items of the questionnaire: a patient being diagnosed within the last 2 years who is currently during chemotherapy or radiotherapy or who completed treatment only recently. Additionally, a definition of moderate-intensity physical activity was provided referring to all measures.

2.3.1 | Qualitative and quantitative pretests

Variables of the TPB were developed according to Ajzen's guidelines based on a series of elicitation studies.²⁸ These included a qualitative ($N = 30$ HCP) and quantitative ($N = 97$ HCP) pretest (see Supplement S1 for more details on the pretests).

2.3.2 | Attitude: rest-paradigm and activity-paradigm

The assessment of attitude was introduced as follows: "We are interested in your personal perception of physical activity among cancer patients. How much do you agree with the following statements." This was followed by 15 original statements of HCP' derived through the pretests. Examples were: "Through physical activity, cancer patients experience again their capabilities" (activity-paradigm) and "Cancer patients should conserve their energy for the actual therapy" (rest-paradigm). A 5-point Likert scale ranging from "completely disagree" to "completely agree" was used. Table S2 presents all statements and the item statistics.

2.3.3 | TPB constructs

Perceived behavioral control was assessed with three items (e.g., "It is difficult for me to recommend physical activity to my cancer patients regularly") on 7-point Likert scales from "completely disagree" to "completely agree." Cronbach's α was 0.69.

Subjective norm was assessed with three items, for example, "Most of my colleagues who I consider important think I should recommend physical activity to my cancer patients" (from 1 = "completely disagree" to 7 = "completely agree"). Cronbach's α was 0.64.

Descriptive norm was assessed beside the classical TPB construct subjective norm.²⁹ One item was used: "What do you think is the percentage of your colleagues who recommend physical activity to cancer patients during their treatment?"

Behavioral intention to recommend physical activity to cancer patients was assessed with two items (Cronbach's $\alpha = 0.76$) according to Sieverding, Mattered, and Ciccarello.³⁰ For example, "Think of the next three months, please. Do you intend to recommend physical activity regularly to your cancer patients?" (on a 7-point Likert scale from "no, under no circumstances" to "yes, at any rate").

Active interest measure was used as a more behavioral criterion for motivation.²⁶ After completion of the questionnaire, participants

were offered the possibility to request different informational resources. Active interest options regarding physical activity included: (1) a half-day workshop, (2) a scientific review paper, and (3) a booklet HCP could pass on to their patients.

Past recommendation behavior was measured by asking participants how regularly they recommended physical activity to their cancer patients within the last 3 months, *never or rarely recommended* (less than 10%), *sometimes* (10%-50%), *often* (50%-90%), or *routinely recommended* (more than 90%).

Demographic and occupational variables assessed different personal and professional information including sex, age, years of practice, medical specialization, number of treated cancer patients per month, information about the cancer patients they mainly treat (e.g., primary tumor and treatment types), and work setting.

2.4 | Statistical methods

Descriptives (means/standard deviations for metric variables and counts/percentages for nonmetric variables) and correlational analyses were performed using variables of the TPB, as well as sociodemographic and occupational variables. t tests were used to compare means in TPB variables among physicians and nurses. A principal component analyses followed by a varimax rotation was conducted to test the proposed two-dimensional structure of the attitude scale.

Hierarchical regression analyses were calculated with the intention to recommend physical activity as a dependent variable and the following independent variables: activity-paradigm (step 1), rest-paradigm (step 2), control variables (demographic and occupational variables which significantly correlated with the dependent variable) (step 3). As sensitivity analyses, the order of step 1 and step 2 were inverted. Assumptions on normality were checked and considered to be adequate.

Finally, structural equation modeling (SEM) was performed using Amos 22 to analyze the full TPB model. To optimize the measurement structure, parcels were used for the two attitude scales (items-to-construct balance).³¹ To assess model fit, several fit indices were used³²: chi-square test, root mean square error of approximation (RMSEA: less than 0.08 = adequate; less than 0.05 = good model fit), adjusted goodness of fit index (AGFI: more than 0.90 = adequate; more than 0.95 = good model fit), and comparative fit index (CFI: more than 0.90 = adequate; more than 0.95 = good model fit). The amount of missing data was little (all variables less than 5%). Missing values were imputed by AMOS using full information likelihood estimation (FIML).

