Supplementary Materials

Frailty screening in dermato-oncology practice: a modified Delphi study and a systematic review of the literature.

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Table S1. Systematic literature search to identify frailty screening tools

| Database searched: PubMed, Embase (Excerpta Medica Database), Cochrane Library, SUMsearch, PsycINFO and Trip Database |
|---|
| Period of time searched: Articles published up to 16-5-2019 |
| Limit(s): none. |
| Search details (search strategy shown for PubMed, similar search terms were used for other databases): |
| ("frailty"[MeSH Terms] OR "frailty"[All Fields]) AND ("diagnosis"[Subheading] OR "diagnosis"[All Fields] OR "screening"[All Fields] OR "mass screening"[MeSH Terms] OR ("mass"[All Fields] AND "screening"[All Fields]) OR "mass screening"[All Fields] OR "screening"[All Fields] OR "early detection of cancer"[MeSH Terms] OR ("early"[All Fields] AND "detection"[All Fields] AND "cancer"[All Fields]) OR "early detection of cancer"[All Fields] AND ("neoplasms"[MeSH Terms] OR "neoplasms"[All Fields] OR "cancer"[All Fields]) |
| Organisation | Country/region | URL |
|--------------|---------------|-----|
| International society of geriatric oncology (Société Internationale d'Oncologie Gériatrique; SIOG) | Worldwide | [http://www.siog.org/content/comprehensive-geriatric-assessment-cga-older-patient-cancer](http://www.siog.org/content/comprehensive-geriatric-assessment-cga-older-patient-cancer) |
| World Health Organisation (WHO) | Worldwide | [http://www.who.int/cancer/en](http://www.who.int/cancer/en) [http://www.who.int/ageing/en](http://www.who.int/ageing/en) |
| European Organisation for Research and Treatment of Cancer (EORTC) | Europe | [www.eortc.org](http://www.eortc.org) |
| Organisation of European Cancer Institutes (OECI) | Europe | [http://oeci.eu/AboutOeci.aspx](http://oeci.eu/AboutOeci.aspx) |
| European CanCer Organisation (ECCO) | Europe | [http://www.ecco-org.eu](http://www.ecco-org.eu) |
| European Society of Medical Oncology (ESMO) | Europe | [http://www.esmo.org](http://www.esmo.org) |
| European Society for Radiotherapy & Oncology (ESTRO) | Europe | [https://www.estro.org](https://www.estro.org) |
| European Union Geriatric Medicine Society (EUGMS) | Europe | [http://www.eugms.org](http://www.eugms.org) |
| European Union (EU), including European Commission (EC) and the European Innovation Partnership on Active Health and Ageing (EIP on AHA) | Europe | [https://ec.europa.eu/eip/ageing/library/guidelines-instruments-screening-and-diagnosis-frailty-and-functional-decline](https://ec.europa.eu/eip/ageing/library/guidelines-instruments-screening-and-diagnosis-frailty-and-functional-decline) |
| National Cancer Institute (NCI) | United States | [https://www.cancer.gov](https://www.cancer.gov) |
| National Comprehensive Cancer Network (NCCN) | United States | [https://www.nccn.org/professionals/physician_gls/default.aspx#senior](https://www.nccn.org/professionals/physician_gls/default.aspx#senior) |
| American Cancer Society (ACS) | United States | [https://www.cancer.org](https://www.cancer.org) |
| American Society of Clinical Oncology (ASCO) | United States | [https://www.asco.org/practice-guidelines/cancer-care-initiatives/geriatric-oncology](https://www.asco.org/practice-guidelines/cancer-care-initiatives/geriatric-oncology) |
| American Geriatrics Society (AGS) | United States | [https://www.americangeriatrics.org](https://www.americangeriatrics.org) |
| Netherlands Comprehensive Cancer Organisation (Integraal Kankercentrum Nederland; IKNL) | The Netherlands | [www.iknl.nl](http://www.iknl.nl) |
| Dutch Cancer Society (KWF) | The Netherlands | [https://www.kwf.nl](https://www.kwf.nl) |
| Dutch Geriatrics Society (Nederlandse Vereniging voor Klinische Geriatrie; NVKG) | The Netherlands | [https://www.nvkg.nl](https://www.nvkg.nl) |
| Geriatric Oncology Working Group (British Geriatrics Society) | Great Britain | [http://www.bgs.org.uk/oncogeriatrics/sections/specialinterest/oncogeriatrics](http://www.bgs.org.uk/oncogeriatrics/sections/specialinterest/oncogeriatrics) |
| British Geriatrics Society | Great Britain | [http://www.bgs.org.uk](http://www.bgs.org.uk) |
| Requirement                                                                                           |
|------------------------------------------------------------------------------------------------------|
| The screening tool should have appropriate measurement properties*                                    |
| *following the COSMIN checklist, which included: internal consistency, reliability, measurement error, |
| content validity, structural validity, hypothesis testing, cross-cultural validity, criterion validity, |
| responsiveness, and interpretability                                                                   |
| The screening tool should be available in multiple languages                                           |
| The screening tool should include items related to comorbidities                                       |
| The screening tool should include items related to medication use or polypharmacy                       |
| The screening tool should include items related to mobility and falls                                    |
| The screening tool should include items related to (instrumental) activities of daily living           |
| The screening tool should include items related to neurosensory deficits                               |
| The screening tool should include items related to cognitive function (e.g. dementia and/or delirium risk) |
| The screening tool should include items related to mood, anxiety and/or depression                      |
| The screening tool should include items related to nutritional status                                   |
| The screening tool should include items related to social support system (i.e. relatives/friends) or    |
| health care related support system (community nursing)                                                 |
| The screening tool should include items related to the ethnic or cultural background                    |
| The screening tool should be filled in by a physician/physician assistant/nurse (practitioner)          |
| The screening tool should be filled in by a patient or relative/friend                                  |
| The screening tool items should be easy to understand for the person filling in the screening tool; e.g.|
| also suitable for use in a low-educated and/or low-literature population                                |
| The screening tool should be quickly performed in daily dermatologic practice                          |
| The outcome of the screening tool should be easy to interpret                                         |
| The outcome of the screening tool should have a relevant impact in daily dermato-oncologic practice (clinical relevance) |
| The outcome of the screening tool should have a predictive value concerning life expectancy            |
Figure S1. Flow-chart of the systematic search to identify frailty screening tools

