FINAL REPORT

1 General Information

DFG reference number: MA 7865/3-1, SCHM 3423/3-1, STE 1493/6-1

Project number: 438839893

Project title: Longitudinal Investigation of Cancer-related Fatigue and its Treatment (LIFT)

Name(s) of the applicant(s): Prof. Dr. Imad Maatouk, Dr. Martina E. Schmidt, Prof. Dr. Karen Steindorf

Official address(es): Universitätsklinikum Würzburg, Medizinische Klinik und Poliklinik II, Lehrstuhl für Integrierte Psychosomatisch Medizin und Psychotherapie, Oberdürrbacherstr. 6, 97080 Würzburg; Deutsches Krebsforschungszentrum (DKFZ), Abteilung für Bewegung, Präventionsforschung und Krebs, Im Neuenheimer Feld 581, 69120 Heidelberg

Name(s) of the co-applicants: -/-

Name(s) of the cooperation partners: Krebsregister Baden-Württemberg

Reporting period (entire funding period): 04/2021-03/2025

2 Summary

One of the most common and burdensome sequelae during and after cancer therapy is cancer-related fatigue (CRF), defined as a sense of physical, emotional, and/or cognitive tiredness or exhaustion in relation to cancer or its therapy. CRF impairs daily functioning, professional re-integration, social relations, and overall quality of life. To guide healthcare professionals in managing CRF in clinical practice, international associations such as the National Cancer Center Network or the European Society for Medical Oncology have formulated clear recommendations based on empirical evidence and consensus of experts.

However, previous studies demonstrated lacking dissemination and implementation of these guidelines in some countries such as the US and Australia. As a result, many of those affected still feel poorly informed and left alone. As there was very little data on the situation on screening, counselling, and treatment of CRF in Germany, the LIFT project (Longitudinal Investigation of Cancer-related Fatigue) was launched with the aim to gain initial insights and derive starting points for improvements. It investigates the status of CRF management in Germany from the institutional, the healthcare professionals', and the patients' perspective. The multimodal approach included a comprehensive assessment of support offered by healthcare institutions, a survey and qualitative research among practitioners, and a longitudinal survey and qualitative research among cancer patients.

From the institutional perspective, our study indicated several gaps in information and education about CRF. Among oncological institutions, only 67 % of those responding to our survey stated to provide written information on CRF, and online information was generally scarce. Standardized operating procedures in CRF management as recommended in the guidelines were hardly implemented. Although a multiprofessional, patient-centered care approach being most desirable, responsibilities in CRF management were mainly attributed to physicians. From the healthcare professionals' perspective, there was an overall low awareness of CRF guidelines among physicians, nurses, and psycho-oncologists. Knowledge gaps existed regarding exercise as CRF treatment option among nurses (and partly also among psycho-oncologists), as well as knowledge-to-practice gaps among physicians for psychotherapeutic interventions and among psycho-oncologists for exercise. CRF as a topic was hardly covered in basic training and moderately in advanced training of all three professions. Accordingly, 75 % of patients five months after diagnosis had not been informed about CRF by their treating physician. Patients themselves tended not to address CRF due to lacking time during consultation, uncertainties whom to turn to, or worries on being taken for weak. In conclusion, various

problems and needs with respect to current CRF care in Germany have been identified, and first steps for improvement have already been taken.

Zusammenfassung

Eine der häufigsten Folgeerscheinungen während und nach einer Krebstherapie ist die Krebs-assoziierte Fatigue (CRF), definiert als ein Gefühl von körperlicher, emotionaler und/oder kognitiver Müdigkeit oder Erschöpfung im Zusammenhang mit einer Krebserkrankung und/oder Krebsbehandlung. Die Betroffenen empfinden CRF oft als noch beeinträchtigender als andere sehr häufige Folgeerscheinungen wie Schmerzen oder Übelkeit. CRF beeinträchtigt das tägliche Funktionieren, die berufliche Wiedereingliederung, die sozialen Beziehungen und damit auch die wahrgenommene Lebensqualität. Um Fachpersonal in der Krebsversorgung eine Orientierungshilfe für den Umgang mit CRF in der klinischen Praxis zu geben, haben internationale Vereinigungen wie das National Cancer Center Network oder die European Society for Medical Oncology klare Empfehlungen formuliert, die auf empirischen Belegen und einem Konsens von Expertinnen und Experten beruhen.