3 | RESULTS

3.1 | Sample

In sum, 956 HCP (552 physicians and 404 nurses) participated in the study (see Haussmann et al for a flow-chart³³). The response-rate for paper-pencil recruitment was 19.3% (358/1857) among

physicians and 30.8% among nurses (233/760). Additionally, 365 HCP (194 physicians and 171 nurses) completed the questionnaire online (no response rate available). Among the total of 956 participants, 11 (1.2%) did not fill out any measures of the TPB and were excluded. Thus, the final sample consisted of 547 physicians and 398 oncology nurses.

Characteristics of the sample are described in Table 1. Physicians were on average 46.0 years old ($SD = 11.4$), and 47.8% were female. Two hundred eighty nine physicians worked in hospitals, while 246 worked in private practices; 29.4% were general practitioners, 13.9% gynecologists, 11.9% medical oncologists, and 11.9% urologists.

Oncology nurses were on average 39.5 years old ($SD = 10.5$), and 82.4% were female. Inter-correlations between study variables are displayed in Table S3.

3.2 | Two dimensions of attitude: rest-paradigm and activity-paradigm

The principal component analysis revealed the proposed two-factor structure of the attitude scale (see Table S2). The first factor (rest-paradigm) explained 30.2% of the variance, the second factor

TABLE 1 Descriptive statistics of the sample ($N = 945$)

Variable	Physicians ($N = 547$)		Oncology Nurses ($N = 398$)	
	N	%	N	%
Age	$45.99 \pm$	11.36	$39.45 \pm$	10.53
Sex				
Male	285	52.2%	69	17.6%
Female	261	47.8%	322	82.4%
Medical specialization				
General practitioner	161	29.4%	na	
Gynecologist	76	13.9%	na	
Medical oncologist	65	11.9%	na	
Urologist	65	11.9%	na	
Radiation oncologist	63	11.5%	na	
Surgeon	51	9.3%	na	
Gastroenterologist	48	8.8%	na	
Other medical specialties	18	3.3%	na	
Work setting				
Outpatient care	289	54.0%	na	
Inpatient care	246	46.0%	na	
Duration of occupation ^a	$17.53 \pm$	11.03	$19.20 \pm$	10.49
Treated cancer patients/month	$60.40 \pm$	80.57	$81.81 \pm$	105.98
Prior participation in a workshop on physical activity	63	11.5%	99	24.9%
Primarily treated tumor types ^b				
Colorectal	379	69.4%	254	63.8%
Breast	355	65.0%	217	54.5%
Prostate	331	60.6%	205	51.5%
Lung	290	53.1%	230	57.8%
Other	240	44.0%	200	50.3%
Main treatment types ^b				
Chemotherapy	423	77.5%	316	79.4%
Radiotherapy	327	59.9%	234	58.8%
Surgery	416	76.2%	220	55.3%
Aftercare	403	73.8%	158	39.7%
Other	96	17.6%	64	16.1%
Percentage of treated cancer patients being under curative treatment	$63.36 \pm$	25.48	$58.46 \pm$	27.74

Abbreviations: na, not applicable; M, mean; SD, standard deviation.

^ain years;

^bmultiple responses are possible.

(activity-paradigm) explained additional 10.8%. The scree plot confirmed the two-factor solution.³⁴ All factor loadings were according to the proposed structure. For example, “It has to be ensured that physical activity does not weaken cancer patients” was the indicator variable for rest-paradigm (0.71), and “Through physical activity, cancer patients are able to make their own active contribution to their treatment” had the highest loading (0.70) for activity-paradigm.

3.3 | Endorsement of the two dimensions of attitude

The factor activity-paradigm had a significant higher mean value compared with the factor rest-paradigm ($M_{\text{activity-paradigm}} = 4.08$, $SD = 0.53$; $M_{\text{rest-paradigm}} = 2.73$, $SD = 0.59$; $t(942) = -43.37$; $p < 0.001$; $d = -2.42$). Mean comparisons between physicians and nurses showed significant differences between the two professions in all variables (see Figure 1). Nurses had higher average scores on the rest-paradigm than physicians. Additionally, 12.6% of nurses had higher mean values on the rest-paradigm than on the activity-paradigm, whereas only 3.9% of physicians scored higher on the rest-paradigm compared with the activity-paradigm ($\chi(1) = 25.06$, $p < 0.001$).