Records identified through database search* (n=1354) → Duplicates removed (n=439)

Records screened by title/abstract (n=915) → Records excluded after title/abstract screening (n=861)

Records assessed for eligibility in full-text (n=54) → Full-text articles excluded (n=28):
  - Irrelevant (n=13)
  - Tools already included (n=11)
  - Physical or laboratory tests needed (n=4)

Unique screening tools identified (n=26) → Duplicates removed (n=12)

Screening tools identified by website screening (n=12) → Screening tools included in this systematic review (n=26)

* PubMed (n=418), Embase (n=290), Cochrane Library (n=30), SUMsearch (n=305), PsycINFO (n=7) and Trip Database (n=304).
| Frailty Screening Tool | Study | n   | Sensitivity | Specificity | Cut-off point CGA | Components CGA |
|-----------------------|-------|------|-------------|-------------|-------------------|----------------|
| Bellera, 2012 18      | 364   | 85   | 65          | ≥1          | ADL, IADL, MMSE, GDS-15, MNA, CIRS-G, and GUG |
| Bellera, 2012 18      | 364   | 92   | 45          | ≥2          | ADL, IADL, MMSE, GDS-15, MNA, CIRS-G, and GUG |
| Luce, 2012 59         | 211   | 65   | 3           | ≥1          | ADL, IADL, MMSE, GDS, MNA, CIRS-G, social evaluation, biochemical lab, Mob-T, WHOQOL, pain, polypharmacy |
| Pottel, 2012 72       | 51    | 86   | 75          | ≥2          | ADL, IADL, MMSE, GDS-30, MNA, CIRS-G, TUG, and MOS-SSS |
| Baitar, 2013 12       | 170   | 92   | 52          | ≥1          | ADL (Barthel), IADL, MMSE, GDS-30, TUG, polypharmacy, BMI/weight loss, and F-Sozu |
| Hamaker, 2014 49       | 108   | 69   | 79          | ≥2          | ADL, IADL, MMSE, GDS-15, MNA-short form, and CCI |
| Holmes, 2014 51       | 50    | 70   | 71          | ≥2          | ADL, IADL, CLOX 1, CLOX 2, TMTA, TMTB, HADS-anxiety and depression, MNA, HCT-CI, polypharmacy, SPPB, and MOS |
| Kenis, 2014 8         | 937   | 87   | 59          | ≥2          | ADL, IADL, MMSE, GDS-15, MNA, CIRS-G, and GUG |
| Liu, 2014 71          | 518   | 87   | 60          | ≥2          | ADL, IADL, MMSE, GDS-15, CIRA-G, and TUG |
| Soubeyran, 2014 9     | 1597  | 77   | 64          | ≥1*         | ADL, IADL, MMSE, GDS-15, MNA, CIRS-G, and GUG |
| Velghe, 2014 56       | 50    | 89   | 100         | ≥1          | ADL (Barthel), IADL, MMSE, GDS-15, MNA, CIRS-G, and any falls in the previous year |
| Smets, 2014 58        | 398   | 78   | 68          | ≥1          | ADL, IADL, MMSE, GDS-4, MNA, and any falls in the previous year |
| Dubruille, 2015 10    | 90    | 80   | 56          | ≥2          | ADL, IADL, MMSE, GDS-4, MNA, CIRA-G, TUG, Mob-t, HADS, and polypharmacy |
| Kenig, 2015 73        | 135   | 97   | 44          | ≥2          | ADL, IADL, BOMC, GDS, MNA, CIRA-G, TUG, and CDT |
