

1 Men's Information-Seeking Behaviour Regarding Cancer Risk and Screening:
2 A Meta-Narrative Systematic Review

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1 **ABSTRACT**

2 **Objective:** Preventive strategies are known to reduce cancer risk and incidence and improve
3 prognosis. Men seldom seek medical information about cancer prevention and risk reduction.
4 The aim of this meta-narrative systematic review was to critically appraise evidence from
5 qualitative, quantitative, and mixed-methods studies that explored men’s information-seeking
6 behaviours in relation to cancer prevention and risk reduction.

7 **Methods:** MEDLINE, CINAHL Plus with Full Text, PsycINFO, PsycARTICLES,
8 Psychology and Behavioral Sciences Collection, Education Full Text, and ERIC were
9 systematically searched for studies published in English between January 1st 2006 and May
10 30th 2016. A total of 4,117 titles were identified; of which, 31 studies were included (21
11 qualitative studies, nine quantitative studies, and one mixed-methods study). The
12 methodological quality of the studies was appraised using different tools.

13 **Results:** Most studies focused on screening for prostate (n=18) and colorectal cancer (n=7).
14 The majority of men were passive information-gatherers rather than active information-
15 seekers. Key sources of information included the internet for active information-seekers and
16 healthcare professionals for passive information-gatherers. Barriers to information-seeking
17 included information overload, embarrassment, and fear. Low literacy and health literacy
18 levels were addressed in three studies and were identified as impediments to active
19 information-seeking. Facilitators to information-seeking included family support, media,
20 celebrity endorsements, and targeted information.

21 **Conclusions:** Men’s information-seeking behaviour regarding cancer risk reduction,
22 prevention, and screening is influenced by several factors. This necessitates targeted
23 interventions aimed at raising awareness of cancer prevention and screening, whilst
24 accounting for men’s informational needs, preferred learning strategies, and literacy levels.

25 **Keywords:** cancer; colorectal cancer; health literacy; information-seeking; men; oncology;
26 prevention; prostate cancer; screening; systematic review.

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1 INTRODUCTION

2 Cancer remains one of the leading causes of mortality and morbidity around the world.¹
3 Fourteen million new cancer cases and 8.2 million cancer deaths were recorded worldwide in
4 2012.¹ It is expected that cancer incidence will increase by 70% over the coming two
5 decades.¹ Cancer incidence and mortality are higher among men in comparison to women.²
6 The most commonly diagnosed cancers in men are lung, prostate, colorectal, gastric, and
7 liver cancer.^{1,2}

8 Preventive strategies have been shown to reduce the risk of cancer and have been linked to
9 improved prognosis.³ Nelson et al. reported a statistically significant decrease in breast cancer
10 mortality in women aged 50 to 69 years who were screened compared to those who were
11 not.⁴ Similarly, a randomised controlled trial with 30-year follow-up found that faecal occult
12 blood testing reduced colorectal cancer mortality significantly when performed annually or
13 biennially.⁵ While widespread, the effect of prostate cancer screening on mortality remains
14 controversial.^{6,7} Other preventative strategies, including national smoking bans, have resulted
15 in decreased smoking-related mortality.⁸ In order for preventative strategies to be effective,
16 health information needs to reach, engage, and be understood by the target population.

17 In their analysis of the concept “health-seeking behaviour”, Lambert and Loisel described
18 health-seeking behaviours as “ways in which individuals go about obtaining information,
19 including information about their health, health promotion activities, risks to one’s health,
20 and illness” (p.1008).⁹ Health-seeking can be undertaken when people are asymptomatic,
21 with a view to prevent disease.¹⁰

22 A range of information-seeking behaviours have been described, including active
23 information-seeking (i.e. actively and with purpose seeking out information regarding a
24 specific issue); active monitoring (i.e. actively scanning one’s environment for information,
25 cues regarding a particular issue); passive monitoring (i.e. relying on chance encounters and
26 other individuals to provide unsolicited information); and proxy searching (i.e. using
27 intermediary channels such as friends or family members to search for information about an
28 issue on behalf of the individual).¹¹

29 The literature reports that men seek health information less often than women.^{12,13} Moreover,
30 men are more likely to engage in passive information-gathering, whereas women are more
31 likely to be active information-seekers.¹³⁻¹⁵

