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Prevalence of Traditional, Complementary, and Alternative Medicine Use by Cancer Patients in Low Income and Lower-Middle Income Countries

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Abstract

Purpose: The use of traditional, complementary, and alternative medicine (TCAM) for cancer may influence the delivery or effectiveness of conventional cancer treatment. In this systematic review, we aimed to 1.) summarize the available prevalence data on traditional medicine use by cancer patients in less developed countries (LDCs), and 2.) stratify the prevalence data by world region and country income level.

Methods: A literature search for cancer, TCAM, and low income (LI) and lower-middle income (LMI) countries was conducted across 5 databases. A total of 2,365 publications were reviewed for eligibility, of which 25 studies met inclusion criteria.

Results: The combined sample size was 6,878 cancer patients, with a median of 54.5% reporting the use of TCAM for cancer care. Of the studies providing data on the concomitant use of TCAM and conventional cancer treatment (n = 4,872 cancer patients), a median of 26.7% of participants reported combining the two systems of medicine.

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Disclaimer/Conflict of Interest

The authors have no conflict of interest to disclose regarding this systematic review.

Conclusion: From the data available, it is apparent that TCAM use among cancer patients in less developed countries is common; however, additional studies are needed to support the safe and effective management of cancer for patients in LI and LMI countries.

Keywords

Traditional Medicine; Global Health; Less Developed Countries; Cancer; Public Health

Introduction

The prevalence of traditional, complementary, and alternative medicine (TCAM) in less developed countries (LDCs) depends on numerous variables including cultural and historical influences, legal regulations, and access and affordability of TCAM in comparison to conventional medicine (World Health Organization, 2013). The World Health Organization (WHO) estimates the prevalence of TCAM use in LDCs reaches as high as 80% (Bodeker & Kronenberg, 2002; World Health Organization, 2002). For some patients, TCAM is the only option for care due to the lack of access to conventional medical facilities or expense associated with receiving conventional medical care (World Health Organization, 2013). A prime example is the continent of Africa, where the traditional healers/population ratio is estimated at 1:500, compared to the medical doctors/population ratio of 1:40,000 (Abdullahi, 2011; World Health Organization, 2013). Access to anti-neoplastic medication in LDCs partially depends on revenue for pharmaceutical companies, which in part depends on volume of medication sold and income of the local population (Ruff, Al-Sukhun, Blanchard, & Shulman, 2016; Villa, Compagni, & Reich, 2009). Due to low income levels in LDCs, there may be a lack of incentive for pharmaceutical companies to invest in cancer medications in LDCs, leading to a lack of access (Ruff et al., 2016). The expense associated with radiation therapy, required skillset and facilities required for surgical care, and legal regulations and cultural attitudes regarding palliative care medications also influence access to cancer care in LDCs (Ruff et al., 2016).

The high reliance on TCAM in LDCs may increase the concomitant use of TCAM with conventional medical practices when conventional practices are introduced into a country. An example is the expansion of conventional cancer care into less developed countries in order to address the increasing global cancer burden. On a global scale, cancer has become a significant public health concern. In 2012, there was 14 million new cancer cases and 8.2 million cancer deaths (Stewart & Wild, 2014). The rate of new cancer cases is expected to rise by 70% over the next two decades (Stewart & Wild, 2014). Less developed countries are experiencing the majority of this cancer burden, and greater than 60% of new cancer cases occur in Africa, Asia, Central America, and South America (Stewart & Wild, 2014). These same regions account for more than 70% of cancer deaths worldwide (Stewart & Wild, 2014). Cancer is now responsible for more deaths globally than AIDS, tuberculosis, and malaria combined (American Cancer Society, 2015), and is recognized as a significant global health concern by the National Cancer Institute, American Cancer Society, and the World Health Organization. The WHO collaborates with the International Agency for Research on Cancer (IARC) and additional United Nations organizations within the UN Non-communicable Diseases Interagency Taskforce to help address this global burden

(WHO Cancer, 2015). These organizations, among others, are addressing the significant cancer crisis from a multitude of approaches. A main strategy is to expand conventional cancer health systems among less developed countries to provide treatment and care to as many patients as possible (INCTR Strategies, 2016).