| Martinez-Tapia, 2016 19| 729  | 87   | 58          | ≥2          | ADL, IADL, MMSE, Mini-GDS, MNA, CIRS-G, and TUG |
| Study | Year | ADL | IADL | MMSE | GDS | MNA | CIRS-G | TUG | ECR | CDT | Fluency | Risk of Falls |
|-------|------|-----|------|------|-----|-----|--------|-----|-----|-----|---------|--------------|
| Hentschel, 2016 | 2016 | 84 | 38 | 63 | ≥2 | IADL, cognition, NCCN Distress Thermometer, MNA-short form, polypharmacy, and falls |
| de Thezy, 2017 | 2017 | 49 | 100 | 73 | ≥1 | ADL, IADL, MMSE, GDA, TUG, and malnutrition |
| Osborne, 2017 | 2017 | 178 | 44 | 84 | ≥1 | ADL, IADL, MNA, BMI, CCI, polypharmacy, World Health Organization Performance status, and medication |
| Pamoukdjian, 2017 | 2017 | 269 | 90 | 35 | ≥1 | ADL, simplified IADL, MMSE, mini-GDS, BMI, albumin, and SPPB |
| Pamoukdjian, 2017 | 2017 | 269 | 93 | 29 | ≥2 | ADL, simplified IADL, MMSE, mini-GDS, BMI, albumin, and SPPB |
| van Loon, 2017 | 2017 | 123 | 92 | 26 | ≥2 | ADL (Barthel), IADL, MMSE, GDS-15, MNA, CIRS-G, TUG, CDT, Tinetti Scale, Gijon Scale and risk of falls |
| Russo, 2018 | 2018 | 282 | 89 | 50 | ≥3 | IADL (Barthel), IADL, MMSE, GDS-15, MNA, CIRS-G, TUG, CDT, Tinetti Scale, Gijon Scale and risk of falls |
| Yokom, 2018 | 2018 | 28 | 73 | 80 | ≥2 | IADL, cognition, mood, nutrition, CCI, social vulnerability, polypharmacy, mobility and falls |
| Martinez-Tapia, 2016 | 2016 | 729 | 89 | 79 | ≥2 | ADL, IADL, MMSE, Mini-GDS, MNA, CIRS-G, and TUG |
| Pamoukdjian, 2017 | 2017 | 269 | 89 | 65 | ≥1 | ADL, simplified IADL, MMSE, mini-GDS, BMI, albumin, and SPPB |
| Pamoukdjian, 2017 | 2017 | 269 | 92 | 36 | ≥2 | ADL, simplified IADL, MMSE, mini-GDS, BMI, albumin, and SPPB |
| Modified G8 | | | | | | |
| Kellen, 2010 | 2010 | 113 | 39 | 86 | ≥2 | ADL (Barthel), IADL, MMSE, and GDS |
| Baitar, 2013 | 2013 | 170 | 66 | 87 | ≥1 | ADL, IADL, MMSE, GDS-30, MNA, CIRS-G, TUG, and MOS-SSS |
| Smets, 2014 | 2014 | 398 | 76 | 73 | ≥1 | ADL (Barthel), IADL, MMSE, GDS-15, food intake, weight loss, and medication |
| Hamaker, 2014 | 2014 | 73 | 69 | 76 | ≥1 | IADL, MMSE, GDS-15, BMI, CCI, and polypharmacy |
| Kenig, 2015 | 2015 | 135 | 64 | 86 | ≥2 | ADL, IADL, BOMC, GDS, MNA, CCI, TUG, and CDT |
|                | van Loon, 2017 61 | 123 | 74 | 52 | ≥2 | ADL, IADL, MMSE, GDS, MNA, CIRS-G, TUG, ECR, CDT, and fluency |
|----------------|-------------------|-----|----|----|----|---------------------------------------------------------------|
| **SAOP2**      | Extermann, 2009 20| 31  | 100| 40 | NR | ADL, IADL, MMS, GDS, CES-D, MNA, CIRS-G, self-rated health, ECOG PS |
| Russo, 2018 11 | 282              | 94  | 50 |    | ≥3 | ADL (Barthel), IADL, MMSE, GDS-15, MNA, CIRS-G, TUG, CDT, Tinetti Scale, Gijon Scale and risk of falls |

