Title:

Barriers and Facilitators to Health Screening in Men: A Systematic Review

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Abstract:

Rationale. Men have poorer health status and are less likely to attend health screening compared to women.

Objective. This systematic review presents current evidence on the barriers and facilitators to engaging men in health screening.

Methods. We included qualitative, quantitative and mixed-method studies identified through five electronic databases, contact with experts and reference mining. Two researchers selected and appraised the studies independently. Data extraction and synthesis were conducted using the 'best fit' framework synthesis method.

Results. 53 qualitative, 44 quantitative and 6 mixed-method studies were included. Factors influencing health screening uptake in men can be categorized into five domains: individual, social, health system, healthcare professional and screening procedure. The most commonly reported barriers are fear of getting the disease and low risk perception; for facilitators, they are perceived risk and benefits of screening. Male-dominant barriers include heterosexual - self-presentation, avoidance of femininity and lack of time. The partner's role is the most common male-dominant facilitator to screening.

Conclusions. This systematic review provides a comprehensive overview of barriers and facilitators to health screening in men including the male-dominant factors. The findings are particularly useful for clinicians, researchers and policy makers who are developing interventions and policies to increase screening uptake in men.

Keywords:

Systematic review, screening, barrier, facilitator, men's health, masculinity, qualitative, quantitative

Introduction

Globally, men do not live as long as women (Barford et al., 2006; WHO, 2011) and have higher mortality and morbidity rates across most of the diseases (AIHW, 2013; Bilsker et al., 2010; EC, 2011; Ng et al., 2014; White et al., 2011a). Possible explanations include men's poor health seeking behavior, lack of health knowledge, risk taking behavior as well as their reluctance to engage in health promotion activities (Addis & Mahalik, 2003; Byrnes et al., 1999; Courtenay, 2003).

Various strategies can be used to improve the status of men's health, particularly health screening. Through health screening, one can identify a disease at the early stage allowing intervention before the disease worsens. For instance, a study on the impact of cardiovascular disease (CVD) screening reported that screening attenders have lower CVD mortality rate, all-cause mortality rate, healthcare utilization and cost compared to non-attenders (Lee et al., 2015). A one percent reduction of cardiovascular events through a preventive program across England and Wales has the potential to save at least £30 million of health services cost per year (Barton et al., 2011). Similarly, screening for colorectal cancer using faecal occult blood test (FOBT) was reported to decrease the relative risk of colorectal cancer death by 15-20%, save 3.8-8.29 quality adjusted life days per person and £1,890-£2,576 of healthcare cost per life year (Hewitson et al., 2007; Tappenden et al., 2004).

In spite of all the benefits of screening, screening uptake is low, particularly in men. The uptake rates of guaiac-based faecal occult blood (gFOB) test in the UK Bowel Cancer Screening Programme were lower in men across all three rounds of the biennial invitation (first round: men 53.3% vs women 61.3%; second round: men 58.0% vs women 63.7%; third round: men 64.1% vs women 68.2%) (Lo et al., 2015). Another study on screening uptake in Ontario showed a similar pattern where the uptake of screening was lower in men for

colorectal cancer (men 55.1% vs women 61.6%), diabetes (men 61.4% vs women 72.9%) and cholesterol (men 70.3% vs women 82.4%) (Borkhoff et al., 2013). A narrative scoping review on socio-determinants of screening uptake cites nine studies that indicated men were less likely to engage health screening compared to women, particularly men who are less educated, unemployed and from low socio-economic status (Dryden et al., 2012). However, this review did not provide reasons for the low screening uptake in men.

For a screening intervention to be effective, it is important that it is tailored to the characteristics of the population, such as using a gendered approach. Masculinity attributes like avoidance of femininity, toughness and risk taking have been used to explain the difference in health screening behavior between men and women (Connell, 1987, 1995). The Madrid Statement, released by the World Health Organization (WHO) in 2001, clearly states that health policies must recognize that men and women have different needs, obstacles and opportunities in order to attain the highest standard of health (WHO, 2001). Experts have argued the importance of considering gender when developing interventions, programs and policies in recognition that men and women behave differently (Baker et al., 2014; Banks, 2004; Weller & Campbell, 2009; White et al., 2011b).