Doch auch wenn diese Leitlinien frei verfügbar und aktuell sind, zeigen internationale Studien bspw. aus den USA und Australien eine mangelnde Verbreitung und Umsetzung. Dementsprechend fühlen sich viele Betroffene nach wie vor schlecht informiert und allein gelassen. Da es in Deutschland kaum Daten zur allgemeinen Situation von Screening, Beratung und Behandlung von CRF gab, wurde das LIFT-Projekt (Longitudinal Investigation of Cancer-related Fatigue) ins Leben gerufen. Um erste Erkenntnisse zu gewinnen und daraus Ansatzpunkte für Verbesserungen abzuleiten, wurde der Stand des CRF-Managements in Deutschland aus institutioneller Perspektive, Perspektive involvierter Fachpersonen und Perspektive der Patient*innen untersucht. Der multimodale Ansatz beinhaltete eine umfassende Bewertung der von den Gesundheitseinrichtungen angebotenen Unterstützung, eine Umfrage und Interviews unter Fachpersonen sowie eine Längsschnittstudie und Interviews unter Krebspatient*innen. Es war nicht zu erwarten, dass die Situation in Deutschland besser sein würde als für andere Länder beschrieben.

Aus institutioneller Sicht hat sich dies bestätigt. Schriftliche Informationen wurden kaum an Patient*innen weitergegeben und Online-Informationen waren im Allgemeinen rar. Standardisierte Arbeitsabläufe im CRF-Management, waren kaum umgesetzt. Die Zuständigkeiten für das CRF-Management wurden hauptsächlich den Ärzt*innen zugeschrieben, anstatt sie nach dem multiprofessionellen, personenzentrierten Versorgungsansatz auf mehrere Berufsgruppen zu verteilen. Das Bewusstsein für CRF-Leitlinien war bei Ärzt*innen, Pflegefachpersonen und Psychoonkolog*innen insgesamt gering. Bei Pflegefachpersonen (und

Psychoonkolog*innen) gab es einen Wissensmangel in Bezug auf Sport als Behandlungsoption. Das Wissen von Ärzt*innen in Bezug auf psychotherapeutische Interventionen sowie von Psychoonkolog*innen in Bezug auf Sport bildete sich nicht in ihrem Beratungsverhalten ab. Das Thema CRF wurde in der Grundausbildung kaum und in der Fortbildung mäßig behandelt. Die meisten Analysen zur Perspektive der Patient*innen stehen noch aus, aber auch unter diesen zeigte sich ein ungedecktes Informationsbedürfnis sowie gewisse Hemmungen in der Kommunikation über CRF. Zusammenfassend lässt sich sagen, dass die aktuelle CRF-Versorgung in Deutschland erwartungsgemäß mangelhaft ist. Auf allen Ebenen ist uns jedoch Interesse und der Wille, etwas zu verändern, begegnet. Die identifizierten Barrieren und die sich daraus ergebenden Implikationen können den Weg für Verbesserungen ebnen.

3 Progress Report

The number of cancer incidents has been increasing and predicted to rise globally upon 77 % from 2022 until 2050 [1, 2]. At the same time, also the number of cancer survivors is increasing due to improved screening and treatment [3]. However, many cancer survivors, even if disease-free, still suffer from physical and psychological side effects of cancer therapy [4, 5]. One of the most impairing sequelae during and after cancer therapy is cancer-related fatigue (CRF), defined as “a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer and/or cancer treatment that is not proportional to recent activity, and significantly interferes with usual functioning” [6, 7]. Often leading to reduced quality of life of those affected, conflicts in their social and professional relations, isolation, and work loss [8-10], CRF needs to be understood as a challenge for society as a whole [11].