1 Men's lack of information-seeking is believed to be one of the leading causes for
2 deprioritising men's health promotion among service providers and assuming that gendered
3 approaches to health should be primarily focused on women, rather than both genders
4 equally.¹⁶⁻¹⁸ This, according to Leone and Rovito, negatively impacts on men's engagement
5 with health services and increases the health gap between both genders.¹⁹ In fact, men are less
6 likely to participate in preventative healthcare activities, including cancer screening, than
7 women,²⁰ and are known to delay medical help-seeking for symptoms of male-specific,²¹ and
8 non-gender-specific malignancies.²²

9 In order to inform future health promotion policy and positively affect men's health, it is
10 necessary to understand men's health information-seeking behaviour in relation to cancer
11 prevention and risk reduction. To the authors' knowledge, there has been only one systematic
12 review that focused on prostate cancer information.²³ Therefore, the aim of this meta-
13 narrative systematic review was to critically appraise evidence from qualitative, quantitative,
14 and mixed-methods studies that explored men's information-seeking behaviours in relation to
15 cancer prevention and risk reduction. This review was conducted based on five predefined
16 questions as follows:

- 17 (i) Where do men seek information on cancer prevention and risk reduction?
- 18 (ii) How do men use information on cancer prevention and risk reduction?
- 19 (iii) What are the barriers to information-seeking?
- 20 (iv) What are the facilitators to information-seeking?
- 21 (v) What is the impact of health literacy on information-seeking and use?

22

23 **METHODS**

24 This meta-narrative systematic review was conducted in accordance with the Cochrane
25 Handbook for Systematic Reviews,²⁴ and reported using the 20-item Realist And MEta-
26 narrative Evidence Syntheses: Evolving Standards (RAMESES) reporting tool.²⁵ Meta-
27 narrative review is a relatively recent systematic review methodology aimed at reviewing
28 evidence from qualitative and mixed-methods studies and is best suited for topics that have
29 been differently conceptualised.²⁵ The review questions and methods were pre-defined and
30 were not changed during the review process.

31 **Eligibility criteria**

1 Empirical studies considered for inclusion met the following criteria: (i) involved men; (ii)
2 adults (i.e. aged ≥ 18 years); (iii) primarily focused on where and how men seek and use
3 information on cancer prevention and risk reduction; (iv) published between January 1st 2006
4 and May 30th 2016; and (v) published in English. Although there is no golden rule for
5 limiting publications by date, scientific evidence published within a 10-year timeframe is
6 considered to be recent.^{26,27} Eligible studies were included regardless of their methodological
7 quality, since excluding studies on the basis of their methodological quality increases the risk
8 of study selection and reporting bias.²⁴

9 Studies involving women exclusively or where findings from men and women were
10 indistinguishable were excluded. Studies involving cancer survivors were also excluded since
11 their experiences may differ from those without cancer. Opinion papers, policy reports, and
12 conference abstracts were excluded as their methodological quality could not be appraised.
13 Dissertations and theses were excluded, since the merit of using them in systematic reviews is
14 inconclusive.²⁸

15 **Information sources and search strategy**

16 A systematic search of relevant electronic databases over a 10-year period was conducted.
17 The electronic databases searched were: MEDLINE, CINAHL Plus with Full Text,
18 PsycINFO, PsycARTICLES, Psychology and Behavioral Sciences Collection, Education Full
19 Text, and ERIC. Each database was searched on May 30th 2016 for papers published between
20 January 1st 2006 and May 30th 2016. Reference lists of eligible studies were checked for
21 potentially relevant references that were not identified during the database search.

22 Boolean terms “OR” and “AND”, Medical Subject Headings (MeSH), and truncation “*”
23 were used and the search was conducted on title or abstract as follows: (men OR males OR
24 man OR male) AND (inform* OR advice OR advis* OR educat*) AND (cancer* OR
25 neoplas* OR oncolog* OR tumour* OR tumor*) AND (need* OR necessit* OR require* OR
26 seek* OR look* OR search* OR acquir* OR learn* OR "engag* with" OR use OR using OR
27 utilis* OR utiliz*) AND (prevent* OR "reduc* risk" OR minimis* OR minimiz* OR "health
28 promot*" OR screen*).

29 **Study selection**

30 Records identified through database searching were exported to Covidence, an online service
31 recommended by Cochrane to facilitate data screening and extraction.²⁹ Studies were first

1 screened on title and abstract to determine whether they met the inclusion criteria. The full-
2 texts of potentially relevant papers were then evaluated and reasons for excluding each article
3 were recorded. Title, abstract, and full-text screening were conducted independently by
4 paired reviewers. Disagreements were resolved by consensus and involved a third reviewer
5 when needed.