The expansion of conventional medical practices in less developed countries creates an interface with previously established TCAM practices. Both benefits and concerns exist regarding the combination of TCAM and conventional cancer care. TCAM can play a role in supporting quality of life (QOL) for cancer patients, with a number of research studies reporting benefit of TCAM for QOL support (Blaes, Kreitzer, Torkelson, & Haddad, 2011). TCAM may also play a role in prevention, reduction of treatment side effects, and survivorship support. However, there are significant and justified concerns regarding TCAM use in cancer treatment including herb/drug and mechanism interactions with conventional treatment (Block & Gyllenhaal, 2002), lack of patient disclosure of TCAM use (Davis, Oh, Butow, Mullan, & Clarke, 2012), and delay in seeking conventional treatment or increased likelihood of incomplete treatments due to TCAM use (Obrist et al., 2014).

The aim of this systematic review is to evaluate the existing prevalence data on traditional, complementary, and alternative medicine in cancer patients in low income and lower-middle income countries. The review will stratify TCAM prevalence data by country income level and by world region. This data are intended to provide a global perspective on TCAM use among cancer patients in low and lower-middle income countries as well as highlight areas for additional research needs. The protocol and manuscript for this systematic review was created using PRISMA guidelines. The protocol is listed on the PROSPERO registry, with registration number CRD42016053447.

Methods

Literature Search

The search terms for this systematic review were created with the assistance of a health sciences librarian familiar with formatting search terms across multiple databases. Medical subject headings (MeSH) terminology was applied when possible. A literature search was completed using 5 databases, which included PubMed, EMBASE, Web of Science, Global Health Database, and PsycINFO. The searches were completed on the following dates; 1.) studies with any date of publication up to January 11, 2017, and 2.) an updated search using identical search terms including studies from January 1, 2017 to June 30, 2017 (PubMed and Embase) and January 1, 2017 to July 7, 2017 (Web of Science, Global Health Database, PsycINFO). The following search terms were used across all databases with formatting changes applied per specific database requirement:

Cancer AND Complementary Medicine OR Alternative Medicine OR Complementary Therapies OR Traditional Medicine AND (86 iterations of ways to say less developed country + the name and name variations of low income or lower-middle income countries (81 country names/name variations))

Systematic reviews and reference sections of included studies were screened for additional relevant studies. A second independent abstract screening was conducted on 10% of imported studies to verify the correct application of inclusion and exclusion criteria. Each study was either excluded for irrelevancy/failure to meet eligibility criteria, or moved to full text screening.

Included Countries

The World Bank Atlas Method version September, 2016, was used to determine the list of countries with a low income or lower-middle income country stratification (“World Bank list of economies (September 2016),” 2016). See appendix 1 for countries included in the search terms (n = 81).

Eligibility Criteria

The following eligibility criteria were applied to all studies: Study Designs: 1.) studies must be published in a peer-reviewed medical journal, 2.) there is no restriction on the year of publication or language of publication for included studies, 3.) studies may be of any design style as long as all other inclusion criteria are met, 4.) in-vitro and animal studies are excluded. Population: 1.) studies can include children and adults of any age with a current or previous diagnosis of cancer, 2.) the study sample must include only participants with a diagnosis of cancer, 3.) studies including caregiver or next-of-kin representation for adult cancer patients are excluded, 4.) parental or caregiver representation for a child with cancer is eligible, 5.) the study sample must reside in a low income or lower-middle income country at the time of the study, 6.) there is no restriction on sample size for included studies.

TCAM: 1.) studies must document patient reported use of at least 1 TCAM modality for symptom or treatment support of their cancer illness, and/or patients who report seeking a TCAM practitioner specifically for their cancer illness. TCAM is defined as medical recommendations or practitioners using modalities not considered standard of care in conventional medical approaches. An additional definition used for this study can be found at the National Center for Complementary and Integrative Health (NCCIH) website.

Outcome: 1.) Studies must include prevalence of TCAM use, and/or prevalence of seeking a TCAM practitioner for care related to cancer among cancer patients in low income or lower-middle income countries. Studies of questionable eligibility were presented to a senior reviewer to decide on the inclusion or exclusion of the study.

Quality and Risk of Bias Review

Each study meeting inclusion criteria after the full-text review was then further reviewed independently by two researchers for quality and risk of bias. The researchers used the Cincinnati Children’s LEGEND: Evidence Appraisal of a Single Study, Descriptive Study, Epidemiology Study, Case Series, template for review. The studies were either graded as, G: Good Quality, or, L: Low Quality, based on the cumulative available information per study. A quality rating was determined for each study through discussion and consensus by the quality review researchers.