To guide healthcare professionals in managing CRF, the National Comprehensive Cancer Network [6], the Canadian Association of Psychooncology [12], and the European Society of Medical Oncology [13] have formulated clinical practice guidelines over the last decades. Those contain comprehensive information regarding how to educate patients, screen for and diagnose CRF. Evidence-based treatment options are listed in all three international guidelines. Dissemination and implementation of those recommendations in clinical practice had been shown to be poor in the US [14], as well as in Australia [15]. The situation in Germany was not expected to be much better as indicated by some preliminary data [16]. Yet, in-depths data on screening, counseling, and treatment of CRF in Germany was lacking. Likewise, data on the knowledge among German patients and healthcare professionals or false beliefs regarding CRF on both sides were not available.

To generate profound data on these issues and to provide valuable insights on target groups that enable concrete, targeted future actions, we have set up the LIFT project (Longitudinal Investigation of Cancer-related Fatigue and its Treatment). The project aimed to thoroughly investigate the current status of CRF-management in Germany from (1) the institutional, (2) the healthcare professionals', and (3) the patients' perspective. The multimodal approach included a comprehensive assessment of support offered by healthcare institutions, a survey and qualitative research among physicians, nurses, and psycho-oncologists, and a longitudinal survey and qualitative research among cancer patients. Characteristics, patterns, and potential shortcomings of the current CRF management were to be identified. Overall, the LIFT project was meant to enlarge the evidence base for improving the care for patients with CRF in Germany.

Primary objectives:

• to assess patients' knowledge, attitudes, and needs regarding CRF

• to assess healthcare professionals' knowledge and attitudes regarding CRF

• to assess the current practice of informing, screening, diagnosis, counseling, and treatment of CRF in Germany

Secondary objectives:

• to identify factors associated with patients' knowledge about CRF

• to identify factors associated with health professionals' knowledge about CRF

• to identify factors associated with quality of CRF management at the institutional level

• to explore the associations of patients' knowledge about CRF (about 6 months after diagnosis) with persistence and severity of fatigue and related patient-reported outcomes (e.g. quality of life, depression, sleep problems)

Bibliography

1. Bray F, Laversanne M, Sung H et al. (2024) Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 74:229-263. 10.3322/caac.21834
2. American Cancer Society (2024) Global Cancer Facts & Figures 5th Edition. In:American Cancer Society, Atlanta, https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/global-cancer-facts-and-figures/global-cancer-facts-and-figures-2024.pdf. Zugegriffen: 20.02.2025
3. Allemani C, Matsuda T, Di Carlo V et al. (2018) Global surveillance of trends in cancer survival 2000-14 (CONCORD-3): analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. Lancet 391:1023-1075. 10.1016/S0140-6736(17)33326-3
4. Firkins J, Hansen L, Driessnack M, Dieckmann N (2020) Quality of life in "chronic" cancer survivors: a meta-analysis. J Cancer Surviv 14:504-517. 10.1007/s11764-020-00869-9
5. Kotronoulas G, Papadopoulou C, Burns-Cunningham K, Simpson M, Maguire R (2017) A systematic review of the supportive care needs of people living with and beyond cancer of the colon and/or rectum. Eur J Oncol Nurs 29:60-70. 10.1016/j.ejon.2017.05.004

