








Prevalence of Preferences for End-of-Life Place of Care and Death Among Patients With Cancer in Low- and Middle-Income Countries: A Systematic Review and Meta-Analysis

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ABSTRACT

PURPOSE There is limited information on preferences for place of care and death among patients with cancer in low- and middle-income countries (LMICs). The aim was to report the prevalence and determinants of preferences for end-of-life place of care and death among patients with cancer in LMICs and identify concordance between the preferred and actual place of death.

METHODS Systematic review and meta-analysis guided by Preferred Reporting Items for Systematic Reviews and Meta-Analyses was conducted. Four electronic databases were searched to identify studies of any design that reported on the preferred and actual place of care and death of patients with cancer in LMICs. A random-effects meta-analysis estimated pooled prevalences, with 95% CI, with subgroup analyses for region and risk of bias.

RESULTS Thirteen studies were included. Of 3,837 patients with cancer, 62% (95% CI, 49 to 75) preferred to die at home; however, the prevalence of actual home death was 37% (95% CI, 13 to 60). Subgroup analyses found that preferences for home as place of death varied from 55% (95% CI, 41 to 69) for Asia to 64% (95% CI, 57 to 71) for South America and 72% (95% CI, 48 to 97) for Africa. The concordance between the preferred and actual place of death was 48% (95% CI, 41 to 55) for South Africa and 92% (95% CI, 88 to 95) for Malaysia. Factors associated with an increased likelihood of preferred home death included performance status and patients with breast cancer.

CONCLUSION There is very little literature from LMICs on the preferences for end-of-life place of care and death among patients with cancer. Rigorous research is needed to help understand how preferences of patients with cancer change during their journey through cancer.

ACCOMPANYING CONTENT

[Data Supplement](#)

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INTRODUCTION

Approximately 56.8 million people globally are in need of palliative care annually, of whom 78% live in low- and middle-income countries (LMICs).¹ The need in LMICs is partly driven by limited resources for the early identification and treatment of cancer.² Access to palliative care in most LMICs continues to be a concern. Barriers include a lack of trained palliative care providers, limited physical infrastructure, inadequate palliative care education and training, misconceptions about palliative care, lack of funding, limited access to drugs for symptom management (including opioids), and lack of comprehensive national palliative care plans.^{1,3,4}

Palliative care should aim to achieve the best quality of life for patients, provide care consistent with their personal values and preferences, and support families during and after the dying process.⁵ Supporting patients with cancer to receive care and die in their preferred place is a key quality indicator for palliative care services. Preferences for place for end-of-life care and place of death sometimes differ for a given patient on the basis of concerns that include whether they will have their symptoms managed and the likely burden on their family.⁶ Regular discussion and documentation of these preferences is essential to appropriately plan the need for community palliative care.^{7,8} Timely assessment of preferences of patients with cancer also helps avoid

unwanted hospital admissions near the end of life, thus improving cost-effectiveness.⁷

Where patients with cancer die is an important determinant of patient and caregiver experience. In most high-income countries (HICs), home is the most commonly preferred place of death.⁹⁻¹² However, hospital deaths continue to remain common.^{13,14} A recent systematic review and meta-analysis found the prevalence of home, hospital, and hospice as the preferred place of death among patients with cancer to be 55%, 17%, and 10%, respectively.¹⁵ However, HICs and LMICs data were not disaggregated, reducing information for policymaking in LMICs. The review also did not explore how preferences might be influenced by geographical, sociodemographic, or clinical factors. The current authors aimed to review the prevalence and determinants of preferences for end-of-life place of care and death among patients with cancer in LMICs and identify concordance between the preferred and actual place of death.

METHODS

This systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.¹⁶

Data Source and Search Strategy

A comprehensive search was conducted for relevant studies in the following electronic bibliographic databases: Cochrane Library, CINAHL, EMBASE, and Medline. These electronic databases were selected because they are continuously indexed with new publications. Databases were searched between August 25, 2022, and September 5, 2022, and updated on October 20, 2023. The search was not limited by publication year. The search strategy included terms related to the following concepts: cancer, preferences, place of care, place of death, palliative care, end of life, and LMICs. Medical subject headings, keywords, and free-text terms were combined using AND or OR Boolean operators. Reference lists of relevant articles were hand-searched to identify additional studies. The search terms were devised from two relevant reviews.^{17,18} It was also checked against a previous review focusing on the preferred place of death among adult patients with cancer.¹⁵ The initial search strategy was performed in Medline (Ovid; Data Supplement).

Inclusion and Exclusion Criteria

The inclusion criteria limited admission to those studies that reported primary research findings on preferred place of care and death of patients with cancer, were conducted in LMICs, and were published in the English language. The World Bank Group categorizes LMICs into low-income countries (those with a gross national income [GNI] per capita of \$1,085 US dollars [USD] or less), low-middle-income countries (those

with a GNI per capita between \$1,086 USD and \$4,255 USD), and upper-middle-income countries (those with a GNI per capita between \$4,256 USD and \$13,205 USD).¹⁹ Exclusion criteria were studies reported without full text (only abstract), studies not aimed at the preferred place of care and death, editorials, comments, and studies undertaken in HICs.

Study Selection

After the search of the electronic databases, all citations of the identified records were collated and uploaded into the EndNote Version 20 reference manager for removal of duplicated files and storage. The titles and abstracts of the articles were screened by two independent review authors (P.N.A. and J.A.A.) for relevance. The two reviewers then reconciled the outcome of the screening. Full text of potential articles assessed as relevant on the abstract review were retrieved and screened by the same independent reviewer authors against the inclusion criteria. Full-text articles that did not meet the inclusion criteria were excluded, and reasons for exclusion were justified. Any disagreements that occurred between the two review authors were resolved through mutual discussion, and where no consensus was reached, a third reviewer (A.D.) was involved.

Data Extraction

Three review authors (P.N.A., E.O.O., and A.D.) independently extracted data such as study characteristics (first authors, publication year, country, study aim and design, age group, participants, cancer type, and sample size), preferred place of care, preferred place of death, actual place of death, concordance between the preferred and actual place of death, and determinants of place of death.

Study Quality Assessment

Two review authors (A.D. and E.O.O.) assessed the quality of the included studies. Quantitative studies were assessed according to the appropriate Joanna Briggs Institute (JBI) Critical Appraisal Checklist, such as cross-sectional studies and cohort studies.^{20,21} Any discrepancies were resolved by discussion. Studies were classified into low or high risk of bias using a cutoff of 60%.

Data Analysis

Data were analyzed using Review Manager 5.4. The generic inverse variance method was used in pooling the data because the included studies were without control groups.²² A random-effects meta-analysis was used to calculate pooled data with 95% CIs because it allows for the possibility that studies in the meta-analysis have heterogeneous effects.²³ The extracted data were used to compute the SE of the prevalence of preferences for end-of-life place of care and death for each included study using the equation below, where n represents the sample size and p is the sample proportion.²⁴

$$SE = \sqrt{\frac{p \times (1 - p)}{n}} \quad (1)$$

Estimation of SE (1).