This systematic review thus aims to review the existing evidence on the barriers and facilitators to engaging men in health screening. We sought to identify the most commonly reported barriers and facilitators to health screening along with those barriers and facilitators that are particularly prominent in a male population (male-dominant). We hope that identification of these factors will help in the development of effective interventions to overcome these barriers and improve screening uptake in men. However, this review did not include studies focusing on certain male populations, such as gay and aboriginal men, as there are unique factors that influence their health screening behavior which deserve separate reviews.

Methods

Eligibility Criteria

We included qualitative, quantitative and mixed-method studies that identified men's barriers or facilitators in engaging with health screening. For inclusion, a study must clearly differentiate the barriers or facilitators between men and women. Informants could include men or women patients or healthcare professionals as long as the barriers or facilitators discussed are those for male patients. Studies included in the review investigate men who have attended for screening, as well as non-attenders. Participants could be derived from any age group and they must be asymptomatic of the disease for the screening planned in each study. We excluded studies that focused on men who were gene carriers, prisoners, disabled, drug users, in military service, homeless, immigrants, refugees as well as aboriginal and gay men. These groups of men face additional barriers when seeking healthcare and they deserve separate reviews.

We included all types of screening recommended by the United States Preventive Services Task Force (USPSTF) as well as male-specific diseases like prostate and testicular cancer screening (United States Preventive Services Task Force, 2016). We included studies on prostate cancer screening conducted before 2012 as USPSTF recommended against prostate cancer screening after that. Studies of barriers or facilitators of screening carried out as a part of a screening program were also included in this review. We excluded genetic tests for prostate cancer and studies that focus on screening at the emergency department. Studies that used an intervention to increase screening uptake, looked solely at socio-demographic determinants or focused on physicians' screening practices were also excluded from this review.

Information Sources and Search

We searched five key databases (PubMed, Embase, CINAHL via EBSCOHost, PsycINFO via OvidSP and Web of Science) up to 23 October 2014 to identify relevant articles. We combined three main concepts (men, screening, barrier/facilitator) and a methodological filter (qualitative/survey) using keywords and subject headings from respective databases in the search. The search strategy can be found in Appendix A. We only included articles published in English. Apart from database searching, we also sourced relevant articles from men's health experts and followed up references in eligible articles.

Study Selection and Appraisal

Two researchers performed all phases of study sifting and selection independently, including screening of titles, abstracts and full-texts. In cases of doubt, the researchers were encouraged to be inclusive. Any discrepancies were resolved through discussion and consensus. All the included studies were appraised using the Mixed-Method Appraisal Tool (MMAT) which allows appraisal of the validity, reliability and generalizability of the quantitative, qualitative and mixed-method studies (Appendix B) (Pluye et al., 2011). It can also be used quickly and reliably (Pace et al., 2012). For mixed-method studies, both qualitative and quantitative components of the studies were appraised. The appraisal was conducted to report the quality of the studies and not used as a threshold for selecting studies for inclusion.

Data Extraction and Synthesis

Data extraction and synthesis were conducted based on the 'best fit' framework synthesis method which provides 'a means to test, reinforce and build on an existing published model, conceived for a potentially different but relevant population' (Carroll et al., 2013). Researchers can combine several frameworks if necessary and refine the framework by adding new themes that emerged from the data, which are not found in the initial framework.

We first identified a framework on the barriers and facilitators to screening from the studies included in this review (Garcia-Dominic et al., 2012), supplemented by two other frameworks by Christy et al and Denberg et al, which focused on masculinity (avoidance of femininity, self-reliance, risk taking and heterosexual self-presentation) and screening procedure respectively, to form a more comprehensive meta-framework (Christy et al., 2014; Denberg et al., 2005). This meta-framework was then pilot tested by two researchers against ten studies before the final framework was decided.

Two researchers extracted the data from each included paper and coded them deductively using the meta-framework. Data that could not fit the meta-framework were coded separately under a new theme in a subsequent inductive phase. Data that were unclear or without sufficient explanation were excluded from the analysis.

Once data from all studies were extracted, the researchers compared the coding, discussed and resolved any discrepancy through consensus. The themes from the meta-framework and the newly generated themes were combined using the thematic approach to produce the final framework of barriers and facilitators to health screening in men. The analysis including the quotations can be obtained from the researchers upon request.

Additional Analysis

Besides aiming to develop the comprehensive framework of barriers and facilitators to health screening in men, we also sought to find out which are the most common barriers or facilitators by counting the number of studies that reported a barrier or facilitator and ranking them accordingly.