3.4 | Explaining the intention to recommend physical activity

Generally, the activity-paradigm has a slightly stronger association with intention than the rest-paradigm ($r_{\text{activity-paradigm}} = 0.57$; $r_{\text{rest-paradigm}} = -0.46$). Additionally, results of the hierarchical regression analysis confirmed the hypothesis that the rest-paradigm can explain the intention to recommend physical activity to cancer patients over and above the activity-paradigm. Results are displayed in Table S4. If the rest-paradigm is inserted in the second step after the activity-paradigm ($R^2_{\text{activity-paradigm}} = 0.32$), additional 5% can be explained ($R^2_{\text{total}} = 0.37$).

Inversely, when the rest-paradigm is entered in the first step, it can explain 21.1% in intention. The activity-paradigm explained additional 15.6% in the second step. None of the control variables (step 3) were significant ($\Delta R^2 = 0.006$, $p = 0.220$); therefore, they were not included in the structural equation model in the following section.

3.5 | The role of the two dimension of attitude in the full TPB model explaining active interest

Lastly, the full TPB model was analyzed, including an active interest measure as a more objective measure of motivation and an indicator of recommendation behavior. Regarding the active interest measure, 68.9% of participants were interested in at least one information resource. The overall model fit of the structural equation model was adequate (RMSEA = 0.057; CFI = 0.932) to good (AGFI = 0.995). The full model is presented in Figure 2. The activity-paradigm revealed the highest associations with intention ($\beta = 0.35$, $p < 0.001$) compared with all factors included in the model. Again, in the full TPB model, it turned out that rest-paradigm had an independent association with intention controlling for the other TPB variables. Further, intention significantly explained active interest ($\beta = 0.33$, $p < 0.001$).

4 | DISCUSSION

The perception of physical activity during cancer treatment has changed during the last decades among experts.^{3,6,10} This study investigates if the shift in paradigms from rest to activity has consolidated in HCP' attitude. Therefore, we developed a scale assessing the rest-paradigm and the activity-paradigm separately, implementing original statements of physicians and nurses gained through qualitative interviews.²³

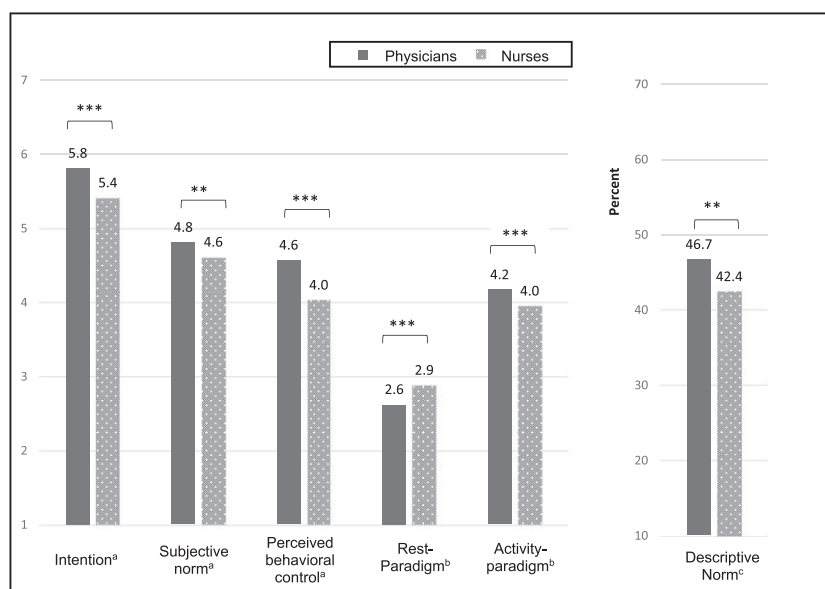


FIGURE 1 Mean comparison (t tests) between physicians and nurses for variables of the theory of planned behavior; ^a on a scale from 1 to 7; ^b on a scale from 1 to 5; ^c in percent ** < 0.01; *** < 0.001