Heterogeneity among studies was estimated using the I^2 index, with values classified as no heterogeneity (0%), low heterogeneity (25%–50%), moderate heterogeneity (51%–75%), and high heterogeneity ($\geq 75\%$).²⁵ Leave-one-out sensitivity analysis was performed to examine whether single studies had a disproportionately excessive influence. Subgroup meta-analyses on the basis of country were conducted to determine the potential sources of heterogeneity. Further subgroup analyses were conducted to determine whether the results of the meta-analysis were robust to omission of studies classified as high risk of bias. Forest plots were generated. Probability values below 0.05 were considered statistically significant. It was not possible to conduct meta-regression of variables associated with preference.

Ethics Approval and Consent to Participate

This article is based on a secondary analysis of the existing literature and does not contain any data gathered from human participants or animals. The PRISMA guideline for reporting systematic and meta-analysis was followed.

RESULTS

An initial search through the electronic databases yielded 89 studies. After removing 18 duplicates, the remaining 71 articles were screened by title and abstract. Using the exclusion criteria, 43 articles were excluded. Of the remaining 28 articles, nine articles met the inclusion criteria. In addition, four articles were included through reference tracing and hand searches. Finally, a total of 13 articles reporting on end-of-life preferences for place of care and death among patients with cancer were included in this review (Fig 1).

Characteristics of the Included Studies

All the included studies used a quantitative approach. Of these, eight studies used convenience sampling,^{26–33} four used purposive sampling,^{34–37} and one used simple random sampling.³⁸ The cumulative sample size of the included studies was 17,704 participants, which included 16,346 patients with cancer, 1,262 caregivers, and 96 nurses. The mean age of the participants was 51.5 ± 10.2 years: 54.6 ± 8.1 years for patients with cancer and 36.3 ± 0.8 years for caregivers. The studies were conducted across seven LMICs, namely, China,^{28,30,36,38} Iran,^{29,31} Mexico,^{34,35} South Africa,^{27,32} Brazil,³³ Egypt,²⁶ and Malaysia³⁷ (Table 1). Results from caregivers and health care professionals were excluded as the focus populations were patients with cancer.

Measuring Preferences for Place of Care and Death

Only two studies measured the preferred place of care,^{28,29} whereas 11 studies measured the preferred place of death.^{26–33,36–38} All included studies used ad hoc, unvalidated questionnaires to measure the place of care and/or death preferences. None of the studies used a longitudinal approach to facilitate the observation of variations in preferences in different phases of the life course of a patient with cancer. The questions used mainly reflect the assumption that the preferred place of care and/or death of patients with cancer were stable. To measure the preferred place of care, one study from Iran asked: “At the end of life, some individuals choose to be cared for at home, while others prefer to be cared for in a hospital. Where would you rather get treatment as you near death?”²⁹ Questions used to assess preferred place of death included “In case of death, where would you prefer to be?”²⁶; “At the end of their lives, some individuals choose to pass away at home while others choose to pass away in a hospital. Where would you rather pass away?”²⁹; “Where do you prefer to die if circumstances allowed you to choose at your terminal stage of life?”³⁰; and “If you were dying or at the end of your life, where would you most want to be?”^{27,32} Eight studies offered two options for preferred place of death, namely, home and hospital.^{26,27,29–31,33,36,38} Only one study from South Africa provided four options for the preferred place of death, namely, home, hospital, palliative care unit, and nursing home³² (Table 2).

Place of Care Preferences

Prevalence of Home as a Preferred Place of Care

Figure 2 shows the forest plot of prevalence of home as a preferred place of care. Two studies including 803 patients with cancer reported prevalence data on home as a preferred place of care.^{28,29} The estimated pooled prevalence of home as a preferred place of care by patients with cancer was 68% (95% CI, 65 to 71) by using the random-effects model. No between-study heterogeneity was observed ($I^2 = 0\%$, $P = .035$).

Prevalence of Hospital as a Preferred Place of Care

Two studies reported prevalence data on patients with cancer preferring care at the hospital at the end of life.^{28,29} The estimated pooled prevalence of hospital as a preferred place of care was 20% (95% CI, 0 to 40) by using the random-effects model (Fig 3). However, a considerable between-study heterogeneity was observed ($I^2 = 98\%$, $P < .00001$).

Prevalence of the Palliative Care Unit as a Preferred Place of Care

One study from China reported prevalence data on patients with cancer preferring the palliative care unit as a place of

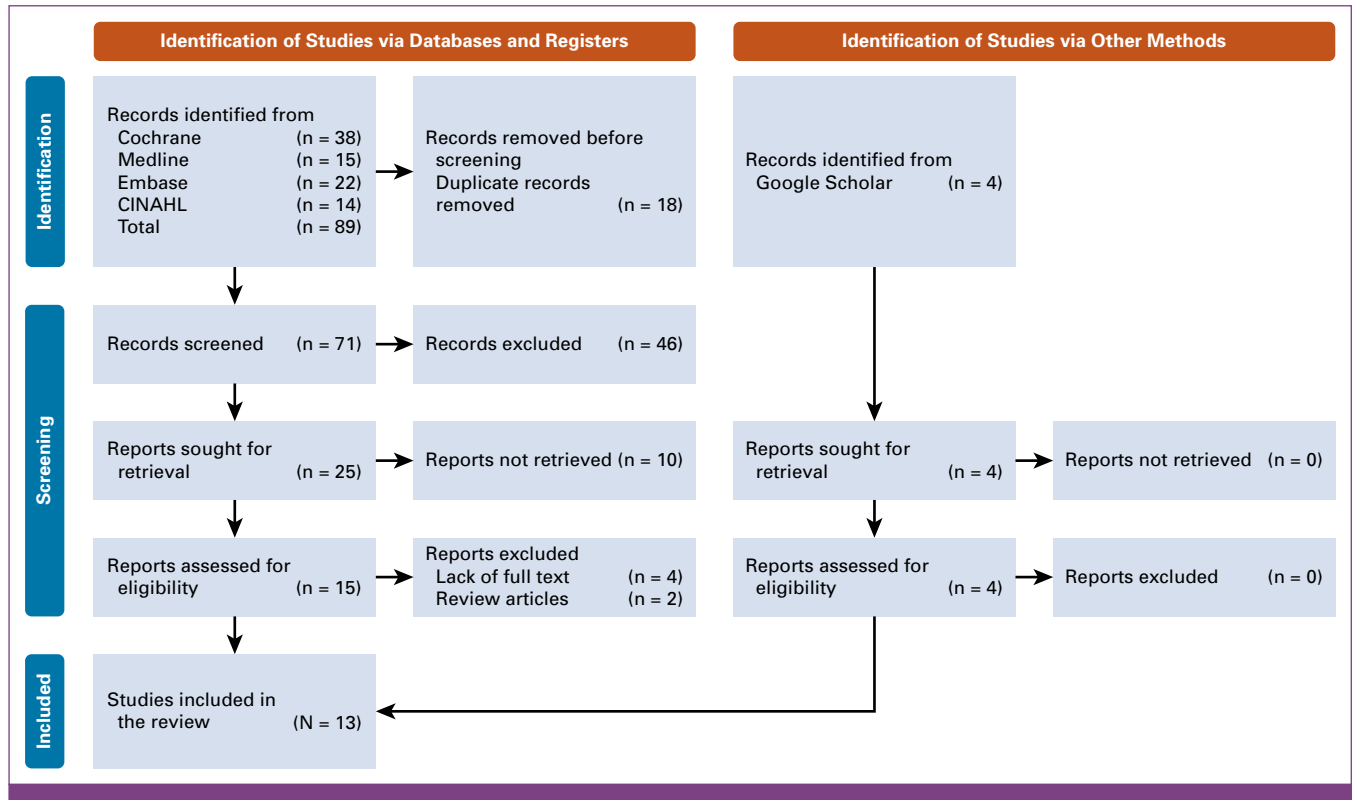


FIG 1. PRISMA flow diagram.