Abbreviations: ADL, Activities of Daily Living; BMI, Body Mass Index; BOMC, Blessed Orientation-Memory-Concentration; CCI, Charlson Comorbidity Index; CDT, Clock Drawing Test; CES-D, Center for Epidemiologic Studies Depression Scale; CGA, comprehensive geriatric assessment; CIRS-G, Cumulative Illness Rating Scale for Geriatrics; CLOX, Clock Draw Test; ECOG PS, Eastern Cooperative Oncology Group Performance Scale; ECR, Enhanced Cued Recall; F-Sozu, Fragebogen zur Erfassung der sozialen Unterstützung; G8, Geriatric-8; GDS, Geriatric Depression Scale (followed by the number of items); GFI, Groningen Frailty Index; GUG, Get Up and Go; HADS, Hospital Anxiety and Depression Scale; HCT-CI, Hematopoietic and Cellular Therapy-Comorbidity Index; IADL, Instrumental Activities of Daily Living; mG8, modified Geriatric-8; Mini-GDS, Mini Geriatric Depression Scale; MMSE, Mini-Mental Status Exam; MNA, Mini Nutritional Assessment; Mob-T, Mobility-tiredness scale; MOS, Medical Outcomes Survey; MOS-SSS, Medical Outcomes Study Social Support Scale; NCCN, National Comprehensive Cancer Network; NR, not reported; SAOP2, Senior Adult Oncology Program 2; SPPB, Short Physical Performance Battery; TUG, Timed Up and Go test; TMTA, Trail Making Test A; TMTB, Trail Making Test B; WHOQOL, World Health Organization Quality of Life Questionnaire.

* ≥1 missing was also scored as abnormal CGA