6. NCCN (2023) NCCN Clinical Practice Guidelines in Oncology: Cancer-related fatigue (version 2.2024). In:National Comprehensive Cancer Network (NCCN), https://www.nccn.org/login?ReturnURL=https://www.nccn.org/professionals/physician_gls/pdf/fatigue.pdf . Zugegriffen:13.05.2025
7. Ma Y, He B, Jiang M et al. (2020) Prevalence and risk factors of cancer-related fatigue: A systematic review and meta-analysis. Int J Nurs Stud 111:103707. 10.1016/j.ijnurstu.2020.103707
8. Roila F, Fumi G, Ruggeri B et al. (2019) Prevalence, characteristics, and treatment of fatigue in oncological cancer patients in Italy: a cross-sectional study of the Italian Network for Supportive Care in Cancer (NICSO). Support Care Cancer 27:1041-1047. 10.1007/s00520-018-4393-9
9. Jones JM, Olson K, Catton P et al. (2016) Cancer-related fatigue and associated disability in post-treatment cancer survivors. J Cancer Surviv 10:51-61. 10.1007/s11764-015-0450-2
10. Bootsma TI, Schellekens MPJ, van Woezik RAM, van der Lee ML, Slatman J (2020) Experiencing and responding to chronic cancer-related fatigue: A meta-ethnography of qualitative research. Psychooncology 29:241-250. 10.1002/pon.5213
11. Corbett T, Groarke A, Walsh JC, McGuire BE (2016) Cancer-related fatigue in post-treatment cancer survivors: application of the common sense model of illness representations. BMC Cancer 16:919. 10.1186/s12885-016-2907-8
12. Pearson EJ, Morris ME, McKinstry CE (2016) Cancer-related fatigue: appraising evidence-based guidelines for screening, assessment and management. Support Care Cancer 24:3935-3942. 10.1007/s00520-016-3228-9
13. Fabi A, Bhargava R, Fatigoni S et al. (2020) Cancer-related fatigue: ESMO Clinical Practice Guidelines for diagnosis and treatment. Annals of Oncology 31:713-723. 10.1016/j.annonc.2020.02.016
14. Jones G, Gollish M, Trudel G, Rutkowski N, Brunet J, Lebel S (2021) A perfect storm and patient-provider breakdown in communication: two mechanisms underlying practice gaps in CRF guidelines implementation. Supportive Care in Cancer 29:1873–1881. 10.1007/s00520-020-05676-7
15. Pearson EJM, Morris E, McKinstry CE (2015) Cancer-related fatigue: a survey of health practitioner knowledge and practice. Support Care Cancer 23:3521-3529. 10.1007/s00520-015-2723-8
16. Schmidt ME, Bergbold S, Hermann S, Steindorf K (2021) Knowledge, perceptions, and management of cancer-related fatigue: the patients' perspective. Support Care Cancer 29:2063-2071. 10.1007/s00520-020-05686-5

WP 1: Review and evaluation of information and support offered at the institutions' level (Maatouk)

The publicly available information and institutional support on CRF in Germany have been systematically reviewed based on (a) the institutions' webpages and (b) a questionnaire mailed to the official contact addresses of the institutions. The website rating instrument was developed based on well-established, previously used rating tools, e.g., the DISCERN Handbook, which we adopted to the context of CRF. Content items of the rating instrument as well as the institutional questionnaire were generated based on official guidelines and clinical expertise within our research team following several feedback loops. Targeted institutions for both investigations (a, b) were Comprehensive Cancer Centers (CCCs) (n = 13) and organ-specific certified cancer centers (n = 127); uncertified hospitals and practices for (hemato)oncology (n = 70), and outpatient cancer counseling units ("Ambulante Krebsberatungsstellen") (n = 70). With rated websites of 14 CCCs, 116 organ-specific cancer centers, 69 other hospitals, 50 practices for (hemato)oncology, and 34 outpatient counseling units the aimed sample sizes were partially met within the revision of the institutions' provided online information. For some initially drawn institutions, there was no website found or websites were permanently inaccessible during our assessment period. Regarding the revision of institutional support, sample

sizes were smaller with 11 CCCs, 35 organ-specific cancer centers, 29 practices for (hemato)oncology, and 48 outpatient counseling units having answered the questionnaire. As survey response rates within the previously and systematically drawn targeted sample (for WP1) of other/non-certified hospitals and practices were too low, we opened recruitment for these groups only at that point to be able to reach more institutions. Results regarding available online information and institutional support on CRF have already been published [P1-2]. Key findings from both publications will be reported in the following:

The website rating revealed a low provision of information over all institutional groups. Nevertheless, the mean rating sum score of CCCs was overall higher than of the other institutional groups, indicating more information being provided or of better quality, credibility, or usability, while practices for oncology scored significantly lower than the other institutional groups. The term “cancer-related fatigue” was introduced on 21.9 % and detailed information was provided on 27.9 % of the websites. Information material was offered on 9.2 % of the websites, while CRF treatment offers were presented on 21.6 % of the websites. As none of the institutions reached the maximum score, our rating criteria might have been too demanding. What we would recommend, however, is at least an explanation alongside an introduction of the term CRF, a hint to its treatability, as well as linking information booklets or external websites for comprehensive information. In addition, naming contact persons at the institution may be helpful [P1].

Within the institutions survey we investigated institutional support structures and to what extent those mirrored recommendations of clinical practice guidelines. Almost all institutions (per group) reported to inform patients verbally on CRF, less in written form. Information events, eHealth tools, and online information were rather used at CCCs. Systematic screening as recommended in the guidelines was conducted at less than one third of the institutional groups. Likewise, only a few institutions followed standardized operating procedures in diagnostics and treatment of CRF. In accordance with guidelines, exercise (resistance and endurance) as well as psychotherapeutic interventions seemed to be most frequently recommended to patients with CRF across all institutional groups. While this is good news, there is a broad discrepancy between recommendations on screening and diagnostics of CRF and clinical practice. Moreover, even if information is shared verbally and evidence-based treatment options are recommended almost everywhere, patients still lack information and adequate treatment. Aside of favored standardization, this brings an increased provision of written (online) information as well as professional training in communication skills up for discussion in terms of future actions [P2].

We were well aware of the overrepresentation of certified institutions and possibly resulting “positive selection”. In accordance with our expectations, however, the status of CRF care was

low even at certified institutions. We consider improving CRF management among the high-quality cancer care providers as a reasonable important first step. Extending an established good CRF management from these centers to all other providers would then be the subsequent step.

WP 2: Survey and qualitative research considering the professionals' perspective (Maatouk, Steindorf)

Beyond the institutional perspective, current attitudes and provision of care from the carers' perspective is necessary when creating the basis for improving care. Therefore, a comprehensive survey among different healthcare professionals and stakeholders in the field was conducted in a mixed-methods design. Healthcare professionals from three professional fields (medicine, nursing, psycho-oncology) were invited to take part in an online survey questionnaire on their knowledge, attitudes, and actions regarding CRF. Survey items were mostly taken over from a similar, previously used questionnaire from Australia [12]. This had been elaborated within a systematic procedure ensuring its verifiability. Targeted sample sizes were 140 participants per professional field. Regarding practitioners from the inpatient setting, we had opened the original recruitment procedure. We used the German hospital registry to draw hospitals systematically per medical field, federal state, and ownership. In accordance with the targeted sample sizes, we included 148 physicians, 184 nurses, and 184 psycho-oncologists. Analyses of the survey data are completed. Results have been published [P3-5] and will shortly be reported in the following section. Additionally, we conducted two focus-group discussions with physicians, nurses, and psycho-oncologists (n = 2 each per focus-group) to explore and discuss attitudes and experiences of dealing with cancer-related fatigue (e.g., their knowledge about CRF, their interaction with those (chronically) affected, their interprofessional interaction and thoughts on how care (screening, diagnostics, therapy) could be improved [P6]. Thirdly, stakeholders (n = 18) involved in cancer care and professional training (e.g., as board members of professional societies) were invited to take part in a semi-structured interview to share their opinion regarding barriers in CRF management and suggestions on how to meet those barriers, which we had identified within the LIFT project, as well as to complement the latter. Originally, semi-structured interviews were planned with healthcare practitioners from the three mentioned fields, while focus-group interviews were planned with the stakeholders. However, as we preferred to conduct the focus-group interviews in person we decided to invite physicians, nurses, and psycho-oncologists at the university hospital Würzburg to take part instead of nationwide participation and the stakeholders to take part in 1:1 interviews online. From 18