care at the end of life, which was estimated to be 11% (95% CI, 7 to 15).²⁸

Prevalence of Nursing Home as a Preferred Place of Care

Prevalence of nursing home as a preferred place of care for patients with cancer at the end of life was reported by one study from China to be 4% (95% CI, 1 to 6).²⁸

Place of Death Preference

Prevalence of Home as a Preferred Place of Death

A total of 11 studies with 3,837 patients with cancer reported data on home as a preferred place of death for patients.^{26-33,36-38} The estimated pooled prevalence using the random-effects model was 62% (95% CI, 49 to 75). The between-study heterogeneity was significantly high ($I^2 = 99%$, $P < .00001$; Fig 4). There was a difference in the prevalence of home as a preferred place of death by continent among the studies. The pooled prevalence of home as a preferred place of death was 55% (95% CI, 41 to 69, $I^2 = 98%$, $P < .00001$) for Asia, 64% (95% CI, 57 to 71) for South America, and 72% (95% CI, 48 to 97, $I^2 = 98%$, $P < .00001$) for Africa.

Prevalence of Hospital as a Preferred Place of Death

The prevalence of hospital as a preferred place of death for patients with cancer was estimated in 11 studies.^{26-33,36-38}

Expressed as random-effects, the estimated pooled prevalence was 31% (95% CI, 19 to 44; Fig 5). High between-study heterogeneity was observed ($I^2 = 99%$, $P < .00001$). On the basis of the continents of the studies, the estimated pooled prevalence of hospital as a preferred place of death was 14% (95% CI, 9 to 19) for South America, 21% (95% CI, 5 to 37, $I^2 = 97%$, $P < .00001$) for Africa, and 38% (95% CI, 23 to 54, $I^2 = 99%$, $P < .00001$) for Asia.

Prevalence of Palliative Care Unit as a Preferred Place of Death

Two studies with 411 participants were used to estimate the pooled prevalence of palliative care unit as a preferred place of death for patients with cancer.^{32,33} The estimated pooled prevalence was 12% (95% CI, -8 to 32), with a high between-study heterogeneity ($I^2 = 98%$, $P < .00001$; Fig 6). The prevalence of palliative care unit as a preferred place of death was highest in South America with 22% (95% CI, 16 to 28) and lowest in Africa with 2% (95% CI, 0 to 4).

Prevalence of Nursing Home as a Preferred Place of Death

Preference for nursing home as the place of death for patients with cancer was reported in one study from South Africa, with 221 participants.³² The prevalence was 1% (95% CI, 0 to 1).

TABLE 1. Characteristics of Included Studies

First Author/ Country	Study Aim	Study Design/ Sampling Methods	Participants	Sample Size	Sex	Mean Age	Cancer Type
Valentino et al ³³ /Brazil	To identify the Brazilian preferred place-of-death of patients with advanced cancer and their caregivers; to compare preferences and the agreement between them and any possible related factors	A cross-sectional study/ convenience	Patients with cancer and their caregivers	Patients with cancer = 190; Caregivers = 190	Patients with cancer: Male = 100; Female = 90 Caregivers: Male = 50; Female = 140	Patients with cancer: 59.3 ± 13.1 Caregivers: 48.5 ± 13.8	Lung = 48; GI = 62; Breast = 26; Urologic = 22; Gynecologic = 18, Head and Neck = 14 Used to be 172
Portorani et al ³¹ /Iran	To determine the attitudes of nurses, patients with cancer, and their families toward in-home death in health care centers in southeastern Iran	Cross-sectional study/ Convenience	Nurses, patients with cancer, and family caregivers	Nurses = 96; Patients with cancer = 274; Family caregivers = 278	Nurses: Male = 74; Female = 22 Patients with cancer: Male = 129; Female = 145 Family caregivers: Male = 119; Female = 159	Nurses: 32.76 ± 6.8 years Patients with cancer: 36.27 ± 12.15 years Family caregivers: 35.79 ± 10.3 years	Not reported
Leng et al ³⁸ /China	To examine preferences for end-of-life care among patients with terminal cancer in China	Descriptive cross-sectional study/ Sample random	Patients with terminal advanced cancer	183	Male = 128; Female = 55	61 ± 8.4	Lung = 30; Digestive (gastric, colorectal, or liver) = 36; Urologic (kidney, bladder, or prostate) = 98; Other = 19
Ho et al ³⁷ /Malaysia	To investigate the symptom burden in patients with advanced cancer, achievement of their place of death preferences, and factors associated with home death	A retrospective study/Purposive	Deceased patients with cancer	287	Male = 151; Female = 136	61.2 ± 15.4	Lung = 55; Colorectal = 35; Breast = 34; Pancreatic = 28; Gastroesophageal = 28; Hepatocellular = 22; Cholangiocarcinoma = 15; Nasopharyngeal = 14; Renal = 8; Male reproductive = 8; Sarcoma = 7; Gynecologic = 9; Hematologic = 5; Brain = 4; Oral = 4; Thyroid = 3; Melanoma = 3; Laryngeal = 2; Bladder = 2; Neuroendocrine = 2; GI stroma tumor = 1; Unknown primary = 2 (NB: Three patients had 2 concurrent tumors)
Fereidouni et al ²⁹ /Iran	To determine the preferred place of end-of-life care and death in patients with cancer	Descriptive cross-sectional study/ Convenience	Patients with cancer	564	Male = 189; Female = 375	50.21 ± 13.91	GI = 144; Breast = 219; Blood = 59; Other = 83 (NB: 59 cases unaccounted for)
Cheng et al ²⁸ /China	To investigate the knowledge and attitudes of patients with cancer of palliative care and their preferences regarding end-of-life care in mainland China	Descriptive cross-sectional study/ Convenience	Patients with cancer	239	Male = 104; Female = 135	49.63 ± 11.65 years	Head and neck = 69; Nervous = 3; Thorax = 57; Abdominal = 18; Digestive = 30; Genital = 24; Urinary = 8; Bone = 3; Lymphatic/haematologic = 9; Others = 18
Li et al ³⁶ /China	To determine factors that influence POD for end-stage patients with cancer and investigate how the health care utilization mediates the effect of socioeconomic status on POD	A population-based, retrospective study/Purposive	Patients with end-stage cancer	894	Male = 597; Female = 297	Median age = 69 years	Not reported

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TABLE 1. Characteristics of Included Studies (continued)