6 **Data collection process**

7 Data from included studies were extracted by all authors using a predefined extraction table.
8 Data were extracted as follows: author(s) and year; country and setting; study aim(s); study
9 design and theoretical underpinning; data collection method and instruments; and findings
10 relating to the review questions. The table was cross-checked for accuracy by the first author.

11 **Critical appraisal**

12 The choice of tools to appraise the methodological quality of the reviewed studies was
13 dependent on the study design. The 14-item Quality Assessment Tool for Observational
14 Cohort and Cross-Sectional Studies was used to critically appraise the quality of quantitative
15 studies.³⁰ The overall quality of each study was rated as either 'Poor', 'Fair', or 'Good'. The
16 quality of qualitative studies was appraised using the 10 items of the Critical Appraisal Skills
17 Programme (CASP) Qualitative Checklist.³¹ The Mixed Methods Appraisal Tool (MMAT)
18 comprising 13 questions in relation to the appropriateness of the qualitative methods,
19 quantitative methods, and the combination of both, was used to appraise the quality of mixed-
20 method studies.³² Each item in all three tools was evaluated on a 'Yes' and 'No' basis. Only
21 the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies enabled
22 an overall quality rating.³⁰

23 **Synthesis of results**

24 Data synthesis was conducted by the first author and cross-checked by the last author.

25 Findings were analysed and synthesised thematically according to the review aims.

26 Information-seeking behaviours were characterised as 'active information-seeking' and
27 'passive information-gathering.' Active information-seeking was defined as purposely
28 seeking out information and/or actively scanning one's environment for information (i.e.
29 solicited information). Passive information-gathering was defined as relying on accidental
30 encounters and other individuals, including healthcare professionals, to provide unsolicited

1 information, and/or using intermediaries, such as friends and family members, to seek
2 information on behalf of the individual.¹¹

3 Use of information to make a decision regarding cancer screening was investigated and
4 factors influencing information-seeking were classified as barriers and facilitators. These
5 pertained to information format, content, amount, and source.

6 Finally, the impact of literacy and health literacy on information-seeking and use was
7 addressed. Health literacy was defined as the degree to which men were capable of obtaining,
8 processing, and understanding information on cancer prevention and risk reduction.³³

9

10 **RESULTS**

11 **Study selection**

12 The study identification, screening, and selection processes are presented in Figure 1.³⁴
13 Overall, 4,117 titles were identified through electronic database searching from MEDLINE
14 (n=2,528); CINAHL Plus with Full Text (n=775); PsycINFO (n=670); PsycARTICLES
15 (n=56); Psychology and Behavioral Sciences Collection (n=37); Education Full Text (n=28);
16 and ERIC (n=23). Following deletion of duplicates, 3,374 records were screened on title and
17 abstract and 3,054 irrelevant records were excluded. The full-texts of 320 papers were then
18 evaluated and 289 articles were excluded. In total, 31 papers were deemed eligible for
19 inclusion; 21 qualitative studies, nine quantitative studies, and one mixed-methods study. No
20 additional studies were identified from reference list-checks.

21 **Study characteristics**

22 Study characteristics are presented in Table 1. The majority of the studies were conducted in
23 the United States (n=20). Most of the participants were recruited from the community (n=12)
24 and primary care practices and screening centres (n=7). Ten studies were underpinned by a
25 theoretical framework. The minimum sample size for men was 8^{35,36} and the maximum was
26 4,194.³⁷ Ages ranged between 19³⁸ and 95 years.³⁹ The majority of men were White (n=21).
27 Studies focused primarily on information about prostate cancer and Prostate Specific Antigen
28 (PSA) testing (n=18), followed by colorectal cancer (n=7).

29 **Critical appraisal**

1 The qualitative studies had clear aims and findings and used appropriate methods, designs,
2 recruitment strategies, data analysis frameworks, and measures to enhance rigour.³¹ All but
3 one qualitative study⁴⁰ failed to address the relationship between the researcher and study
4 participants, which increases the risk of bias (see supplementary Table 1S). The quantitative
5 studies were rated as ‘Poor’ (n=4); ‘Good’ (n=3); and ‘Fair’ (n=2). Studies rated as ‘Poor’
6 failed to justify the sample size, specify the data collection timeframe, use valid and reliable
7 data collection instruments, assess outcomes more than once, and/or adjust for confounders
8 (see supplementary Table 2S).³⁰ The mixed-methods study met all but one MMAT criterion,
9 namely sample representativeness, since the quantitative element of this study was a pilot-test
10 (see supplementary Table 3S).⁴¹

11 **Synthesis of results**

12 For results from individual studies, see supplementary Table 4S.

13 *Information-seeking behaviours and information sources*

14 Men either sought information on cancer prevention and risk reduction themselves i.e. active
15 information-seeking, or came across information i.e. passive information-gathering. In the
16 majority of cases, the latter was true.