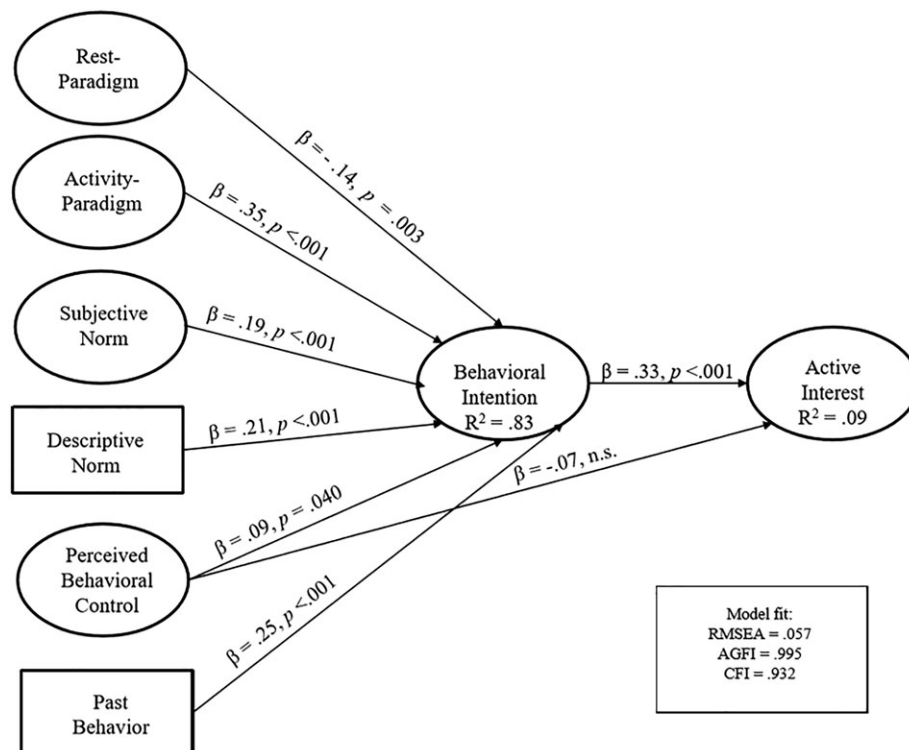


FIGURE 2 Structural equation model with theory of planned behavior variables and active interest measure. Standardized structural coefficients are shown. Measurement model and covariance between all variables are not displayed

Results confirmed the proposed distinction of attitude into the two dimensions rest and activity. It was shown that most HCP reported much higher agreement to the activity-paradigm than to the rest-paradigm. Nevertheless, the rest-paradigm was still represented in HCP' minds. We found that the rest-paradigm was able to explain the intention to recommend physical activity to cancer patients over and above the activity-paradigm. Additionally, rest-paradigm and activity-paradigm were both significant factors in the full TPB model, including an active interest measure.

Most recent studies focused on the new activity-paradigm and did not include the "old" rest-paradigm.^{19,35,36} However, many HCP report insecurities about what to recommend to their cancer patients and concerns about physical overload and psychological stress.²³ Our research shows that although the rest-paradigm is outdated in research, it still seems to be relevant in oncological practice. As the rest-paradigm was influential in former times,³ one could suggest that some HCP are still ambivalent toward physical activity (e.g., "yes, physical activity is good, but patients should not deplete themselves"). So one of the central important questions are: how could this gap between research and practice be reduced? Maybe it is helpful to not only engage in implementing the activity-paradigm in hospitals and practices but also parallel, make an effort to address and reduce the rest-paradigm.