In addition, we sought to identify the barriers and facilitators that are found predominantly in men, using to two methods. For qualitative studies (53 qualitative paper plus qualitative components of 4 mixed-method papers), criteria for deciding male-dominant barriers and facilitators in men appear in Appendix C. For quantitative studies, barriers and facilitators were considered male-dominant when there were significantly higher percentage of barriers or facilitators reported by men compared to women, with $p < .05$.

Results

Included Studies' Characteristics

We identified 14322 articles from five databases, contact with experts and follow up of references (excluding duplicates and non-journal articles) (Fig. 1). We eventually included 103 studies in the review which consisted of 53 qualitative, 44 quantitative and 6 mixed-method studies. In four out of six mixed-method studies, only the qualitative component of the study was included as the quantitative component did not meet our inclusion criteria. In the other two mixed-method studies both qualitative and quantitative components of the study were included in the analysis.

[INSERT FIGURE 1 ABOUT HERE]

The characteristics of all studies and their references are presented in Appendix D. The studies were conducted from 1985 to 2012 and in North America (k=62), Europe (k=14), Africa (k=9), Oceania (k=8), Asia (k=6) and South America (k=4). Most of the studies were conducted in the community (k=70); few in the healthcare setting (k=19); and a small number in both settings (k=3). All included quantitative studies were cross-sectional studies. Most qualitative studies (k=53) did not report their study design and the most commonly reported study designs were grounded theory (k=3), phenomenology (k=2) and ethnography (k=1). More than half of the included studies (k=65) did not report using a theory in their study. Of those reported, the Health Belief Model (k=16) was the most commonly used theory (Champion VL, 2008).

Among the included studies, the most commonly studied screening topics were prostate cancer (k=40), colorectal cancer (k=33) and HIV (k=15) and the remainder included sexually transmitted disease (k=4), cancer (k=4), testicular cancer (k=3), cardiovascular disease (k=2), skin cancer (k=1) and multiphasic examination (k=1). Twenty studies were conducted as a part of a screening program. Most included both attendees and non-attendees of screening (k=73), 11 studies included ever-screened participants; 9 studies included never-screened participants; while 10 studies did not report.

Out of 103 studies, 37 reported barriers, 13 facilitators and 55 both barriers and facilitators. Only 30 studies focused exclusively on barriers or facilitators to screening while 73 studies focused on participants' attitudes, beliefs and knowledge of a disease of which barrier to screening was only a constituent of the studies. Among the 103 studies, 47 compared men's barriers and facilitators to those of women while 56 only focused on men's barriers. Of 24 quantitative studies comparing barriers/facilitators between men and women, only 13 reported p-values in their studies.

Barriers and Facilitators to Health Screening in Men

Factors influencing uptake of health screening in men fall within five domains: individual, social, health system, healthcare professional and screening procedure (Table 1). The six individual factors that influence health screening uptake in men are knowledge, attitudes and values, fear, masculinity attributes, communication and resources. Factors within the social domain include influence of family and/or peers as well as stigma. For the health system domain, factors include accessibility to screening services, cost and insurance, health information, screening program or policy, men's health advocacy and quality of service. Healthcare professional factors include attitudes, communication, physician's gender and ethnicity as well as physician's recommendation. The nature of the screening procedure also affects men's decisions as to whether or not to attend health screening.

[INSERT TABLE 1 ABOUT HERE]

There are several barriers and facilitators under each factor. The most commonly reported barrier to health screening across all domains is fear of being diagnosed with the disease and its consequences (k=52) (Table 2), followed by a perception of low risk (k=39) and fear of a painful screening procedure (k=37). The most commonly reported facilitators are perceived risk (k=31), perceived benefits of screening (k=29) and physicians' recommendations to attend screening (k=24).

[INSERT TABLE 2 ABOUT HERE]

Table 3 shows barriers and facilitators to screening found to be dominant in heterosexual men based on the 57 qualitative studies. Heterosexual self-presentation (k=18), avoidance of femininity (k=18), self-reliance (k=10), seeking help only when disease is severe (k=9) and avoidance of illness (k=7) are the most commonly reported male dominant

barriers to screening. Partner's role (k=18), perceived risk (k=2), wanting to stay healthy to take care of family (k=2), non-invasive screening procedure (k=2) and physicians' gender (k=2) are the most commonly reported male dominant facilitators to screening.