17 *Active information-seeking*

18 Men were predominantly active information-seekers in six studies: two qualitative and one
19 quantitative longitudinal study assessing information-seeking for prostate cancer screening⁴²⁻
20 ⁴⁴; one cross-sectional³⁷ and one qualitative study on general cancer information-seeking⁴⁵;
21 and one qualitative study on information-seeking for skin cancer prevention.⁴⁶

22 The internet served as the primary source of information among active seekers in five
23 studies.^{37,42,43,45,46} Men searched for information on the internet to manage uncertainty
24 following a high PSA test⁴³ or to learn about the cancer diagnosis of a family member.^{42,45}
25 Additionally, 61% of participants in a cross-sectional study actively sought general cancer
26 information online.³⁷ Haluza and Cervinka surveyed 193 men and 363 women about the
27 impact of skin health information on their sun protective behaviours.⁴⁶ It was found that
28 women were more likely than men to seek information on skin cancer prevention using the
29 internet (36.1% for men vs. 24.7% for women; $p = 0.004$). Other than the internet, 11% of
30 participants in the longitudinal study by Gibson et al. actively sought PSA testing information
31 from non-medical sources, including family, friends, and co-workers.⁴⁴ Hicks et al. also

1 found that men's social networks were identified as important sources of information,⁴² while
2 participants in the study by Biddle et al. actively sought PSA testing information from
3 "medical journals, newspapers, television, media, chat rooms, and medical brochures" (p.6)
4 as well as their family, friends, and men who had similar experiences.⁴³

5 *Passive information-gathering*

6 Men passively acquired information in 13 studies: four quantitative,⁴⁷⁻⁵⁰ two qualitative,^{51,52}
7 and one mixed-methods study⁴¹ on prostate cancer screening; three qualitative studies^{35,36,53}
8 and one quantitative study on colorectal cancer screening³⁹; one quantitative study on Human
9 Papilloma Virus (HPV) and anorectal cancer prevention⁵⁴; and one qualitative study on
10 general cancer information.⁵⁵

11 Healthcare professionals were identified as a major source of unsolicited health information.
12 For instance, participants in two qualitative studies identified their physician as the primary
13 source of information about colorectal cancer.^{35,53} Blackwell et al. surveyed 89 men who
14 have sex with men about their awareness of HPV and anorectal cancer.⁵⁴ It was found that 49
15 participants had heard of anal Pap smears from different sources including their primary care
16 physician (10.2%), nurse (16.3%), and other healthcare professionals (32.7%).⁵⁴ This was
17 also the case in five studies on prostate cancer prevention and PSA testing.^{41,47,48,51,52}

18 Men also identified numerous and varied nonmedical sources of passively acquired
19 information including: friends, family members, and spouses^{39,41,49,52,54}; mass media^{41, 52-54};
20 their churches^{41,51}; personal stories⁵³; and medical posters.⁵⁵

21 *Use of information*

22 Four studies addressed men's use of acquired information to make informed decisions
23 regarding cancer prevention and risk reduction practices. Of those, one was a qualitative
24 study⁴² and one was a quantitative study on prostate cancer screening⁵⁰; one quantitative
25 study addressed colorectal cancer screening³⁹; and one quantitative study explored general
26 cancer information-seeking.³⁷

27 In a cross-sectional study aimed at exploring general cancer information-seeking in Australia,
28 Zajac et al. found that men were less likely to search for information than women, but were
29 more likely to be open to receiving unsolicited information (both $p < 0.001$).³⁷ However, only
30 32% of men expressed their willingness to receive unsolicited information via the internet.³⁷

1 Being equipped with information on cancer prevention and screening and having a close
2 relative with a malignancy did not serve as predictors for prostate cancer screening
3 behaviours.⁴² Similarly, a cross-sectional study examining the relationship between family
4 support and PSA testing among men (n=625) found that those with a family member who had
5 been diagnosed with prostate cancer were less likely to have undergone PSA testing in the
6 previous year (odds ratio 0.47, 95% CI 0.31 to 0.70; $p < 0.001$).⁵⁰

7 Of note, prostate cancer screening remains controversial with conflicting evidence regarding
8 the effectiveness of screening on reducing prostate cancer mortality.^{6,7} Furthermore, the
9 opinions and screening behaviours of healthcare professionals differ, making the decision to
10 undergo prostate cancer screening a difficult one for men.⁵⁶