invited stakeholders, 15 (five per professional field) could manage to take part. Corresponding qualitative analyses are still in progress.

The nationwide online survey among healthcare professionals [P3-5] revealed that a majority of physicians, nurses, and psycho-oncologists felt rather well or very well informed and (rather) agreed to feel competent in counseling on CRF. However, still one third of physicians and nurses felt rather poorly or very poorly informed. Additionally, physicians and nurses mostly estimated their colleagues to be neither well informed. Psycho-oncologists, on the other hand, self-perceived their knowledge and competences to be (rather) high and estimated knowledge and competences of their colleagues accordingly. Furthermore, the majority of physicians, nurses, and psychooncologists were unaware of any international or national guidelines regarding CRF. The most knowledgeable guideline, which considers CRF at least partially, was the German S3-Guideline for palliative care in all three groups. The likelihood of knowing any CRF guidelines was higher among physicians, if having completed advanced training in palliative care, among psycho-oncologists, if being in leading position, and among nurses, if working at a certified cancer centre (against non-certified institutions). Besides that, the majority of physicians, nurses and psycho-oncologists were aware of the empirical evidence supporting exercise, physical activity, yoga, and psychotherapeutic interventions. Knowledge is lacking regarding exercise among nurses (and psycho-oncologists). Looking at the reported frequencies with which professionals actually recommended those interventions to patients, physical activity is leading, being recommended often to almost always by the majority of professionals. Although exercise is proven more effective than physical activity, this was recommended often to almost always by 83 % of physicians, but only 42 % of nurses and 61 % of psycho-oncologists. Psychotherapeutic interventions, which are proven almost as effective as exercise, were recommended often to almost always by 84 % of psycho-oncologists, but only 56 % of physicians and 48 % of nurses. Yoga was recommended often to almost always by 37 % of physicians, 35 % of nurses, and 50 % of psycho-oncologists. While knowledge on yoga seems not to be transferred into clinical (recommendation) practice in all three professional groups, there are two more group-specific knowledge-to-practice gaps: Physicians' knowledge on psychotherapeutic interventions, as well as psycho-oncologists' knowledge on exercise was not mirrored in their clinical counseling respectively. Participants in all three professional groups stated that CRF had been covered not at all or hardly as a subject in their studies or basic training. In oncology nursing training, it was mostly considered moderately to comprehensively. For most of the physicians and psycho-oncologists, however, CRF had only been covered at least moderately in advanced training, e.g., for psycho-oncology. All participants called for interprofessional training on CRF, which is aligned with and oriented to their daily clinical practice and, if possible, thematically covered in the broader context of survivorship care.

WP3: Longitudinal survey and qualitative research on patients' perspective regarding fatigue (Schmidt, Steindorf)

In order to create the basis for improving care of patients suffering from CRF, precise knowledge of the current attitudes and provision of care from the patients' perspective is essential. Within a longitudinal survey, comprehensive data on knowledge, attitudes, needs, support and treatment received with respect to CRF during and after cancer therapy was assessed. Patients diagnosed with one of 15 common cancer entities received questionnaires at four time points within 24 months (t1-t4: at 6, 9, 12, and 24 months after diagnosis). To foster knowledge on CRF, we aimed to explore which factors were associated with lack of knowledge or false beliefs regarding CRF among our patient population. Moreover, we were interested in whether patient's knowledge, attitudes, or received CRF management might have an impact on his/her well-being. Patient-reported outcomes were prospectively assessed including CRF, depressive symptoms, anxiety, sleep problems, physical, social, emotional, cognitive, and role function, and overall health-related quality of life.