Statistical Analysis

All included data was extracted independently by two researchers. Differences in extraction data were resolved through discussion and consensus. The data were collected in a Microsoft Excel spreadsheet. Extracted data for each study is included in Appendix 2. The primary outcome of this review is the prevalence of overall TCAM use for cancer. The secondary outcome is the prevalence of concomitant TCAM and conventional medicine use for cancer. Descriptive statistics were used to summarize the data. Median percentage values were used to summarize the prevalence data for the total amount of studies, and per world region and income level. The median value was selected due to the robustness of this statistic. In addition, we performed hypothesis tests on the difference of the prevalence of overall TCAM and concomitant TCAM and conventional medicine use between different country income levels and world regions, using analysis of variance (ANOVA). The analyses were done using R version 3.3.0. P-values < 0.05 are considered to be significant.

Results

A total of 2,729 publications were imported for screening, of which 16 were added to screening from reference section review. A de-duplication program was run and initially excluded 364 duplicate publications. Title and abstract screening was completed on 2,365 publications. Full text screening was completed on 389 publications, of which 365 were excluded (Figure 1). A total of 24 publications providing prevalence data for 25 individual studies met inclusion criteria. Eligibility criteria for the 25 studies was verified by a second reviewer. The language of publication for the studies includes English (n = 21) and French (n = 3).

The sample size of all included studies was 6,878 cancer patients (see appendix 2 for included studies). A total of 14 different countries were represented, including 3 (21.4%) low-income countries and 11 (78.6%) lower-middle income countries (Appendix 2). Country sample sizes and percent representation of total sample, were: India (2,200, 32.0%), Pakistan (811, 11.8%), Cameroon (587, 8.5%), Nigeria (560, 8.1%), Sri Lanka (500, 7.3%), Morocco (484, 7.0%), Mongolia (482, 7.0%), Tanzania (449, 6.5%), Ethiopia (264, 3.8%), Ghana (187, 2.7%), Myanmar (107, 1.6%), West Bank/Palestine (103, 1.5%), Guatemala (100, 1.5%), and Mali (44, 0.6%). The highest represented countries by study count were Pakistan (n = 4 studies), followed by India (n = 3), and Ethiopia, Ghana, Cameroon, Morocco, Nigeria, and Tanzania (n = 2 for each).

Included survey participants were 57.7% female and 42.3% male. Of the 25 total studies, 14 provided data on the percent of male and female TCAM users. Participants reporting TCAM use for their cancer care were 58.1% female, and 41.9% male. The most common cancer types surveyed were hematological (30.6%), breast (24.1%), gastrointestinal (8.0%), gynecological (7.1%), Head & Neck (7.1%) and other (16.9%). Summary statistics for age could not be determined due to a lack of available age data, although age range and/or mean per study are reported in Appendix 2.

Among all study participants, a median of 54.5% reported TCAM use for their cancer care. Of the studies providing data on the concomitant use of TCAM and conventional cancer

treatment (n = 4,872 cancer patients), a median of 26.7% reported combining the two systems of medicine. Summary statistics for prevalence of TCAM use for cancer and concomitant TCAM in conjunction with conventional treatment are represented in Tables 2 and 3, respectively.

Country Income and World Region Analysis

Eligible study data was available for 3/31 (9.7%) low income countries, and 11/52 (21.2%) lower-middle income countries. The number and percent of included study-countries for the LMI and LI stratifications per world region includes 2/16 (12.5%) in East Asia & Pacific, 0/7 (0.0%) in Europe and Central Asia, 1/6 (16.7%) in Latin America and Caribbean, 2/7 (28.6%) in Middle East and North Africa, 0/0 (0.0%) in North America, 3/7 (42.9%) in South Asia, and 6/40 (15.0%) in Sub-Saharan Africa. There were no noted differences in the overall prevalence of TCAM stratified by country income ($p = 0.42$) and by world region ($p = 0.4$). Concomitant TCAM and conventional medicine use also did not differ by country income ($p = 0.95$) nor the world region ($p = 0.8$).

Type of TCAM Modalities Used

A descriptive summary of reported TCAM modalities are described in Table 4 from 20 of the 25 included studies, stratified by world region. When possible, individual products were grouped into broad categories, such as specific herbs into a general herbal medicine category. There is no weight provided to these modalities/categories. Herbal medicines and spiritual/religious healing were the only 2 modalities documented in each world region.