11 As for colorectal cancer, “information-seeking by others was associated with greater absolute
12 perceived risk of colon cancer, and information-seeking for oneself was associated with more
13 frequent worry about colon cancer” (p.73).³⁹

14 ***Barriers to information-seeking***

15 Barriers to information-seeking with regards to prostate cancer screening and PSA testing
16 were addressed in eight qualitative,^{39,40,42,57-61} one quantitative,⁴⁴ and one mixed-methods
17 study.⁴¹ Barriers involved: information format and quantity (print and radio advertisements
18 that are either lacking in or flooded with information ‘information overload’); information
19 content (trigger words such as ‘research program’ and ‘research subjects’)³⁸; lack of trust in
20 the information offered by the media⁵⁷; and anxiety and fear.⁵⁸

21 Barriers to information-seeking were more pronounced among men belonging to some ethnic
22 groups (i.e. Filipino, African American, and Latino men). In their qualitative study, Conde et
23 al.⁴⁰ found that first generation Filipino men were more likely to ignore prostate cancer
24 information and Friedman et al.⁵⁹ reported that African American men were primarily passive
25 rather than active information-seekers. Moreover, two studies identified embarrassment,
26 shame, perceived weakness, machoism, and fear as barriers to information-seeking in relation
27 to prostate cancer among African American men.^{41,60} Lack of awareness of the PSA test, and
28 cancer being a taboo subject among African American and Latino men also served as barriers
29 to seeking information on prostate cancer and PSA testing.^{41,42,59,60} One study identified low
30 literacy levels among African American men as a barrier to information-seeking.⁴¹
31 Furthermore, limited access to screening services/physicians and cost of screening were
32 highlighted as barriers to information acquisition among African American men.^{41,59,61}

1 Similar barriers were reported in three qualitative studies on colorectal cancer.^{35,53,62} These
2 include: lack of information and understanding^{35,53}; confusing instructions about faecal occult
3 blood testing⁶²; generic materials being overlooked by certain cultures (e.g. American
4 Indian)⁵³; fear, embarrassment, clinic location/access, and concerns about privacy and cost.⁵³

5 *Facilitators to information-seeking*

6 Facilitators to information-seeking in relation to prostate cancer screening were addressed in
7 nine qualitative,^{38,40,42,57-61,63} four quantitative,^{44,47,49,50} and one mixed-methods study.⁴¹ Many
8 of these facilitators pertained to information layout, content, and mode of delivery. In two
9 qualitative studies, men were more likely to acquire information using print media (e.g. sports
10 section of the newspaper), appealing videos, and bullet points⁶¹ and favoured information that
11 is practical and delivered via the mass media (e.g. television).⁶³ Moreover, a number of men
12 preferred information targeted towards men.^{57,63}

13 Men in a qualitative study who were asked to evaluate advertisements on prostate cancer
14 screening, requested information about the signs, symptoms, and risk factors of prostate
15 cancer and recommended using gender- and age-appropriate models and celebrities to
16 promote screening.⁶¹ This was echoed in another study, whereby men interviewed about their
17 prostate cancer information-seeking behaviour requested information on prostate cancer, its
18 risk factors, and treatment options.⁵⁸

19 Community jurors (i.e. groups of men from the community) who evaluated different aspects
20 of PSA testing believed that information about the risks and benefits of prostate biopsy and
21 prostate cancer treatment should be offered to those who wanted it, including men with high
22 PSA levels.³⁸ They also believed that men would not want such information unless it was
23 relevant to them.

24 Access to both, medical (e.g. trusted general practitioners and urologists)^{41,38} and non-medical
25 (e.g. family and friends, the church, and neighbourhood settings)^{59,60} sources of information
26 served as a facilitator to the passive acquisition of information.

27 Using information specifically targeted at different ethnic groups also facilitated information-
28 seeking and acquisition.^{59,61} In two qualitative studies, African American men intended to
29 seek information on ethnic-specific risk factors of prostate cancer,⁶¹ and recommended
30 prostate cancer prevention messages that are simple, direct, and specific to African American
31 males.⁵⁹ Men also suggested that information should be delivered by trusted people including

1 African American church pastors, women, and prostate cancer survivors.⁵⁹ Furthermore,
2 transfer of knowledge between generations,⁶⁰ being a second generation Filipino man who
3 has computer-access,⁴⁰ and living in a household that has access to information on prostate
4 cancer (e.g. through newspapers),⁴⁷ also served as facilitators to acquiring information on
5 prostate cancer screening.