[INSERT TABLE 3 ABOUT HERE]

Table 4 shows barriers and facilitators to screening found to be dominant in men based on the 13 quantitative studies. Lack of time (k=6), fear of getting disease and its consequences (k=2), painful screening procedure (k=2) and lack of knowledge about disease and screening (k=2) are the barriers found to be significantly more common in men compared to women. For facilitators, having knowledge about disease and screening (k=1) and physician's recommendation to screening (k=1) were found to be more important in men. However, unlike qualitative studies, masculinity factors were rarely reported in the quantitative studies.

[INSERT TABLE 4 ABOUT HERE]

Among the five domains, the individual domain is the most commonly cited domain in the ten most commonly reported barriers (70.0%) as well as in qualitative (60.9%) and quantitative studies (62.5%) reporting male-dominant barriers (Table 5). The pattern is less obvious for the facilitators to health screening in men.

[INSERT TABLE 5 ABOUT HERE]

Quality Assessment

Overall, included studies carried a moderate risk of bias. Most qualitative studies satisfied all assessment criteria except for criteria 4, where most studies did not report whether the researchers' role might influence the outcome of the study (Appendix B). The

quality of quantitative studies was substantially lower as only about half of the studies satisfied criteria 1 (sampling strategy) and criteria 4 (response rate). These patterns were almost similar to the included mixed-method studies. The quality of mixed-method integration was moderate.