Quality Assessment and Risk of Bias

The quality assessment and risk of bias was completed on 24 publications that include 25 studies. Of those publications, 14 (58.3%) were rated as good quality with low risk of bias, and 10 (41.7%) were rated as low quality with high risk of bias. The quality assessment reviewers agreed the following inconsistencies were common among low quality studies: lack of survey information and/or validation, lack of assessment for confounding variables such as age or gender, missing demographic data, lack of disclosure of attrition rate, limited statistical analysis or disclosure of analysis methods, and lack of a conflict of interest statement.

Discussion

Available Global Data on TCAM Prevalence for Cancer

Little is known regarding the use of TCAM for cancer care in LI and LMI countries. Of the 83 LI and LMI countries/regions of the world, we only identified prevalence data on TCAM use for cancer in 14, or 16.9%, of the countries. The largest collective sample size from our studies was from the South Asia world region, although the greatest number of studies were from the Sub-Saharan Africa region. Only 3 of 31 (9.7%) of low income countries had available data on the prevalence of TCAM for cancer, and 11 of 52 (21.2%) lower-middle income countries. Hematological cancers and breast cancer were the most commonly surveyed cancer types, which is expected due to their high prevalence. Roughly 1/2 of the surveyed cancer patients report using TCAM, or seeking a TCAM provider. Approximately

1/4 report combining TCAM use with conventional treatment. This indicates a substantial proportion of cancer patients in LI and LMI countries seek TCAM for care, which can have significant clinical implications. However, the available data collected in this review are a very limited representation of TCAM use for cancer care in low resource countries.

It is also important to consider the quality of the data collected. Only 58.3% of the included studies were deemed good quality with low risk of bias. With the complexity and variety of traditional medicine, high quality prevalence studies are needed to provide a clear picture of the TCAM use among cancer patients. Thus, there is potential for misrepresentation of TCAM use in cancer care, which could have safety repercussions for the delivery of conventional cancer treatment and limit the management of TCAM practices.

Implications for the Delivery of Cancer Treatment

As conventional cancer treatment expands into low and lower-middle income countries, there is a responsibility to assess and address the use of local traditional, complementary, and alternative medicine strategies for cancer. Patient safety is a top priority of concern regarding the combination of traditional and conventional medicine, but respect for local tradition, a patient's autonomy for treatment choice, and potential benefits of integration are also critically important. In regards to safety, herb/drug interactions may potentially be concerning, as well as alternative or traditional practices with a high potential for harm (i.e. non-standardized or unsanitary surgical practices, and/or toxic or contaminated herbal products).

Even though the potential for harm exists, traditional medicine practices play an important role in the culture and lifestyle of many communities. Traditional medicine far outdates the use of modern conventional medicine approaches. Patients often have a greater sense of trust in traditional medicine, and will frequently patronize a traditional healer before seeking western conventional treatment (Afungchwi, Hesselning, & Ladas, 2017). When considering a disease such as cancer, a delay of presentation for effective treatment can have detrimental effects on outcomes (Malik & Gopalan, 2003). Accessing, managing, and integrating traditional practices with conventional cancer care may increase patient satisfaction, or potentially build trust and improve delivery of highly researched and effective medical treatment to locations in need.

Several modern cancer treatments were derived from traditional medicines, such as herbs, and increasing research over the past few decades indicates a potential for substantial benefit of TCAM for cancer care, when used appropriately (Blaes et al., 2011). Additional systematic research on TCAM products and therapies for cancer care is important, especially in low resource areas with a high use of traditional medicine. Identifying local, low cost, non-invasive traditional practices with benefit to cancer patients could wield significant benefit to the cancer populations of low and lower-middle income countries.

It is difficult to determine the best approach to addressing the use of traditional medicine in cancer care. Most conventionally trained oncologists are unfamiliar with the mechanisms or practices of traditional medicine. The training of traditional healers can also vary dramatically, as can their practices and the modalities which they use for treatment. More

research is needed to assess who is using traditional medicine for cancer, what they are using, its effects on the efficacy of conventional therapy, and how it fits into the cancer care process.

Limitations

It is important to note all studies included in this review were conducted in a hospital setting, which may reduce generalizability. Due to limited resources, cancer patients in LI or LMI countries may not present, or be able to attend a hospital for cancer treatment. In addition, patients who chose to completely forgo conventional cancer treatment are not well represented in these studies.