6 Four qualitative studies addressed facilitators to seeking colorectal cancer screening
7 information.^{36,53,62,64} Bennett et al. found that factual information about colorectal cancer
8 made screening less abstract.³⁶ Moreover, men belonging to three different ethnic groups (i.e.
9 African American, English Caribbean, and Haitian) recommended pamphlets at the doctor's
10 office, group sessions, and information and educational materials that are visual.⁶⁴ Other
11 facilitators included: using real people in narratives to make screening more vivid³⁶; leaflets
12 with information about faecal occult blood testing⁶²; having a friend or a family member with
13 cancer; and using social networks to raise awareness.⁵³

14 ***The impact of literacy levels on information-seeking and use***

15 The impact of literacy and/or health literacy on information-seeking and use was addressed in
16 two qualitative studies on colorectal cancer screening,^{65,66} and one mixed-methods study on
17 prostate cancer screening.⁴¹

18 Smith et al. explored, qualitatively, the colorectal cancer screening information needs and
19 preferences of 14 men with varying literacy levels.⁶⁵ Men with both high and low literacy
20 levels reported that health information should be direct, short, and sharp and appreciated
21 medical diagrams, found some of the statistics confusing and unclear, perceived some
22 scientific information as difficult, and suggested phone helplines as a source of information.⁶⁵
23 Moreover, both groups perceived medical terminology as problematic; however, this was
24 more pronounced among the low literacy group. The lower literacy group also perceived
25 high-density text as off-putting, was not reassured by scientific references, and perceived
26 certain visual images as patronising. However, a weighing scale with 'reasons to undergo
27 colorectal cancer screening' on one side and 'reasons not to undergo colorectal cancer
28 screening' on the other side was perceived as helpful. Men with high literacy levels were
29 reassured by scientific references and appreciated the use of visual images.⁶⁵

30 Friedman et al. conducted a mixed-methods study to assess functional health literacy among
31 25 African American men using two modified Cloze tests and the Shortened Test of
32 Functional Health Literacy in Adults.⁴¹ Adequate comprehension of the survey tools was

1 demonstrated, with more than 56% correct answers. In addition, it was found that functional
2 health literacy did not differ significantly by reading level and that 25% of participants were
3 non-seekers of cancer information.⁴¹

4 Finally, Smith et al. explored, qualitatively, how 12 men with low educational attainment
5 used an evidence-based decisional aid to make colorectal cancer screening decisions.⁶⁶
6 Understanding the purpose of the decisional aid determined how men used this information.
7 Some used the information to make informed decisions on undergoing colorectal screening;
8 some men chose to get screened because of the statistics; some chose to get screened despite
9 doubting the statistics; and others chose not to get screened because they believed that the
10 harms of screening outweighed its benefits. Moreover, some men dismissed this information
11 and/or questioned its validity, including those who were critical of statistics and/or lacked the
12 confidence to interpret statistics.⁶⁶

13

14 **DISCUSSION**

15 Findings from this meta-narrative systematic review suggest that men seek information in
16 different ways, with the majority acquiring information passively through intermediary
17 channels, rather than actively seeking this information. Men's preferred format, content, and
18 delivery of information were identified along with barriers and facilitators to seeking
19 information on cancer prevention and risk reduction.

20 Regardless of how men acquire information; knowledge empowers.⁶⁷ Therefore, once
21 acquired, men can use information to make decisions about their health. In fact, the review
22 found that men did use information to make decisions regarding cancer screening. However,
23 very few studies explored the effect of literacy and/or health literacy on men's understanding
24 of cancer prevention and risk reduction information, which could negatively impact decision-
25 making.^{41,65,66}

26 Knowledge of how and where men acquire information is required to ensure its effectiveness.
27 An individual's information field is the totality of possible sources an individual may consult
28 and incorporates their information network. The daily sphere of information, i.e. the source of
29 information an individual comes into contact with on a daily basis, is most likely to be with
30 those whom they perceive that they have shared interests, for example, sports teams/groups,
31 work associates, peer support groups, religious groups, friends, and neighbours.^{44,68,69}

1 Additionally, this can include journals, newspapers, television, internet, chat rooms, medical
2 brochures, and speaking to family members, friends, and men who have similar
3 experiences.⁴³ As an exemplar, a large proportion of men read the sports sections of
4 newspapers on a daily basis; understanding this is very important as the daily sphere of
5 information varies for each man and differs according to their age, cultural, and
6 socioeconomic backgrounds. Adolescent and young adults regularly name their parents,
7 peers, and teachers as their key social network and the internet and social media as the key
8 place for accessing information.⁷⁰ In contrast, healthcare professionals are regularly cited as a
9 major source of information for older males.^{35,39,48}