First Author/ Country	Study Aim	Study Design/ Sampling Methods	Participants	Sample Size	Sex	Mean Age	Cancer Type
Blanchard et al ²⁷ /South Africa	To investigate factors associated with the preferred and actual place of death for patients with cancer in Johannesburg, South Africa	Prospective cohort study/ Convenience	Adult patients with advanced cancer and their caregivers	Patients enrolled = 191	Patients with cancer: Male = 85; Female = 106 Data on caregivers not reported	57.6 ± 13.26 years	Breast = 54; Lung = 60; GIT and hepatobiliary = 74; and Sarcoma and melanoma = 3
Alsirafy et al ²⁶ /Egypt	To know the preferred place of death of Egyptian patients with incurable cancer and their family caregivers and to determine the factors that may affect their preferences	Observational cross-sectional study/ Convenience	Patients with incurable cancer and one of their family caregivers	Patients with cancer = 272 Family caregivers = 272	Patients with cancer: Male = 136; Female = 136 Family caregivers: Male = 156; Female = 116	Patients with cancer: 51.2 ± 14.1 years Family caregivers: 36.9 ± 11.3 years	Breast = 36; Hematologic = 35; Colorectal = 34; Sarcomas = 22; Lung = 21; Pancreas = 21; and Others = 103
Shen et al ³² /South Africa	To examine patients' terminal illness awareness, their preferences for the type of care received at the end of life, and their current and preferred communication surrounding poor prognosis	Prospective cohort study/ Convenience	Patients with advanced cancer and their informal, unpaid caregivers	Patients with cancer = 221 Data on caregivers not reported	Patients with cancer: Male = 84; Female = 137 Data on caregivers not reported	55.89 ± 14.02	Breast = 82; Lung = 52; Gastric/GI = 49; Pancreatic = 30; Melanoma/sarcoma = 8
Gu et al ³⁰ /China	To describe the preference of place of death among Chinese patients with cancer and their caregivers and to identify factors associated with the preference	A prospective study/ Convenience	Terminally ill patients with cancer and their caregivers	Patients with cancer = 522 Family caregivers = 522	Patients: Male = 279; Female = 243 Data on caregivers not reported	Patients: 63 years (range: 21-95 years) Data on caregivers not reported	Lung = 108; Breast = 49; Liver = 44; Colon = 68; GI = 98; Head and neck = 19; Female genital organs = 56; Hematology = 9; Urinary = 33; Others = 38
Cárdenas-Turanzas et al ³⁵ /Mexico	To understand the factors associated with the place of death of children with cancer in metropolitan Mexico	Retrospective study/Purposive	Deceased patients with cancer	1,948	Male = 1,135; Female = 813	Range: <1 to >15 years	Medical Units—Leukemia/Lymphoma = 1,015; CNS = 230; Bone = 77; Soft tissue = 48; Hepatic and upper GI = 48; Renal and urinary system = 35; Eye = 27; Other = 169 (NB: Only cases from the medical unit) The remaining 299 died at home
Cárdenas-Turanzas et al ³⁴ /Mexico	To improve the care of patients with cancer by understanding the factors associated with the place of death	Retrospective study/Purposive	Deceased patients with cancer	10,561	Not reported	63.3 years (standard deviation not reported)	Lung, bronchial, and tracheal = 958; Colorectal = 620; Breast = 936; Cervix uteri = 644; Uterus, vulva, and vagina = 162; Ovary = 306; Prostate = 705; Hodgkin and non-Hodgkin = 496; Leukemia = 565; Esophagus = 140; Stomach = 857; Liver and intrahepatic bile duct = 822; Pancreas = 534; CNS = 288; Lip, oral cavity, pharynx, and larynx = 243; Urinary tract = 428; Other malignant tumors = 1,857

Abbreviations: GIT, gastrointestinal tract; NB, note; POD, place of death.

TABLE 2. Preferences for End-of-Life Place of Care, Death, Actual Place of Death, Concordance, and Questions Asked

First Author/ Country	Preferred Place of Care	Preferred Place of Death	Actual Place of Death	Concordance	Determinants	Preferred Place of Care Questions	Preferred Place of Death Questions
Valentino et al ³³ /Brazil	Not reported	Home = 121 Hospital = 27 Palliative unit = 42	Not reported	Not reported	Not reported	Not reported	Not reported
Portorani et al ³¹ /Iran	Not reported	Home = 176 Hospital = 98	Not reported	Not reported	Not reported	Not reported	Where do you prefer to die (home, hospital, or I do not know)?
Leng et al ³⁸ /China	Not reported	Home = 75 Hospital = 108	Not reported	Not reported	Not reported	Not reported	What is your preferred place of death (home or hospital)?
Ho et al ³⁷ /Malaysia	Not reported	Home = 132 Hospital = 111 Temple = 1 No preference = 9	Home = 112 Hospital = 128 Temple = 1 Unknown = 3	221 of 241 (91.7%) died in their preferred place	Older age was significantly associated with the preference for a home death (OR, 1.021 [95% CI, 1.004 to 1.039]; <i>P</i> = .018)	Not reported	Not reported
Fereidouni et al ²⁹ /Iran	Home = 390 Hospital = 170 No preference = 4	Home = 415 Hospital = 137 No preference = 12	Not reported	Not reported	Married people had a higher chance of choosing the home than single people (OR, 1.62 [95% CI, 1.02 to 2.57]; <i>P</i> = .039) People with a disease period longer than 6 months had a significantly lower chance of choosing the home (OR, 0.468 [95% CI, 0.286 to 0.765]; <i>P</i> = .002)	At the end of life, some individuals choose to be cared for at home, whereas others prefer to be cared for in a hospital. Where would you rather get treatment as you near death?	At the end of their lives, some individuals choose to pass away at home, whereas others choose to pass away in a hospital. Where would you rather pass away?
Cheng et al ²⁸ /China	Home = 157 Hospital = 24 Nursing home = 9 Palliative care unit = 26 Others = 18	Home = 189 Hospital = 24 Community facility = 7 No preference = 1 Others = 18	Not reported	Not reported	Not reported	What is your preferred place of care in the end of life (home, general hospital ward, palliative care unit, nursing home, and others)?	What is your preferred place of death in the end of life (home, hospital, community care facilities, or others)?
Li et al ³⁶ /China	Not reported	Home = 336 Hospital = 558	Not reported	Not reported	Living with a spouse increased the likelihood of hospital death by 72% (OR, 1.72, <i>P</i> = .019) Patients with higher levels of education had higher probabilities of hospital death (OR, 1.93, <i>P</i> = .003) Rate of hospital death increased by 14% (OR, 1.14, <i>P</i> = .009) per hospitalization service used Hospital death decreased by 4% (OR, 0.96, <i>P</i> = .001)	Not reported	Not reported

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TABLE 2. Preferences for End-of-Life Place of Care, Death, Actual Place of Death, Concordance, and Questions Asked (continued)