Taking into account the wider literature, it is important to note that it will not be enough to focus solely on increasing attitude, but also other barriers are very relevant in this context. HCP' barriers toward promoting physical activity include lack of time, lack of

adequate support structures, and lack of knowledge and safety concerns.^{21,35,37,38} Poor knowledge and safety concern might reflect the rest-paradigm. However, rest-paradigm probably goes beyond, as in a recent study applying the TPB to exercise prescriptions among 123 oncologists, knowledge of physical activity guideline was not correlated with attitude toward physical activity ($r = 0.07$).²⁰

Further, results suggest that the paradigm shift from rest to activity has been consolidated to a different degree in physicians and nurses. Small differences emerged in the sense that nurses reported in general more agreement with the rest-paradigm. This is in line with a Dutch study among oncology nurses showing that about half of the nurses perceived insufficient knowledge regarding physical activity.³⁹ Further, differences in self-reported knowledge about physical activity were found between physicians and nurses.²⁴ Differences between physicians and nurses might be a result of having different sources of information, such as congresses and scientific literature, and different kind of contact with the patients.

Several strengths characterize this study; the data were drawn from a very large sample compared with previous studies and included HCP of several specialties and work settings. Additionally, the questionnaire was developed elaborately using a sound theoretical approach and various qualitative and quantitative pretests. In future, the questionnaire we developed can be applied to detect to which degree the rest-paradigm is still present in HCP' minds in different settings and countries. Further, it can be used to test if the gap between research and practice will get smaller over time.

4.1 | Study limitations

The social desirability of HCP' reports has to be carefully kept in mind while interpreting the results of this study. For example, in our study, recommendation rates were higher compared to another study using electronic health records.¹⁸ Another limitation of this study is that the focus is on HCP' intention to recommend physical activity to their cancer patients instead of actual physical activity recommendations. However, we included a measure of active interest as a more behavioral criterion of motivation.²⁶ This measure, which goes beyond cognition, can serve as validation of the measure of intention. As the cross-sectional nature of our study does not allow any causal conclusions, future studies should assess actual physical activity recommendations in a longitudinal design. Lastly, as the response rate was relatively low (though typical for surveys of this nature³⁶) and internal consistencies were in questionable range for some TPB variables, generalizability of our findings might be limited.

4.2 | Clinical implications

Hardcastle and Cohen give useful practical advice how HCP can be supported to effectively promote physical activity to cancer patients.¹⁴ They suggest, for example, to provide a 30-second exercise recommendation, consider training for HCP in motivational interviewing, and use a screening tool. These might be very useful tools for many HCP. However, we think that this alone might not be enough, as not all HCP would use these tools because of existing reservations as expressed in the rest-paradigm. As a first step, we suggest to take up HCP' concerns and insecurities about activity to address and reduce the rest-paradigm being still in many HCP' minds. This can succeed, for example, with specific information, counseling, workshops, or literature specifically for clinicians, which address specific concerns^{23,27} expressed in the rest-paradigm. In particular, they should reduce concerns regarding physical overload and psychological distress, and should support clinicians to advise cancer patients with varying physical conditions and high or low interest in physical activity.⁴⁰

Addressing special concern and barriers of nurses might be fruitful to balance the small gap between the two professions. As nurses indicated high interest in informational resources (which included a half-day workshop about physical activity during cancer treatment), they seem to be motivated to learn more about this topic. Additionally, updates about research on physical activity during cancer treatment should be more prominently placed in (scientific) literature and congresses particular for nurses.

Besides exercise specific information, it might be an aim to increase awareness of exercise preferences of cancer patients, and about (dis-)advantages of different types of physical activity (e.g., home-based versus group-based)^{14,20,21} that HCP can match their recommendations to patients' needs. Learning techniques such as motivational interviewing might support HCP to explore and address preferences accordingly.¹⁴

5 | CONCLUSIONS

This study gives first insights that the paradigm shift from rest to activity during cancer treatment has already been consolidated in the minds of many physicians and nurses. However, results revealed the benefit to include the rest-paradigm to explain why many physicians and nurses still do not recommend physical activity to their cancer patients. Addressing concerns and insecurities related to supporting cancer patients in maintaining or building up a physical active lifestyle is a very important educational task.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