10 African American men have preferences for messages delivered through word of mouth and
11 from credible sources such as African American church pastors, women, and prostate cancer
12 survivors.⁵⁹ Thus, for targeted health promotion interventions, it is useful to consider the
13 target audience, their social networks, and their likely daily sphere of information. In
14 addition, the informational preferences of the target group are important.⁷⁰

15 This review revealed that men preferred gender- and age-specific information presented as
16 practical, factual, simple, and direct information using bullet points, pictures/models and
17 multimedia. Moreover, endorsement of information by others was a feature mentioned in a
18 number of studies; including endorsements by celebrities⁶¹ and receiving information through
19 trusted sources such as religious figures.⁵⁹

20 Findings from this review are echoed in the wider literature on health information-seeking. In
21 a study aimed at identifying the demographic characteristics of health information-seekers,
22 Kim found that inactive information-seekers were predominantly males.¹³ Similarly, a survey
23 aimed at determining the characteristics of online health information-seekers, found that men
24 were less likely than women to engage in active health information-seeking using the
25 internet.¹⁵

26 One explanation for the disparity between the two genders, is that health-seeking is often
27 perceived as a 'feminine' rather than 'masculine' behaviour.⁷¹ This could be explained
28 further using sociological theories, including Connell's Theory of Hegemonic Masculinity
29 which describes how masculine social constructs, such as stoicism, risk-taking, and
30 toughness, impinge on the ways men seek health information.^{21,71,72} Men need to be able to
31 justify engaging with healthy lifestyle behaviours and health services.

1 In the present review, men belonging to different ethnic groups (i.e. Filipino, African
2 American, and Latino) were predominantly passive information-gatherers.^{40,42,59-61} Similar
3 findings were identified in the wider literature on health information-seeking, whereby Latino
4 and African American men identified their healthcare providers as the primary source of
5 unsolicited health information.^{73,74}

6 Age and health literacy were also found to impact on wider health information-seeking.^{73,75}
7 For instance, in a study exploring internet use among low-income adults, Jensen et al. found
8 that older individuals were less likely to seek health information online, mainly due to low
9 levels of health and computer literacy.⁷⁵

10 **Implications for future research**

11 The present review has a number of research implications. For men to engage with cancer
12 prevention information, they must perceive it as relevant to them; thus the content and
13 information transmission processes need to be nuanced to reflect gender, generational, and
14 ethnic differences. Moreover, information needs to be developed in both gender-specific and
15 gender neutral formats where appropriate, as it has been shown that gender-specific
16 information can have adverse effects on a number behaviours related to cancer prevention
17 and information-gathering among women.⁷⁶ It is also essential that the target audience,
18 preferred learning strategies, social networks, and daily sphere of information are considered
19 when designing health promoting interventions.^{43,68,70}

20 While older men might benefit from simple interventions that do not involve complex
21 technologies,⁷⁵ interactive and visually appealing interventions can be used successfully to
22 target younger men.⁷⁰ In addition, understanding the age profile of cancers is important, with
23 prostate and colon cancer information being more relevant for older men and testicular cancer
24 information being more relevant to younger men. However, educational interventions aimed
25 at schools are likely to have more lifelong implications on men's health.⁷⁷

26 Researchers need to be vigilant for the potential of information overload and low literacy
27 levels and are encouraged to design interventions that are non-patronising, yet easy to
28 understand.^{65,66} Future research is also required to understand the cognitions and behaviours
29 of passive information-seekers using theories such as the Cognitive Information Processing
30 Theory.⁷⁸ This in turn will inform the development and testing of targeted interventions to
31 increase information-seeking among passive information-gatherers and help them to readily
32 encode, store, and retrieve information.⁷⁸

1 The internet was identified as the key source of health information among active information-
2 seekers.^{37,42,43,45,46} Consequently, evidence-based information needs to be developed and
3 updated periodically using trustworthy online platforms.

4 From a methodological perspective, designing interventions that are underpinned by theory
5 and using valid and reliable data collection instruments is required to strengthen the evidence
6 base. An example is the M.A.L.E. H.E.L.P. questionnaire developed by Leone et al. to assess
7 men's knowledge, attitudes, and behaviours in relation to access to health care.⁷⁹ Finally,
8 longitudinal research is needed to explore the impact of information-seeking on cancer risk,
9 incidence, and mortality.