Patients were randomly sampled from the Epidemiological Cancer Registry of Baden-Wuerttemberg, Germany, stratified by cancer entity. The Trust Center of the Cancer Registry invited patients via postal mail to participate in the study. In total, 1.201 patients were included in this sub-study of the LIFT project and completed the questionnaire at t1, of which 997 patients took part at t2, 892 patients at t3, and still 825 patients at t4. The most common cancer types were breast cancer (26 %), colorectal cancer (16 %) and prostate cancer (14 %). Metastases were reported by 19 % of the study population. First analyses regarding the patients' perspective have been published [P9]. But further analyses, especially those considering longitudinal data, are still ongoing. As among healthcare professionals, an unmet information need also emerged among patients six months after diagnosis. Half of the participants reported that their treating physician had not asked them whether and how much they felt exhausted. Patients of older age as well as those with depression were significantly less likely to be asked. Almost 75 % did not feel informed on CRF by their treating physician. Moreover, what hindered patients themselves to address CRF with healthcare professionals, were the question whom to turn to, a lack of time during consultations, as well as fear of being perceived as weak.

Data of the LIFT project can be made available in pseudonymized or anonymized form to scientific cooperation partners upon reasonable request.

4 Published Project Results

4.1 Publications with scientific quality assurance

[P1] Wagner AS, Milzer M, Steindorf K, Kiermeier S, Schmidt ME, Maatouk I (2024): Cancer-related fatigue: Quality, credibility, usability, and readability of information on websites of health care institutions in Germany. *Patient Education and Counseling*, 121:108135. doi:10.1016/j.pec.2024.108135.

[P2] Wagner AS, Milzer M, Kiermeier S, Schmidt ME, Nguyen TD, Steindorf K (2025): Fatigue bei Krebs: Wie (gut) sind Betroffene in Deutschland versorgt?. *Zeitschrift für Evidenz, Fortbildung und Qualität im Gesundheitswesen*, 194: 40-47. doi:10.1016/j.zefq.2025.02.003.

[P3] Wagner AS, Wehlen L, Milzer M, Schmidt ME, Kiermeier S, Maatouk I, Steindorf K (2024): Physicians' perspectives on cancer-related fatigue management and their suggestions for improvements in medical training: A Cross-sectional Survey Study in Germany. *Supportive Care in Cancer*, 32(788):1-9. doi:10.1007/s00520-024-08978-2.

[P4] Milzer M, Wagner AS, Steindorf K, Kiermeier S, Schmidt ME, Maatouk I (2023): Psycho-oncologists' knowledge of cancer-related fatigue and the targets for improving education and training: results from a cross-sectional survey study. *Supportive Care in Cancer*, *31*(7):412. doi:10.1007/s00520-023-07882-5.

[P5] Wagner AS, Milzer M, Schmidt ME, Kiermeier S, Maatouk I, Steindorf K. (2025): Nurses' Knowledge of Cancer-related Fatigue and Coverage of this Subject in Nursing Training: A Cross-sectional Study. *The Journal of Nursing Research*, 33(2):e379. doi:10.1097/jnr.0000000000000666.

[P6] Wagner AS, Milzer M, Steindorf K, Kiermeier S, Nguyen TD, Schmidt ME, Maatouk I (2025): Patient-professional and interprofessional communication barriers in cancer-related fatigue management: A monocentric focus-group study among multidisciplinary healthcare professionals. *European Journal of Cancer Care*, 2025:1179081. doi:10.1155/ecc/1179081.