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REFERENCES

1. Kangas M, Bovbjerg DH, Montgomery GH. Cancer-related fatigue: a systematic and meta-analytic review of non-pharmacological therapies for cancer patients. *Psychol Bull.* 2008;134(5):700-741.
2. Brearley SG, Stamatakis Z, Addington-Hall J, et al. The physical and practical problems experienced by cancer survivors: a rapid review and synthesis of the literature. *Eur J Oncol Nurs.* 2011;15(3):204-212.
3. Dimeo F. Exercise for cancer patients: a new challenge in sports medicine. *Br J Sports Med.* 2000;34(3):160-161.
4. Speck RM, Courneya KS, Måsse LC, Duval S, Schmitz KH. An update of controlled physical activity trials in cancer survivors: a systematic review and meta-analysis. *J Cancer Surviv.* 2010;4(2):87-100.
5. Mishra SI, Scherer RW, Snyder C, Geigle PM, Berlanstein DR, Topaloglu O. Exercise interventions on health-related quality of life for people with cancer during active treatment. *Cochrane Database Syst Rev.* 2012. Art. No.: CD008465
6. Courneya KS. Physical activity in cancer survivors: a field in motion. *Psychooncology.* 2009;18(4):337-342.
7. Cramp F, Byron-Daniel J. Exercise for the management of cancer-related fatigue in adults. *Cochrane Database Syst Rev.* 2012; Art. No.: CD006145.
8. Buffart L, Kalter J, Sweegers MG, et al. Effects and moderators of exercise on quality of life and physical function in patients with cancer: an individual patient data meta-analysis of 34 RCTs. *Cancer Treat Rev.* 2017;52:91-104.