First Author/ Country	Preferred Place of Care	Preferred Place of Death	Actual Place of Death	Concordance	Determinants	Preferred Place of Care Questions	Preferred Place of Death Questions
Blanchard et al ²⁷ /South Africa	Not reported	Home = 127 Hospital = 64 No preference = 42	Home = 77 Hospital = 110 Hospice = 3 Health care facility = 1	91 of 191 (47.6%) died in their preferred place	Dying at home was associated with an ECOG performance status of 0-2 (OR, 2.53 [95% CI, 1.32 to 4.88]; <i>P</i> = .01) or having lung cancer or breast cancer (OR, 2.18; 95% CI, 1.04 to 4.54; OR, 2.37; 95% CI, 1.08 to 5.18, respectively; <i>P</i> = .05) Dying at home was associated with increasing age (OR, 1.04 [95% CI, 1.01 to 1.06]; <i>P</i> = .01) Patients who wanted family and friends present were more likely to die at home (OR, 7.83, 95% CI, 3.27 to 18.71)	Not reported	If you were dying or at the end of your life, where would you most want to be (home, hospital, nursing home [step-down facility], inpatient hospice, or others)?
Alsirafy et al ²⁶ /Egypt	Not reported	Home = 253 Hospital = 19	Not reported	Not reported	Preferred hospital death was associated with the ECOG performance status of 3 or 4 (OR, 3.015 [95% CI, 1.004 to 9.054], <i>P</i> = .049)	Not reported	In the case of death, where would you prefer to be (home, hospital, or others)?
Shen et al ³² /South Africa	Not reported	Home = 127 Hospital = 51 Nursing home = 1 Palliative unit = 4 Other = 38	Not reported	Not reported	Not reported	Not reported	If you were dying or at the end of your life, where would you most want to be (home, hospital, nursing home/step-down facility, inpatient hospice, or other)?
Gu et al ³⁰ /China	Not reported	Home = 280 Hospital = 204 No preference = 38	Not reported	Not reported	Not reported	Not reported	Where do you prefer to die if circumstances allowed you to choose at your terminal stage (home or hospital)?
Cárdenas-Turanzas et al ³⁵ /Mexico	Not reported	Not reported	Home = 299 Hospital = 1,649	Not reported	Not reported	Not reported	Not reported
Cárdenas-Turanzas et al ³⁴ /Mexico	Not reported	Not reported	Home = 5,701 Hospital = 4,860	Not reported	Not reported	Not reported	Not reported

Abbreviations: ECOG, Eastern Cooperative Oncology Group; OR, odds ratio.

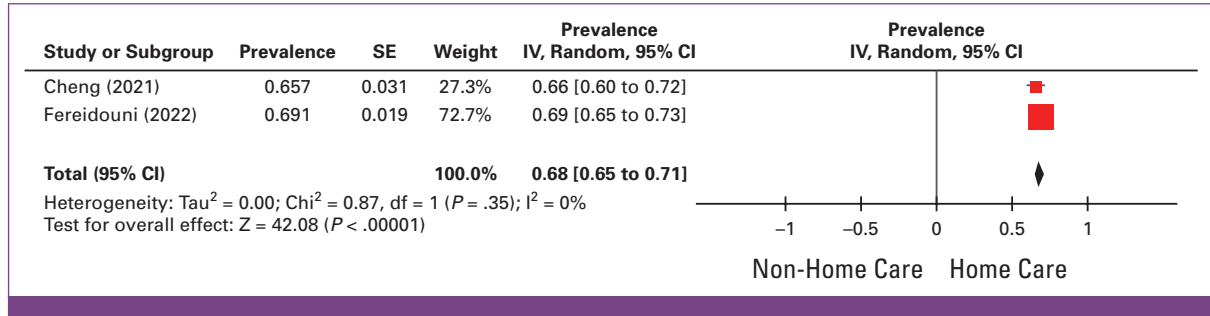


FIG 2. Forest plot of prevalence of home as a preferred place of care. IV, inverse variance.

Prevalence of No Preference for Place of Death

Five studies with 1,803 participants reported data on patients with cancer having no preference for place of death.^{27-30,37} The estimated pooled prevalence was 5% (95% CI, 2 to 9), with a high between-study heterogeneity ($I^2 = 95\%$, $P < .00001$; Fig 7). The estimated pooled prevalence of no preference for place of death was highest in Africa with 18% (95% CI, 13 to 23) and lowest in Asia with 0% (95% CI, 0 to 1). One study from China indicated that patients with cancer with no preferences deferred the place of death decision to family caregivers.³⁰

Prevalence of Actual Place of Death

Four studies with 13,594 participants presented data on the actual place of death.^{27,34-36} The estimated pooled prevalence of actual hospital death and home death using the random-effects model was 63% (95% CI, 40 to 87) and 37% (95% CI, 13 to 60), respectively. However, between-study heterogeneity was significantly high ($I^2 = 100\%$, $P < .00001$). The prevalence of actual home death was 35% (95% CI, -4 to 73) for South America, 38% (95% CI, 34 to 41) for Asia, and 40% (95% CI, 33 to 47) for Africa. By contrast, the prevalence of actual hospital death was highest in South America with 65% (95% CI, 27 to 100), followed by Asia with 62% (95% CI, 59 to 66) and Africa with 60% (95% CI, 53 to 67).

Concordance Between Preferred and Actual Places of Death

Two studies reported data on concordance between the preferred and actual place of death among patients with cancer.^{27,37} The estimated pooled concordance rate using the random-effects model was 70% (95% CI, 27 to 113). The between-study heterogeneity was significantly high ($I^2 = 99\%$, $P < .00001$). The concordance between preferred and actual places of death was 48% (95% CI, 41 to 55) for South Africa²⁷ and 92% (95% CI, 88 to 95) for Malaysia.³⁷

Determinants of Preferred Place of Death

Sociodemographic Factors

A total of five articles were included in the meta-analysis to determine the association between sex and the preferred place of death for patients with cancer.^{26,27,29,36,37} The pooled data indicate that women diagnosed with cancer were more likely to choose home as a preferred place of death than men (odds ratio [OR], 0.87 [95% CI, 0.72 to 1.07]), but the difference was not statistically significant ($P = .18$). There was insignificantly low heterogeneity among the included studies ($I^2 = 0\%$, $P = .56$). In addition, five studies evaluated the association of marital status and the preferred place of death for patients with cancer.^{26,27,29,36,37} The pooled data show that married patients with cancer were almost two

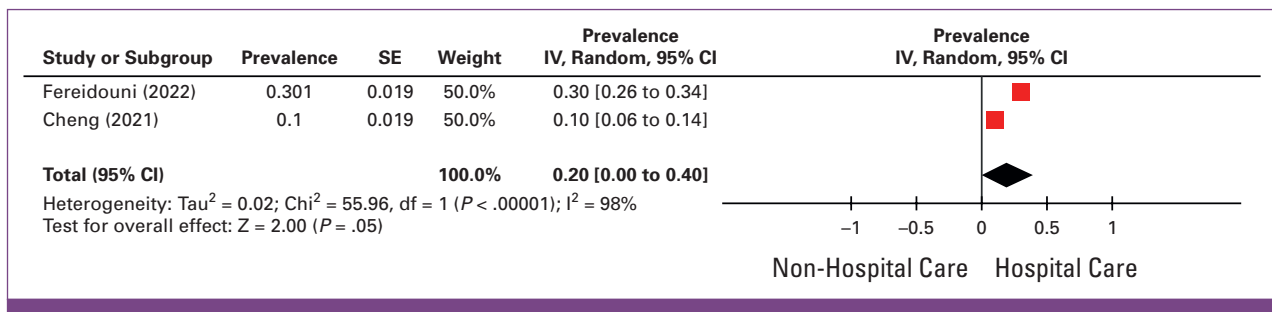


FIG 3. Forest plot of prevalence of hospital as a preferred place of care. IV, inverse variance.