Conclusion

To fight the global burden of cancer it is essential to consider the variables that impact patient safety and treatment delivery and efficacy. The use of traditional, complementary, and alternative medicine for cancer in LI and LMI countries is one of many important variables to consider. The current lack of available data on TCAM use in LDCs creates the potential for numerous avenues of future research opportunities. High quality research on the prevalence of TCAM use in cancer is needed for a greater percentage of LDCs. Additional research possibilities include examining the influence of TCAM on timing of cancer diagnosis and treatment, identifying beneficial and harmful TCAM practices for the support and treatment of cancer patients, or ways to increase communication between traditional healers and conventional doctors to improve cancer care delivery in LDCs. Our results indicate a large proportion of cancer patients in LI and LMI countries use TCAM for cancer care, which requires additional research for the safety and wellbeing of cancer patients in less developed countries.

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Appendix 1:: Countries/Regions Included in Search Terms

Afghanistan, Armenia, Bangladesh, Benin, Bhutan, Bolivia, Burkina Faso, Burundi, Cabo Verde (Cape Verde) Cambodia, Cameroon, Central African Republic, Chad, Comoros (Comores, Comoro), Congo (Democratic Republic of Congo), Côte d'Ivoire, Djibouti, Egypt, El Salvador, Eritrea, Ethiopia, Gambia, Ghana, Guatemala, Guinea, Guinea Bissau, Haiti, Honduras, India, Indonesia, Kenya, Kiribati, Korea (Democratic People's Republic of Korea), Kyrgyzstan (Kyrgyz, Kirghizia, Kirghiz, Kirgizstan), Lao PDR (Laos), Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Micronesia, Moldova (Republic of Moldova), Mongolia, Morocco, Mozambique, Myanmar (Burma), Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Philippines (Phillippines, Philipines, Phillipines), Rwanda (Ruanda), Samoa, Sao Tome (Principe), Senegal, Sierra Leone, Solomon Islands,

Somalia, South Sudan, Sri Lanka, Sudan, Swaziland, Syria (Syrian Arab Republic),
Tajikistan (Tadzhikistan, Tadjikistan, Tadjik), Tanzania (United Republic of Tanzania),
Timor (Timor-Leste), Togo, Tonga, Tunisia, Uganda, Ukraine, Uzbekistan (Uzbek), Vanuatu,
Vietnam, West Bank (Gaza), Yemen, Zambia, Zimbabwe

Appendix 2:: TCAM Prevalence Studies Meeting Inclusion Criteria, Stratified by World Region