9. Cormie P, Zopf EM, Zhang X, Schmitz KH. The impact of exercise on cancer mortality, recurrence, and treatment-related adverse effects. *Epidemiol Rev.* 2017;39(1):71-92.
10. Buffart L, Galvão D, Brug J, Chinapaw M, Newton R. Evidence-based physical activity guidelines for cancer survivors: current guidelines, knowledge gaps and future research directions. *Cancer Treat Rev.* 2014;40(2):327-340.
11. Crawford JJ, Holt NL, Vallance JK, Courneya KS. A new paradigm for examining the correlates of aerobic, strength, and combined exercise: an application to gynecologic cancer survivors. *Support Care Cancer.* 2016;24(8):3533-3541.
12. Lynch BM, Dunstan DW, Winkler E, Healy GN, Eakin E, Owen N. Objectively assessed physical activity, sedentary time and waist circumference among prostate cancer survivors: findings from the National health and nutrition examination survey (2003–2006). *Eur J Cancer Care.* 2011;20(4):514-519.
13. Rogers LQ, Markwell SJ, Verhulst S, McAuley E, Courneya KS. Rural breast cancer survivors: exercise preferences and their determinants. *Psychooncology.* 2009;18(4):412-421.
14. Hardcastle SJ, Cohen PA. Effective physical activity promotion to survivors of cancer is likely to be home based and to require oncologist participation. *J Clin Oncol.* 2017;35(32):3635-3637.
15. Jones LW, Courneya KS, Fairey AS, Mackey JR. Effects of an oncologist's recommendation to exercise on self-reported exercise behavior in newly diagnosed breast cancer survivors: a single-blind, randomized controlled trial. *Ann Behav Med.* 2004;28(2):105-113.
16. Tarasenko YN, Miller EA, Chen C, Schoenberg NE. Physical activity levels and counseling by health care providers in cancer survivors. *Prev Med.* 2017;99:211-217.
17. Fisher A, Williams K, Beeken R, Wardle J. Recall of physical activity advice was associated with higher levels of physical activity in colorectal cancer patients. *BMJ Open.* 2015;5(4):e006853.
18. Nyrop KA, Deal AM, Williams GR, Guerard EJ, Pergolotti M, Muss HB. Physical activity communication between oncology providers and patients with early-stage breast, colon, or prostate cancer. *Cancer.* 2016;122(3):470-476.
19. Spellman C, Craike M, Livingston P. Knowledge, attitudes and practices of clinicians in promoting physical activity to prostate cancer survivors. *Health Educ J.* 2013;73:566-575.
20. Hardcastle SJ, Kane R, Chivers P, et al. Knowledge, attitudes, and practice of oncologists and oncology health care providers in promoting physical activity to cancer survivors: an international survey. *Support Care Cancer.* 2018;26(11):1-9.
21. Keogh JW, Pühringer P, Olsen A, Sargeant S, Jones LM, Climstein M. Physical activity promotion, beliefs, and barriers among Australasian oncology nurses. *Oncol Nurs Forum.* 2017;44(2):235-245.
22. Ungar N, Schmidt L, Gabrian M, et al. Which self-management strategies do health care professionals recommend to their cancer patients? An experimental investigation of patient age and treatment phase. *J Behav Med.* 2018. <https://doi.org/10.1007/s10865-018-9980-1>
23. Haussmann A, Gabrian M, Ungar N, et al. What hinders health care professionals in promoting physical activity towards cancer patients? The influencing role of health care professionals' concerns, perceived patient characteristics, and perceived structural factors. *Eur J Cancer Care.* 2018;27(4):e12853.
24. Burdick L, Mielke GI, Parra DC, et al. Physicians', nurses' and community health workers' knowledge about physical activity in Brazil: a cross-sectional study. *Prev Med Rep.* 2015;2:467-472.
25. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process.* 1991;50(2):179-211.
26. Sieverding M, Decker S, Zimmermann F. Information about low participation in cancer screening demotivates other people. *Psychol Sci.* 2010;21(7):941-943.
27. Tsiouris A, Ungar N, Haussmann A, Sieverding M, Steindorf K, Wiskemann J. Health care professionals' perception of contraindications for physical activity during cancer treatment. *Front Oncol.* 2018;8:98.
28. Ajzen I. Constructing a TpB-questionnaire: Conceptual and methodological considerations. 2002. Available from: <http://people.umass.edu/aizen/pdf/tpb.measurement.pdf>.
29. Rivas A, Sheeran P. Descriptive norms as an additional predictor in the theory of planned behaviour: a meta-analysis. *Curr Psychol.* 2003;22(3):218-233.
30. Sieverding M, Mattered U, Ciccarello L. What role do social norms play in the context of men's cancer screening intention and behavior? Application of an extended theory of planned behavior. *Health Psychol.* 2010;29(1):72-81.
31. Little TD, Cunningham WA, Shahar G, Widaman KF. To parcel or not to parcel: exploring the question, weighing the merits. *Struct Equ Modeling.* 2002;9(2):151-173.
32. Byrne BM. Structural equation modeling with AMOS: basic concepts, applications, and programming: Routledge; 2016.
33. Haussmann A, Ungar N, Gabrian M, et al. Are healthcare professionals being left in the lurch? The role of structural barriers and information resources to promote physical activity to cancer patients. *Support Care Cancer.* 2018;26(12):4087-4096.
34. Costello AB, Osborne JW. Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *PARE.* 2005;10:1-9.
35. Karvinen K, DuBose K, Carney B, Allison R. Promotion of physical activity among oncologists in the United States. *J Support Oncol.* 2010;8(1):35-41.
36. Park J-H, Oh M, Yoon YJ, et al. Characteristics of attitude and recommendation of oncologists toward exercise in South Korea: a cross sectional survey study. *BMC Cancer.* 2015;15(1):249.
37. Keogh JW, Olsen A, Climstein M, Sargeant S, Jones L. Benefits and barriers of cancer practitioners discussing physical activity with their cancer patients. *J Cancer Educ.* 2017;32(1):11-15.
38. Nadler M, Bainbridge D, Tomasone J, Cheifetz O, Juergens RA, Sussman J. Oncology care provider perspectives on exercise promotion in people with cancer: an examination of knowledge, practices, barriers, and facilitators. *Support Care Cancer.* 2017;25(7):2297-2304.
39. van Veen MR, Hoedjes M, Versteegen JJ, van de Meulengraaf-Wilhelm N, Kampman E, Beijer S. Improving oncology nurses' knowledge about nutrition and physical activity for cancer survivors. *Oncol Nurs Forum.* 2017;44(4):488-496.
40. Robertson L, Richards R, Egan R, Szymlek-Gay EA. Promotion and support of physical activity among cancer survivors: a service provider perspective. *Psychooncology.* 2012;22:441-446.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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