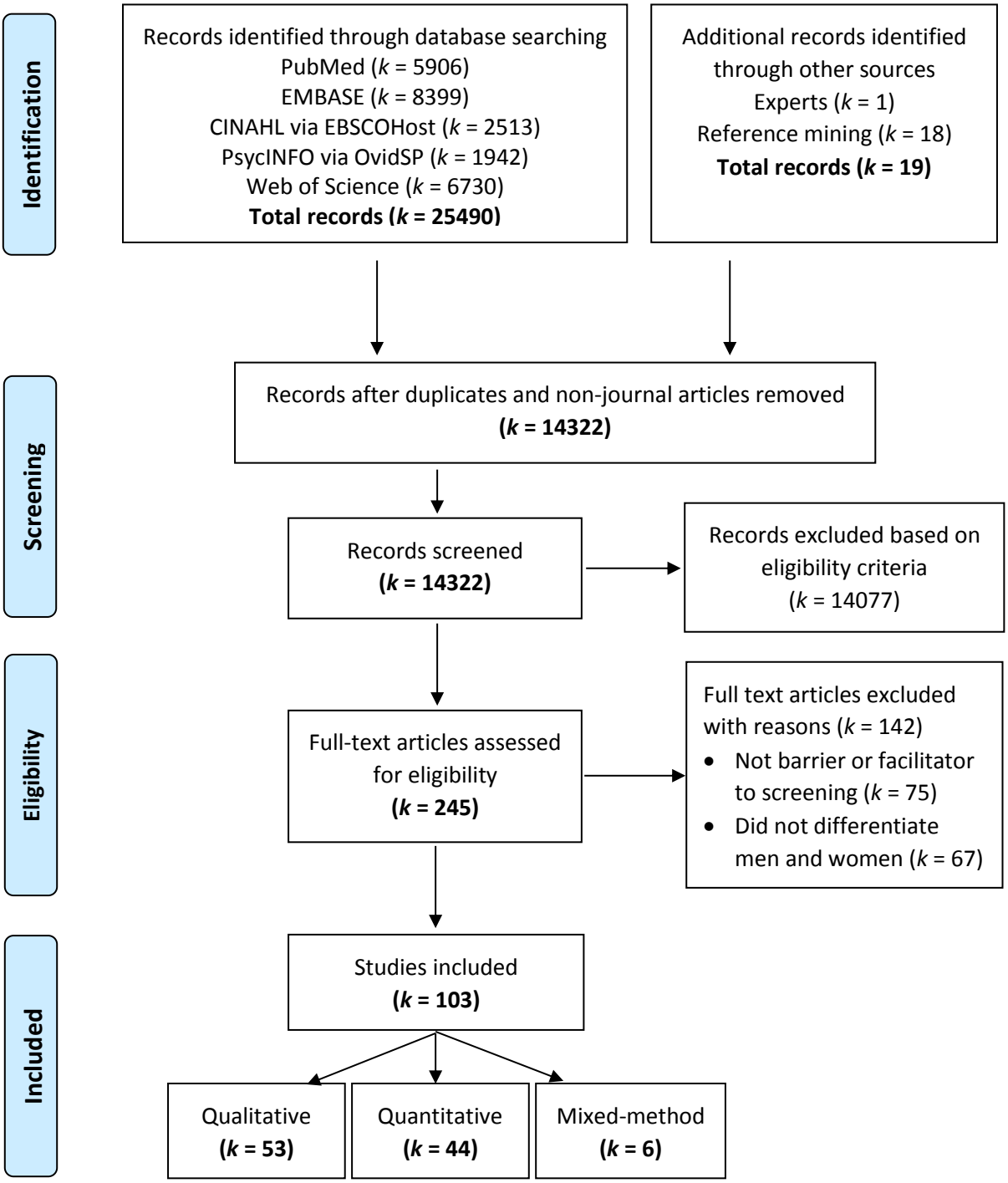

Fig. 1. PRISMA Flow Diagram

Discussion

This systematic review is the first to provide a comprehensive coverage of barriers and facilitators to health screening in men. The barriers and facilitators extracted in this study are those specifically expressed by men and are different from other disease-specific systematic reviews, which are often not gender-specific. Masculinity and characteristics of the screening procedure are highlighted as two important factors among the list of barriers and facilitators that influence men's decisions in taking up screening. We also identified the most common factors as well as those that are predominant in men.

This review identified 'masculinity' as an important factor which impedes screening in men; this factor is seldom highlighted in the literature as a barrier to screening in men. We used a previously published concept of masculinity as part of our analysis framework during data extraction (Christy et al., 2014) and masculinity attributes such as self-reliance, avoidance of femininity and heterosexual self-presentation emerged as barriers to screening. Only 'invincibility belief' emerged as a new barrier under masculinity attributes from the studies. Interestingly, an important masculinity attribute on 'risk taking' did not feature specifically as a barrier in the studies included in this review, which could be because 'risk taking' is an attribute that is difficult to probe in an interview when men do not perceive themselves to be at risk. We also realized that most papers included in this review only discussed masculinity in the context at individual level. Nonetheless, masculinity can be structured in institutional practices and policies, which are not explored in this review (Connell, 1987, 1995; Dovel et al., 2015). Some of the individual factors, such as 'avoiding and denying illness', 'seek help only when disease is severe', and 'fear of getting disease', could be related to masculinity, but the authors did not explicitly report the link. Future studies should explore this issue.

Table 1. Barriers and facilitators to health screening in men synthesized from all studies.

INDIVIDUAL DOMAIN		
FACTORS	**Barriers**	**Facilitators**
Knowledge	• Low risk perception (lack of symptom, no family history) • Lack of knowledge about disease and screening • Feeling inferior/fear of attending screening due to limited education and literacy	• Perceived at risk (having symptoms, having family history, being old and following a risky event) • Having knowledge about disease and screening
Attitudes and values	o Avoiding and denying illness o Fatalism belief o Negative attitude (lazy, procrastination or forgot) o Sceptical of the benefits of screening o Seek help only when disease is severe o Health is not a priority o Not trusting the doctor or health system o Having other health concerns o Already tested or diagnosed o Belief that illness can be healed naturally or with CAM	o Religious belief that a man should take care of his body o Positive attitude (health conscious, screening as a routine and care for others) o Perceived benefits of screening (early intervention and peace of mind) o Stay healthy to take care of family o Trusting the doctor or health system o Already tested or diagnosed
Emotion - Fear	▪ Fear of getting disease and consequence and don't want to know	▪ Fear of disease and consequence and want to find out earlier
Masculinity	➢ Avoidance of femininity - seeking help or talking about health is considered feminine or weak	

	➢ Heterosexual self-presentation - Undergoing DRE or colonoscopy may be perceived as gay ➢ Self-reliance - do not want to depend on doctors ➢ Invincibility belief	➢ Heterosexual self-presentation - Use other screening method rather than DRE ➢ To feel in control ➢ Non-existence of machismo attributes
Communication	× Discomfort discussing issues regarding private part and disease × Language barrier	
Resource	✓ Lack of time ✓ Lack of income and personal insurance ✓ Lack of personal transport	✓ Having personal insurance ✓ Having personal transportation
SOCIAL DOMAIN		
FACTORS	**Barriers**	**Facilitators**
Family and peer influence	• Lack of encouragement • Past negative health care experience • No social contact with the disease	• Encouragement and support from siblings, children, relative, friends and other social contact • Partner's role • Knowing someone with disease or died due to the disease
Stigma	o Concern about being stigmatized	
HEALTH SYSTEM DOMAIN		
FACTORS	**Barriers**	**Facilitators**
Accessibility to screening services	• Inconvenient opening hour, day and location • Difficulty in making appointment • Long waiting time • Busy HCP	• Convenient screening location, hour and day • Screening without appointment required • Short waiting time
Cost and insurance	o Costly services o Lack of insurance	o Free/reduced cost exams o Having insurance coverage