10 **Implications for clinical practice**

11 Healthcare professionals, including nurses and physicians, were identified as the main source
12 of unsolicited health information among passive information-gatherers.^{35,41,47,48,51-54}

13 Therefore, increasing the participation of healthcare professionals in targeted health
14 promoting activities including workshops, conferences, and continuing education may
15 increase information acquisition among their patients and the wider community.

16 Healthcare professionals need to be cognisant of men's sociodemographic characteristics
17 including age, ethnicity, educational attainment, and level of health literacy, whilst providing
18 information and advice in relation to cancer prevention and screening. These could be in the
19 form of pamphlets, brochures, and/or posters placed in waiting areas and/or websites of
20 national and international cancer organisations that offer easy to understand patient
21 information.

22 Health organisations, where appropriate, are encouraged to adopt non-gendered approaches,
23 whereby both men and women have equal opportunities to access care. This could be
24 achieved by addressing structural barriers such as screening locations and times; and factors
25 such as socioeconomic status, ethnicity, age group, and level of literacy and health literacy in
26 cancer prevention information.

27 **Limitations**

28 The reviewed literature on men's information-seeking behaviour in relation to cancer risk and
29 screening was limited to a few cancers – being dominated by prostate and colorectal cancer
30 screening. It is estimated that one third of cancer cases could be reduced through adherence to

1 the recommendations in the European Code Against Cancer; therefore, there is a need to
2 expand the sphere of research on men's health information seeking and engagement.⁸⁰

3 Understanding how to engage men with this information remains largely unexplored. In
4 addition, the reviewed studies were primarily conducted in United States, and barriers and
5 facilitators in that health system may not be generalizable to men in other health systems.
6 Furthermore, despite low health literacy being so prevalent, the impact of low health literacy
7 on health information-seeking has not been well researched. Methodologically, all but one
8 qualitative study failed to address the relationship between the researchers and participants⁴⁰
9 and the quality of four of the nine quantitative studies was rated as 'Poor', which increases
10 the potential for bias.³⁰

11 A number of limitations at the review level are also noteworthy. The search was limited to
12 seven electronic databases, did not include records from the Grey literature, excluded theses
13 and dissertations, and only included studies published in English between January 1st 2006
14 and May 30th 2016, which increases the risk of study selection bias. Moreover, only studies
15 that are in line with the review aim and questions were included, which leaves room for
16 reporting bias.

17

18 **CONCLUSION**

19 Findings from the present review highlight the need to: (i) explore the behaviours underlying
20 passive information-gathering among men; (ii) empower men who are passive information-
21 gatherers to engage with cancer prevention and risk reduction information; (iii) provide men
22 with trustworthy and accessible information platforms; (iv) encourage healthcare
23 professionals to partake in targeted health promoting activities; (v) use men's daily sphere of
24 information to increase awareness of cancer prevention; (vi) explore men's information needs
25 and preferred learning strategies; and (vii) design and measure the impact of targeted
26 interventions aimed at men of different ages, socio-economic and ethnic groups, and literacy
27 and health literacy levels.

28

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Table 1. Study characteristics (n=31)

Country	USA (n=20) Australia (n=5) UK (n=5)
Setting	Dominican Republic (n=1) Community (n=12) Health centres/clinics (n=7) Colleges (n=4) Pre-existing databases (n=3) Churches (n=2) State service agencies (n=2) Social event (n=1)
Study design	Qualitative: Descriptive (n=15) Exploratory (n=2) Grounded theory (n=2) Community jury (n=1) Descriptive and exploratory (n=1) Quantitative: Cross-sectional (n=5) Descriptive (n=1) Longitudinal (n=1) Needs assessment (n=1) Retrospective (n=1) Mixed-methods (n=1)
Theoretical underpinning	Community Based Participatory Model (n=2) Andersen's Behaviour Model of Health Services (n=1) Health Belief Model (n=1) Nutbeam's Health Literacy Framework (n=1) Preventive Health Model (n=1) Social Support Theoretical Framework (n=1) Systemic Linguistic Theory (n=1) Theory of Planned Behaviour (n=1) Theory of Reasoned Action (n=1) None/Not reported (n=21)
Sample size (min-max)	8-4,194
Ethnic groups	White (n=21) Black (n=7) American Indian (n=1) Filipino (n=1) Hispanic (n=1)
Primary focus	Prostate cancer (n=18) Colorectal cancer (n=7) General cancer information (n=4) Skin cancer (n=1) HPV/anorectal cancer (n=1)