Author/Year	Country	World Region - Income Level	Total Survey Sample, N	Prevalence of Overall TCAM Use for Cancer, N (%)	Concomitant TCAM + Conventional Treatment, N (%)	Gender, N (%)	Age Range and/or Mean (SD)**	Cancer Types Surveyed N (%)***
Afunchwi et al. 2017	Cameroon	SSA - LMI	387	213 (55.0)	-	M: 222 (57.5) F: 164 (42.5)	R: 1-17	He: 387 (100.0)
Yomi et al. 1995	Cameroon	SSA - LMI	200	40 (20.0)	-	M: 89 (44.5) F: 111 (55.5)	R: 2-80 M: 41	Br: 53 (26.5), HN: 58 (29.0), GI: 9 (4.5), Gy: 30 (15.0), GU: 5 (2.5), O: 45 (22.5)
De Ver Dye et al. 2011	Ethiopia	SSA - LI	69	40 (58.0)	13 (18.8)	M: 2 (2.9) F: 67 (97.1)	R: <40-70	Br: 69 (100.0)
Erku. 2016	Ethiopia	SSA - LI	195	154 (79.0)	154 (79.0)	M: 89 (45.6) F: 106 (54.4)	R: 18->60	Br: 74 (37.9), GI: 22 (11.3), Gy: 24 (12.3), He: 61 (31.3), O: 14 (7.2)
Clegg-Lamptey et al. 2009	Ghana	SSA - LMI	89	44 (49.4)	6 (6.7)	M: 0 (0.0) F: 89 (100.0)	R: 28-86 M: 53.7 (11.7)	Br: 89 (100)
Yarney et al. 2013	Ghana	SSA - LMI	98	72 (73.5)	72 (73.5)	M: 48 (49.0) F: 50 (51.0)	R: 18-89	Br: 21 (21.4), HN: 15 (15.3), O: 62 (63.3)
Ly et al. 2002	Mali	SSA - LI	44	10 (22.7)	-	M: 1 (2.3) F: 43 (97.7)	R: 25-80 M: 46 (19.5)	Br: 44 (100)
Asuzu et al. 2015	Nigeria	SSA - LMI	400	138 (34.5)	-	M: 95 (23.7) F: 305 (76.3)	R: 18-94 years, M: 50.9 (14.6)	Br: 133 (33.3), HN: 39 (9.8), Gy: 128 (32.0), GU: 19 (4.8), O: 81 (20.3)
Ezeome et al. 2007	Nigeria	SSA - LMI	160	104 (65.0)	104 (65.0)	M: 68 (42.5) F: 92 (57.5)	R: 13-86 M: 52.3	Br: 58 (36.3), HN: 3 (1.9), L: 4 (2.5), GI: 27 (16.9), Gy: 3 (1.9), GU: 31 (19.4), He: 1 (0.6), O: 33 (20.6)
Alexander 1985	Tanzania	SSA - LI	119	53 (44.5)	14 (11.8)	M: 64 (53.8) F: 55 (46.2)	M: 42.8 (13.4) treated M: 40.4 (15.6) untreated	Br: 4 (3.4), HN: 22 (18.5), GI: 9 (7.6), Gy: 29 (24.4), GU: 9 (7.6), He: 3 (2.5), O: 43 (36.1)
Kazaura et al. 2007	Tanzania	SSA - LI	330	67 (20.4)	-	M: 125 (37.9) F: 205 (62.1)	R: 21-84 M: 48 (13.5)	-
Chaturvedi et al. 2002	India	SA - LMI	550	206 (37.5)	70 (12.7)	-	-	-
Gupta et al. 2002	India	SA - LMI	533	302 (56.7)	33 (6.2)	M: 313 (58.7) F: 220 (41.3)	R: 18->50	He: 533 (100)
Kumar et al. 2016	India	SA - LMI	1117	432 (38.7)	432 (38.7)	M: 501 (44.9) F: 616 (55.1)	-	-
Malik et al. (1 pg 304) 1997	Pakistan	SA - LMI	158	76 (48.1)	-	M: 66 (41.8) F: 92 (58.2)	M 45.8 (16.7)	-
Malik et al. (2 pg 305) 1997	Pakistan	SA - LMI	100	4 (4.0)	4 (4.0)	M: 22 (22.0) F: 78 (78.0)	R: 10-84	Br: 38 (38.0), L: 4 (4.0), Gy: 8 (8.0), He: 16 (16.0), O: 34 (34.0)

Author/Year	Country	World Region - Income Level*	Total Survey Sample, N	Prevalence of Overall TCAM Use for Cancer, N (%)	Concomitant TCAM + Conventional Treatment, N (%)	Gender, N (%)	Age Range and/or Mean (SD)**	Cancer Types Surveyed N (%)***
Malik et al. 2000	Pakistan	SA - LMI	191	104 (54.5)	51 (26.7)	M: 74 (38.7) F: 117 (61.3)	R: 17–85	Br: 51 (26.7), HN: 12 (6.3), L: 9 (4.7), GI: 27 (14.1), Gy: 18 (9.4), GU: 14 (7.3), He: 14 (7.3), O: 46 (24.1)
Tovey et al. 2005	Pakistan	SA - LMI	362	304 (84.0)	304 (84.0)	M: 213 (58.8) F: 149 (41.2)	R: 0–90	Br: 100 (27.6), HN: 35 (9.7), GI: 21 (5.8), Gy: 30 (8.3), He: 42 (11.6), O: 134 (37.0)
Broom et al. 2010	Sri Lanka	SA - LMI	500	337 (67.4)	337 (67.4)	M: 234 (46.8) F: 266 (53.2)	M: 45.6 (15.4)	Br: 95 (19.0), HN: 96 (19.2), L: 37 (7.4), GI: 27 (5.4), Gy: 40 (8.0), He: 57 (11.4), O: 148 (29.6)
Brahmi et al. 2011	Morocco	MENA - LMI	100	46 (46.0)	13 (13.0)	M: 34 (34.0) F: 66 (66.0)	R: 26–70 M: 48 (13)	Br: 44 (44.0), HN: 4 (4.0), L: 9 (9.0), GI: 28 (28.0), Gy: 8 (8.0), O: 7 (7.0)
Tazi et al. 2013	Morocco	MENA - LMI	384	276 (71.9)	-	M: 115 (29.9) F: 269 (70.1)	R: 23–72 M: 49	Br: 89 (23.2), HN: 49 (12.8), L: 11 (2.9), GI: 34 (8.9), Gy: 17 (4.4) He: 184 (47.9)
Jaradat et al. 2016	West Bank/ Palestine	MENA - LMI	103	70 (68.0)	-	M: 0 (0.0) F: 103 (100.0)	R: 16–>60 M: 48.84	Br: 103 (100)
Oyunchimeg et al. 2017	Mongolia	EAP - LMI	482	231 (47.9)	116 (24.0)	M: 174 (36.1) F: 308 (63.9)	R: >20	Br: 75 (15.6), GI: 174 (36.1) GU: 140 (29.0), O: 93 (19.3)
Sander et al. 2013	Myanmar	EAP - LMI	107	64 (59.8)	50 (46.7)	M: 64 (59.8) F: 43 (40.2)	M: 6.25 (3.2)	He: 72 (67.3), O: 35 (32.7)
Ladas et al. 2014	Guatemala	LAC - LMI	100	92 (92.0)	63 (63.0)	M: 63 (63.0) F: 37 (37.0)	R: 0.58–19	He: 77 (77.0), O: 23 (23.0)