[P7] Wagner AS, Milzer M, Steindorf K, Kiermeier S, Nguyen TD, Schmidt ME, Maatouk I (2025): An Interdisciplinary Challenge: Responsibilities in German Cancer-related Fatigue Management from the Professional and Patient Perspective. *The Oncologist*, (under review).

[P8] Wagner AS, Schmidt ME, Blickle P, Jentschke E, Steindorf K, Maatouk I (2025): Leben mit Krebs-assoziierter Fatigue: Die Perspektive der Betroffenen und involvierter Fachpersonen. *Die Onkologie*, 4:1-6. doi:10.1007/s00761-025-01692-6.

[P9] Milzer M, Wagner AS, Schmidt ME, Maatouk I, Hermann S, Cancer Registry of Baden-Wuerttemberg, Kiermeier S, Steindorf K (2024): Patient-physician communication about cancer-related fatigue: a survey of patient-perceived barriers. *Journal of Cancer Research and Clinical Oncology*, 150(29):1-16. doi:10.1007/s00432-023-05555-8.

4.2 Other publications and published results

4.2.1. Congress contributions

[P10-11] Arbeitsgemeinschaft für Psychoonkologie in der Deutschen Krebsgesellschaft (DKG) 2023: Die Rolle der Psychoonkologie in der Fatigue-Versorgung: Ergebnisse einer Befragungsstudie unter

Psychoonkolog:innen in Deutschland (Milzer M et. al); 2024: Krebsassoziierte Fatigue gemeinsam bewältigen! Ergebnisse zweier Umfragen unter Behandelnden und Patient*innen in Deutschland (Wagner AS et al.)

[P12-15] Deutscher Kongress für Psychosomatische Medizin 2023: Die Rolle der Pflege in der Fatigue-Versorgung: Heute und morgen (Wagner AS et al.); 2024: Der Umgang mit krebsassoziierter Fatigue aus Perspektive der Medizin, Pflege und Psychoonkologie: Ergebnisse aus interprofessionellen Fokusgruppen (Wagner AS et al.); 2025: Versorgungssituation von Krebspatientinnen und -patienten mit Fatigue in Deutschland: Ergebnisse einer nationalen Befragung unter Versorgungseinrichtungen (Wagner AS et al.); Leitliniengerechte Versorgung von Patientinnen und Patienten mit Krebs-assoziierter Fatigue: Aktueller Stand und Perspektiven aus Sicht praktizierender Ärztinnen und Ärzte (Wagner AS et al.)

[P16] International Psycho-Oncology Society 2023: Cancer-related Fatigue: Gaps between Guideline Recommendations and Clinical Practice as well as Psycho-Oncologists' Suggestions for Improvements (Milzer M et al.)

[P17] Deutsche Gesellschaft für Epidemiologie 2023: Cancer-related fatigue: Results from a survey on knowledge and management among health care professionals in Germany (Schmidt ME et al.); 2024: How do healthcare professionals and patients experience current management of cancer-related fatigue? : Results from two cross-sectional survey studies (Steindorf K et al.)

[P18] International Congress of Psychosomatic Medicine 2024: Whose turn is it? The perspectives of healthcare professionals regarding responsibilities in the management of cancer-related fatigue (Wagner AS et al.)

[P19] International Congress of Clinical Psychology 2024: The fatiguing search for online information on cancer-related fatigue: Results from a nationwide website rating on German healthcare institution websites (Wagner AS et al.)

[P20-23] Deutscher Krebskongress 2024: Barriers to an effective patient-physician communication about cancer-related fatigue (Milzer M et al.); Online information on cancer-related fatigue: A fatiguing search (Wagner AS et al.); Aktueller Stand des Fatigue Managements: die Perspektive der Betroffenen und Versorgenden (Wagner AS et al.)

[P24] Deutscher Kongress für Psychotherapie 2025: Krebsassoziierte Fatigue: aktuelle Versorgungssituation und Behandlungsoptionen (Schmidt ME et al.)

4.3 Patents (applied for and granted)

none