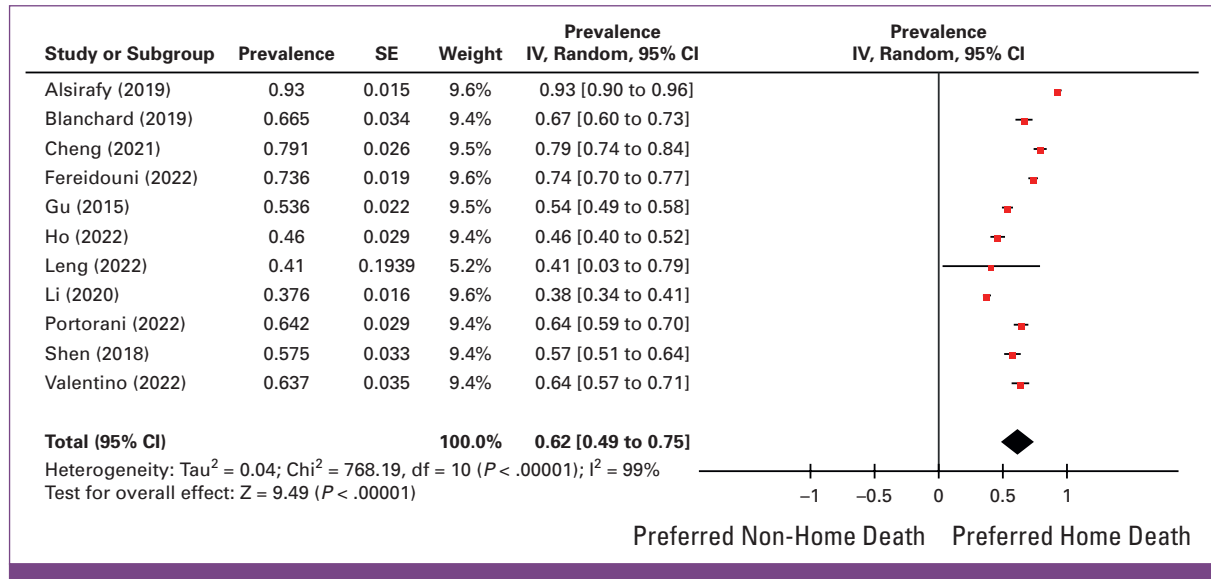


FIG 4. Forest plot of prevalence of home as a preferred place of death. IV, inverse variance.

times more likely to select hospital as a preferred place of death than unmarried patients with cancer (OR, 1.67 [95% CI, 1.18 to 2.37]), with a low between-study heterogeneity ($I^2 = 47\%$, $P = .11$).

Four studies were included to determine the association between educational status and preferred place of death of patients with cancer.^{26,27,29,30} The pooled data revealed that illiterate (primary school and below) patients with cancer were more likely to choose hospital as a preferred place of death than literate (high school and above) patients with cancer (OR, 1.67 [95% CI, 0.84 to 3.33]); however, the difference was not statistically significant ($P = .14$). A significantly high between-study heterogeneity was observed ($I^2 = 84\%$, $P = .0003$). Data on age could not be pooled for the

meta-analysis because the included studies used different age classification.

Clinical Factors

The clinical factors identified included cancer type, performance status, and duration of diagnosis. The meta-analysis results showed that patients with breast cancer were more likely to choose home as a preferred place of death compared with having GI, blood, or lung cancer (OR, 0.63 [95% CI, 0.46 to 0.86]), with no heterogeneity among the included studies ($I^2 = 0\%$, $P = .56$). Two studies were included to determine the association between performance status and preferred place of death of patients with cancer.^{26,27} The pooled data showed that patients with cancer

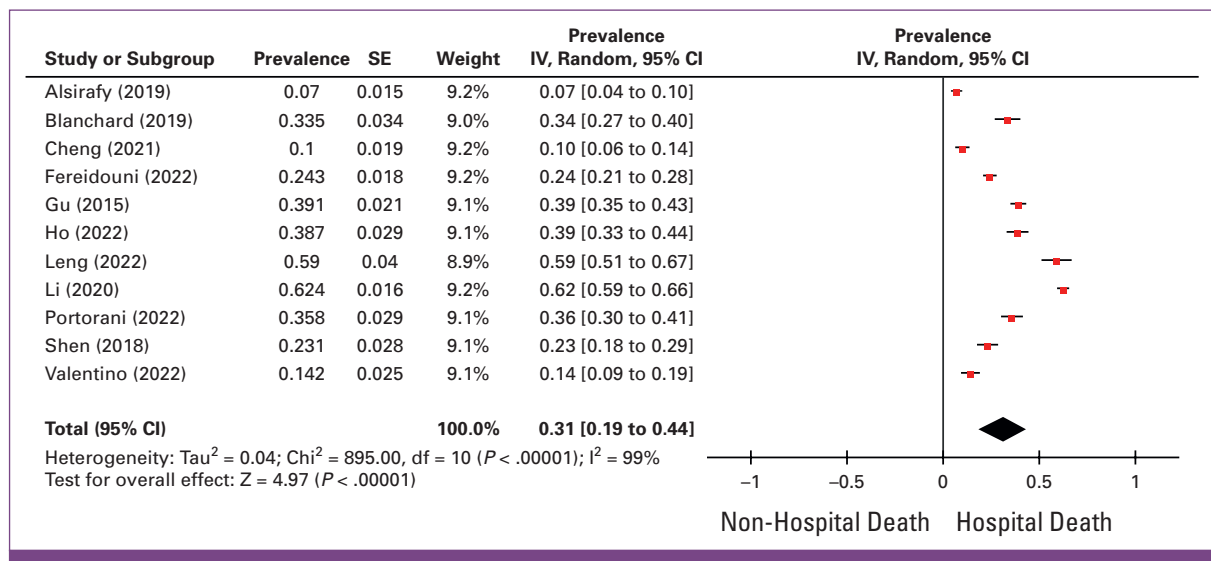


FIG 5. Forest plot of prevalence of hospital as a preferred place of death. IV, inverse variance.