* SSA = Sub-Saharan Africa, MENA = Middle East & North Africa, SA = South Asia, LAC = Latin America & Caribbean, EAP = East Asia & Pacific, LMI = Lower-Middle Income, LI = Low Income

** All units are in years

*** Br = Breast, HN = Head & Neck, L = Lung and Respiratory, GI = Gastrointestinal and Abdominal, Gy = Gynecological, He = Hematological, O: Others

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*LI = low income LMI = lower-middle income

** TCAM = traditional, complementary, and/or alternative medicine

Figure 1:
Inclusion/Exclusion Flow Chart

Table 1:**Gender and Cancer Type of Survey Participants**

Category	Subcategory	Number of Studies Included N (%)	Number of Cancer Patients Included N (%)	Gender, N (%) [*]	Cancer Types Surveyed N (%) ^{**,***}
Total		25 (100)	6,878 (100)	M: 2,676 (42.3) F: 3,651 (57.7)	Br: 1,140 (24.1), HN: 333 (7.1), L: 74 (1.6), GI: 378 (8.0), Gy: 335 (7.1), GU: 218 (4.6), He: 1447 (30.6) O: 798 (16.9)
Income Class					
	Low Income Countries	5 (20.0)	757 (11.0)	M: 281 (37.1) F: 476 (62.9)	Br: 191 (44.7), HN: 22 (5.2), GI: 31 (7.3), Gy: 53 (12.4), GU: 9 (2.1), He: 64 (15.0), O: 57 (13.3)
	Lower-Middle Income Countries	20 (80.0)	6,121 (89.0)	M: 2395 (43) F: 3,175 (57)	Br: 949 (22.1), HN: 311 (7.2), L: 74 (1.7), GI: 347 (8.1), Gy: 282 (6.6), GU: 209 (4.9), He: 1383 (32.2), O: 741 (17.2)
World Region					
	Sub-Saharan Africa	11 (44.0)	2,091 (30.4)	M: 803 (38) F: 1287 (62)	Br: 545 (30.9), HN: 137 (7.8), L: 4 (0.2), GI: 67 (3.8), Gy: 214 (12.2), GU: 64 (3.6), He: 452 (25.7), O: 278 (15.8)
	Middle East and North Africa	3 (12.0)	587 (8.5)	M: 149 (25) F: 438 (75)	Br: 236 (40.2), HN: 53 (9.0), L: 20 (3.4), GI: 62 (10.6), Gy: 25 (4.3), He: 184 (31.3), O: 7 (1.2)
	South Asia	8 (32.0)	3,511 (51.0)	M: 1,423 (48.1) F: 1,538 (51.9)	Br: 284 (16.8), HN: 143 (8.5), L: 50 (3.0), GI: 75 (4.4), Gy: 96 (5.7), GU: 14 (0.8), He: 662 (39.3), O: 362 (21.5)
	Latin America and Caribbean	1 (4.0)	100 (1.5)	M: 63 (63.0) F: 37 (37.0)	He: 77 (77.0), O: 23 (23.0)
	East Asia and Pacific	2 (8.0)	589 (8.6)	M: 238 (40.4) F: 351 (59.6)	Br: 75 (12.7), GI: 174 (29.5), GU: 140 (23.8), He: 72 (12.2), O: 128 (21.7)

^{*} Denominator for gender analysis is sum of male (n) + female (n) from studies that provided gender information

^{**} Denominator for cancer type analysis is sum of all cancer types (n) from studies that provided cancer type information

^{***} Br = Breast, HN = Head & Neck, L = Lung and Respiratory, GI = Gastrointestinal and Abdominal, Gy = Gynecological, He = Hematological, O: Others

Table 2.