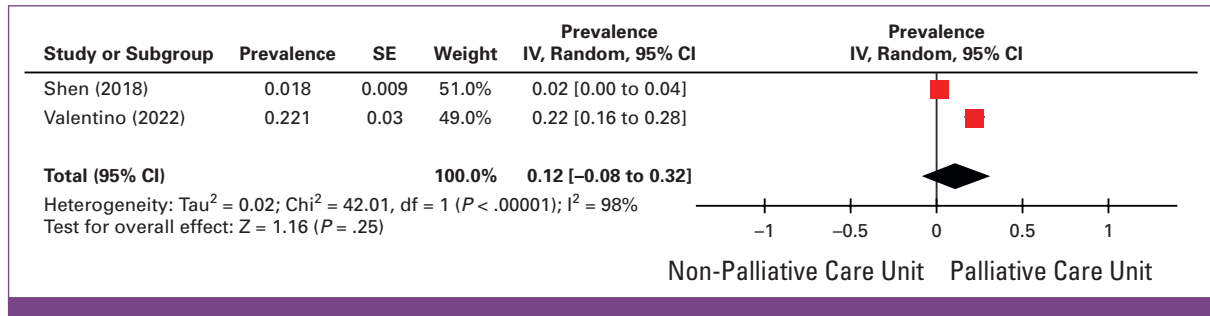


FIG 6. Forest plot of prevalence of palliative care unit as a preferred place of death. IV, inverse variance.

with an Eastern Cooperative Oncology Group (ECOG) performance status of 3–4 were significantly more likely to express a preference for death at home than those with an ECOG performance status of 0–2 (OR, 0.37 [95% CI, 0.21 to 0.64]). There was no heterogeneity among the included studies ($I^2 = 0\%$, $P = .67$). The meta-analysis of the two studies that provided data on the association between duration of cancer diagnosis and the preferred place of death was inconclusive^{29,30} (Fig 8).

Subgroup Analyses

Subgroup analyses did not significantly reduce heterogeneity. Thus, the results should be interpreted cautiously. The level of heterogeneity was 99% ($n = 10$ studies) for prevalence of home as a preferred place of death and 96% ($n = 4$ studies) for prevalence of no preference for place of death when focusing on low risk of bias studies (Data Supplement).

Quality Assessment

The Data Supplement reports the detailed critical appraisal of the included studies. Six of the cross-sectional studies attained 62.5% on the JBI checklist, except one that scored 50%.²⁹ All the retrospective studies scored 100%; however, one of the two prospective cohort studies scored 63.6% on the JBI checklist.³² All survey instruments used to obtain outcome data were self-developed and mostly unvalidated,

with some previous piloting to assess the face validity. Confounding factors were not identified and were inadequately addressed during the design of most of the included studies.^{26,30–32}

DISCUSSION

This systematic review and meta-analysis reported the prevalence and determinants of preferences for end-of-life place of care and death and identified concordance between the preferred and actual place of death among patients with cancer in LMICs. The results of the meta-analysis showed that most patients with cancer in LMICs prefer to receive end-of-life care at home, with an estimated prevalence of 68%, followed by hospital-based care (20%), palliative care unit (11%), and nursing home (4%). In addition, home was the most preferred place of death among patients with cancer in LMICs, with a prevalence of 62%. The prevalence for other preferred places of death options was 31%, 12%, and 1% for hospitals, palliative care units, and nursing homes, respectively. These results differ slightly from a previous systematic review and meta-analysis, which did not separate HICs and LMICs data.¹⁵ Apart from cultural beliefs, reasons for patients with cancer in LMICs preferring home death included the desire to be close to family and friends, autonomy and dignity, home as a familiar environment, and limited access to specialist palliative care services, including inpatient units.^{26,28} Key reasons behind a

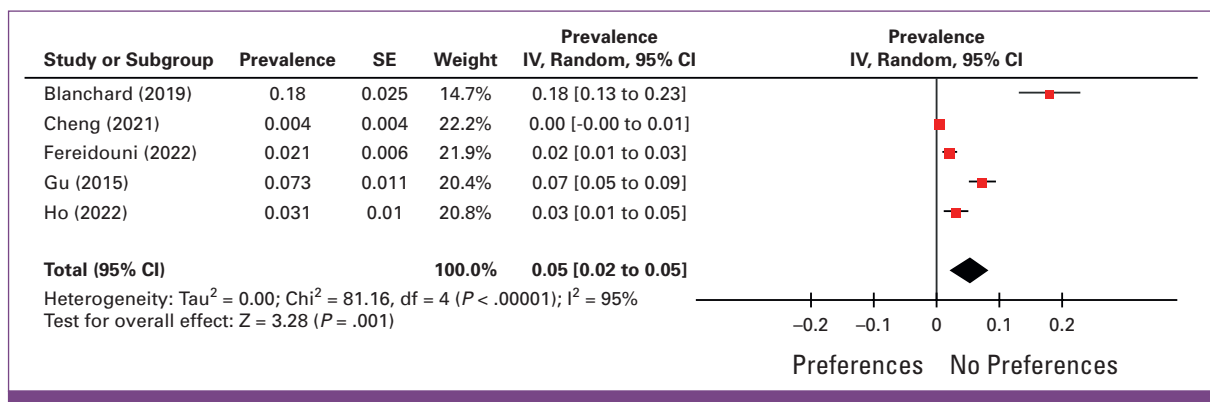


FIG 7. Forest plot of prevalence of no preference for the place of death. IV, inverse variance.

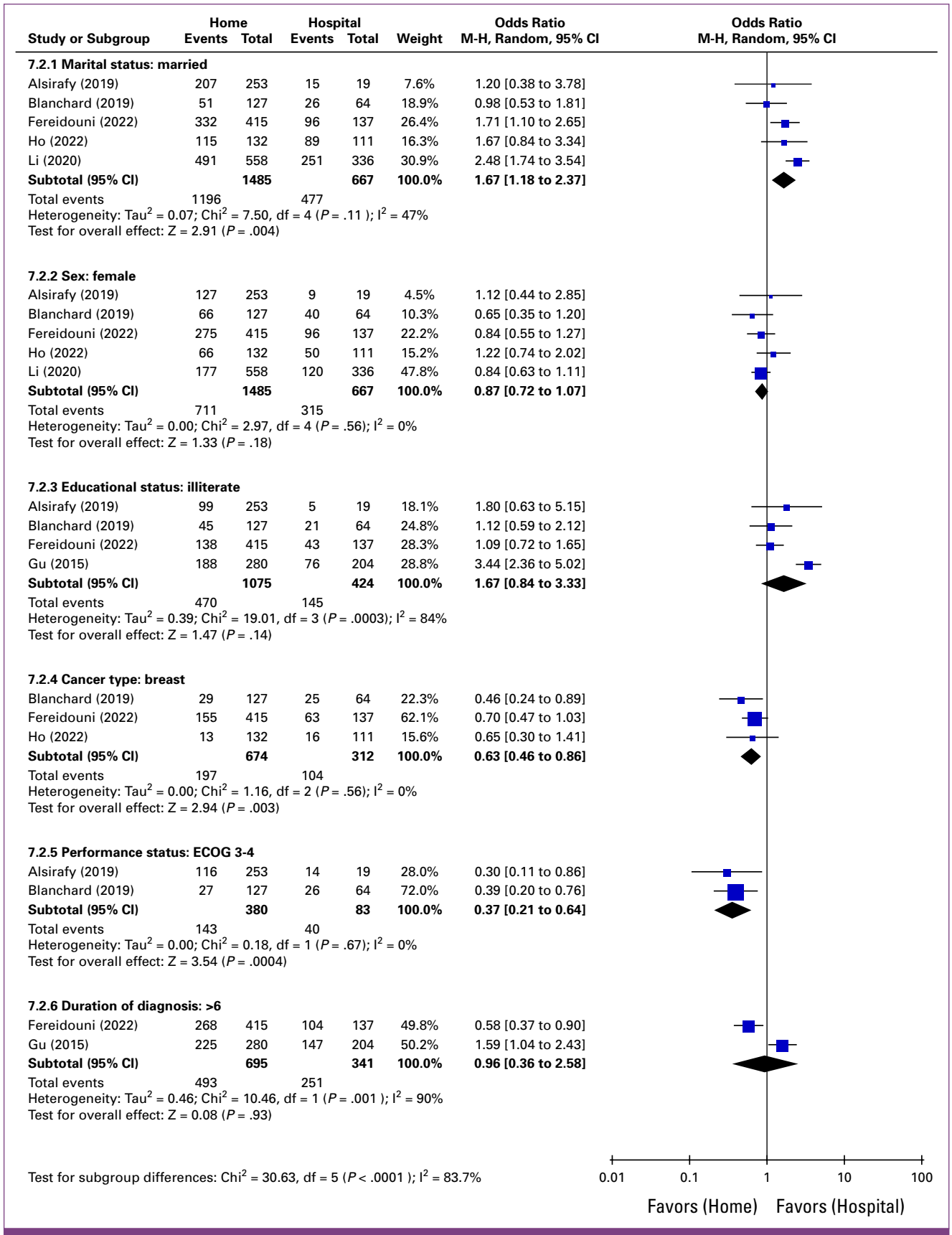


FIG 8. Forest plot of determinants of the preferred place of death. M-H, Mantel-Haenszel.

preference against home included family burden, symptom distress, imminent death, lack of support, or inability to provide care at home.³⁹

The results of the review indicate that only 15% of the included studies measured the preferred place of care, whereas 85% measured the preferred place of death. These results align with previous research that the preferred place of care and the preferred place of death are often distinct, and the former is not synonymous with the latter.⁴⁰ Although home was the most commonly preferred place of care and/or death, many LMICs lack the necessary community services and infrastructure systems to support family-centered care and end-of-life services at home.^{41,42} Consequently, it is unclear whether patients with cancer were expressing preferences hypothetically or on the basis of actual circumstances. For home-based care to be a viable option, services need to exist and family caregivers ought to be supported when health care professionals are not present. Therefore, if there is insufficient support at home, it would be unwise for a person to opt for home death. The considerable consistency in the preference to be cared for and die at home offers an opportunity to expand community and support services in LMICs to meet patients with cancer and their family caregivers' needs.

Many patients with cancer with palliative care needs who live in LMICs require specialized palliative care that is unavailable, inaccessible, and/or unaffordable.^{3,4} Multidisciplinary home-based palliative care teams may be able to fill the availability gap by maximizing independence of patients with cancer and providing symptom management within the home of patients. Home-based palliative care teams may be delivered with a composition of nurses, allied health professionals, and/or social workers.^{43,44} Examples from Iran, India, Uganda, and Kenya show that funds play a critical role in making home-based palliative care accessible and sustainable.⁴⁵⁻⁴⁸ Most of the home-based palliative care services are community-owned projects, with diversified fundraising sources such as fixed monthly contributions from benevolent individuals and organizations; donations from shops, hospitals, and hotels; and international partners and funding bodies.^{45,49} However, there is lack of evidence on whether home-based palliative care for patients with cancer in LMICs is associated with reduced costs over the last days of life. A similar issue has been highlighted in the literature from HICs.⁵⁰

The meta-analysis revealed significant variations in the prevalence estimates for home as a preferred place of death across different countries. These estimates ranged from 38% in China to 93% in Egypt.^{26,36} The differences in the prevalence of home as a preferred place of death are highly complex but are likely to reflect limited options for care location, cultural differences in perspectives on death and dying, and cultural variation in peoples' expectations of health care providers.²⁶ It is notable that although a majority of patients with cancer express a desire to die at home, only 37% went on to die at home. The results of this systematic

review and meta-analysis are consistent with previous research from HICs, suggesting that insufficient options about the place of care and death remain significant challenges in end-of-life care.⁵¹

The results of the review indicate that there remains a discrepancy between the preferred and actual place of death. For instance, the concordance between the preferred and actual place of death was 48% (95% CI, 41 to 55) for South Africa.²⁷ Similar discrepancy between the preferred and actual place of death has been reported in the literature from HICs.⁵²⁻⁵⁴ For example, in the Netherlands, patients previously admitted to hospital preferred to die at home (home v no preference: OR, 2.38 [95% CI, 1.15 to 4.92]; and home versus health care facility: OR, 3.25 [95% CI, 1.15 to 9.16]).⁵⁴ In Australia, of the 2,353 patients who died between 2016 and 2018, 19% did not die in their preferred place, with private residence (45%), hospital (38%), and residential aged care facilities (17%) as the most common preferred place of death.⁹ Even when patients with cancer express a preference to receive care and die at home, the substantial burden of symptoms experienced by patients with cancer often leads to unplanned hospital admissions in the last months of life. These admissions occur frequently and can cause considerable distress for those involved.^{55,56} Aside from the emotional impact, the avoidance of emergency hospital admissions is a major concern because of the economic, social, and organizational impacts of hospitalization.^{57,58}

Factors associated with preferences for place of care and death of patients with cancer have been documented in the literature.^{40,59,60} These factors included environmental, individual, and disease-related factors.⁶¹ Disease-related factors included functional status, tumor type, and length of disease. Individual factors included patient sociodemographic variables. Environmental factors included social support, health care, and geographic characteristics.⁶¹ Our meta-analysis suggests that performance status, marital status, and breast cancer diagnosis are three important determinants of preferred place of death for patients with cancer in LMICs. Patients with cancer with poor performance status (ECOG score of 3-4) are significantly more likely to prefer home as a place of death. Furthermore, patients with advanced breast cancer have significantly higher preference for home-based death compared with those with other types of cancer. On the other hand, married patients with cancer were significantly more likely to prefer hospital as a place of death than unmarried patients with cancer. Although the reasons for this difference remain unclear, it is possible that married patients with cancer are encouraged by their spouses to seek hospital-based care.^{62,63} More research is needed to better understand gender differences in relation to place of care and death preferences. Future research could include larger samples and incorporate a variety of methods such as qualitative and quantitative longitudinal research to understand changes with respect to end-of-life preferences for place of care and death among patients with cancer in LMICs.

The review was conducted using rigorous systematic literature search methods. The limitations of this systematic review and meta-analysis were extracting data from only full articles that were written in English and the lack of information on congruence between the preferred and actual place of death. There are more than 50 LMICs where non-English is the official language; therefore, this review might have missed significant data as it considered only studies published in English. The results of the meta-analysis should be interpreted with caution as considerable heterogeneity was observed. Similarly, the meta-analysis could not consider a range of other factors that might be relevant such as age, religion, culture, living situation, insurance coverage

and income, or family and extended support networks of patients with cancer because of limited or no information from the included studies.

In conclusion, there is very little literature from LMICs on the preferences for end-of-life place of care and death among patients with cancer. More rigorous research is needed to further understand preferences and related determinants of patients with cancer and their caregivers. Specific recommendations for future research include collecting longitudinal data to help understand how preferences for place of care and death of patients with cancer change during their journey through cancer.

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DATA SHARING STATEMENT

All data generated or analyzed during this study are included in this published article.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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Open Payments is a public database containing information reported by companies about payments made to US-licensed physicians (Open Payments).

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