Median and Range of Overall TCAM Use- Total, Per Region, Per Income Category

Category	Subcategory	Number of Studies Included, N (%)	Total Survey Sample, N (%)	Median TCAM Use for Cancer, % (Range)
Total		25 (100)	6,878 (100)	54.5 (4.0 – 92.0)
Income Class				
	Low Income Countries	5 (20.0)	757 (11.0)	44.5 (20.4 – 79.0)
	Lower-Middle Income Countries	20 (80.0)	6,121 (89.0)	54.8 (4.0 – 92.0)
World Region				
	Sub-Saharan Africa	11 (44.0)	2,091 (30.4)	49.4 (20.0 – 79.0)
	Middle East & North Africa	3 (12.0)	587 (8.5)	68.0 (46.0 – 71.9)
	South Asia	8 (32.0)	3,511 (51.0)	51.3 (4.0 – 84.0)
	Latin America & Caribbean	1 (4.0)	100 (1.5)	92.0
	East Asia & Pacific	2 (8.0)	589 (8.6)	53.9 (47.9 – 59.8)

Table 3.

Median and Range of Concomitant TCAM + Conventional Treatment Use- Total, Per Region, Per Income Category

Category	Subcategory	Number of Studies Included, N (%)	Total Survey Sample, N (%)	Median Concomitant TCAM + Conventional Treatment, % (Range)
Total		17 (100)	4,872 (100)	26.7 (4.0 – 84.0)
Income Class	Low Income Countries	3 (17.6)	383 (7.9)	18.8 (11.8 – 79.0)
	Lower-Middle Income Countries	14 (82.4)	4,489 (92.1)	32.7 (4.0 – 84.0)
World Region	Sub-Saharan Africa	6 (35.3)	730 (15.0)	41.9 (6.7 – 79.0)
	Middle East & North Africa	1 (5.9)	100 (2.1)	13.0
	South Asia	7 (41.2)	3,353 (68.8)	26.7 (4.0 – 84.0)
	Latin America & Caribbean	1 (5.9)	100 (2.1)	63.0
	East Asia & Pacific	2 (11.8)	589 (12.1)	35.4 (24.0 – 46.7)

Table 4.**TCAM Modalities/Systems Used per World Region**

World Region	Types of Modalities/Treatments	Systems of Medicine
Sub-Saharan Africa	Herbal medicine, spiritual/religious healing including prayer, divinations, and incantations, dietary supplements, mind/body techniques, massage/therapeutic touch, nutrition therapy/special diets and foods, mineral therapy, music therapy, meditation/relaxation, visualization, reflexology, electromagnetic therapy, support groups, removal of mystical objects from mass, incense/vapor, skin burns with heat or herbs, drills with hot nails, cuts with local applications, holy water, holy mud, holy soil, python fat, ritual sacrifice, black stone, bloodletting, local surgery/scarification, urine therapy, magnetic water	Traditional African Medicine, Chinese Medicine/Acupuncture, Ayurveda, Osteopathy, Chiropractic, Homeopathy
Middle East & North Africa	Herbal medicine, spiritual/religious healing, nutrition therapy/special diets and foods, water of ZamZam (holy water from Mecca)	*
South Asia	Herbal medicine, spiritual/religious healing including prayer, nutrition therapy/special diets and foods, dietary supplements, yoga, meditation/relaxation, laughter therapy, physiotherapy, psychological therapy, exercise, folk remedies, mental imagery, pranic healing/energy medicine, physical abuse/torture	Unani (Perso-Arabic Traditional Medicine), Ayurveda, Naturopathy, Homeopathy, Chinese Medicine/Acupuncture, Siddha Traditional Medicine, Traditional Greek Medicine, Chiropractic, Eastern Medicine
Latin America & Caribbean	Herbal medicine, spiritual/religious healing including prayer, nutrition therapy/special diets and foods, dietary supplements, ointments	*
East Asia & Pacific	Herbal medicine, spiritual/religious healing including prayer, dietary supplements, tripe (goat, sheep, etc.), milk bath, dried foam from camel's mouth, mare's milk, mantra, meditation/relaxation, yoga, massage, bone setting, blessed/anoointed water, charms	Mongolian Traditional Medicine, Chinese Medicine/Acupuncture

* none reported