Health information	▪ Lack of public education ▪ Inaccurate and negative information	▪ More public education programs through media, community, school and health centre ▪ Church as a platform to promote health screening ▪ Celebrity-led campaign and advertisement
Screening programme or policy		➢ Availability of screening program or policy (workplace, marriage)
Men's health advocacy	× Lack of men's health advocacy	
Quality of service	✓ Male-unfriendly healthcare setting ✓ Lack of confidentiality ✓ Negative experience in health centre ✓ Limited access to treatment	✓ Reminder by health provider ✓ Confidentiality ✓ Opportunistic screening ✓ Availability of treatment ✓ Trained HCP
HEALTHCARE PROFESSIONAL DOMAIN		
FACTORS	**Barriers**	**Facilitators**
Attitude	• Negative attitude (rude, discrimination and uncaring)	
Communication	• Lack of rapport with doctor • Lack of bilingual physicians	• Having good rapport with doctor • Availability of bilingual healthcare professional • Shared decision making
Physician's gender and ethnicity	o Availability of physician of the same ethnicity	o Preference of female physicians to perform DRE
Physician's recommendation	▪ Lack of physician recommendation for screening tests	▪ Recommended to screening
SCREENING PROCEDURE DOMAIN		
FACTORS	**Barriers**	**Facilitators**

The nature of screening procedure	• Painful and uncomfortable • Embarrassing procedure • Complication following procedure • Lack of privacy • Difficult procedure preparation • Difficult sample collection • Impersonal procedure • Screening package lack comprehensiveness	• Less painful and discomfort procedure • Convenience test procedure

CAM=Complementary alternative medicine. DRE=Digital Rectal Examination. HCP=Healthcare Professional.

Table 2. Ten most commonly reported barriers and facilitators to health screening in men from all studies.

Barriers	No. of citing studies (*k*=92)	Facilitators	No. of citing studies (*k*=68)
Fear of getting disease and consequence (I)	52	Perceived at risk - having symptoms, having family history, being old and following a risky event (I)	31
Low risk perception - lack of symptom, no family history (I)	39	Perceived benefits of screening - early intervention and peace of mind (I)	29
Painful and uncomfortable screening procedure (SP)	37	Physician's recommendation to screening (HCP)	24
Lack of time (I)	33	Partner's role (S)	22
Lack of knowledge about disease and screening (I)	30	More public education program through media, community, school and health centre (HS)	18
Embarrassing screening procedure (SP)	29	Positive attitude - health conscious, screening as a routine and care for others (I)	16
Costly screening services (HS)	23	Knowing someone with disease or died due to the disease (S)	15
Seeking help or talking about health is considered feminine or weak (I)	21	Encouragement and support from siblings, children, relative, friends and other social contact (S)	12
Undergoing DRE or colonoscopy may be perceived as gay (I)	20	Availability of screening program or policy - workplace, marriage (HS)	11
Avoiding and denying illness (I)	20	Having knowledge about disease and screening (I)	11

DRE=Digital Rectal Examination. HCP=Healthcare Professional. HS=Health System. I=Individual. S=Social. SP=Screening Procedure.

Table 3. Barriers and facilitators to screening found to be dominant in men based on 57 qualitative studies.

FACTORS	Number of studies
Barriers	
Heterosexual self-presentation - Undergoing DRE[6] or colonoscopy may be perceived as gay (I)	18
Avoidance of femininity - seeking help or talking about health is considered feminine or weak (I)	18
Self-reliance - do not want to depend on doctors (I)	10
Seek help only when disease is severe (I)	9
Avoiding and denying illness (I)	7
Invincibility belief (I)	6
Embarrassing screening procedure (SP)	5
Health is not a priority (I)	4
Fear of getting disease and consequence (I)	4
Lack of encouragement (S)	3
Male-unfriendly healthcare setting (HS)	3
Lack of privacy (SP)	3
Lack of knowledge about disease and screening (I)	3
Fatalism belief (I)	3
Lack of Men's Health Advocacy (HS)	2
Negative attitude - lazy, procrastination or forgot (I)	2
Lack of public education (HS)	2
Not trusting the doctor or health system (I)	2
Low risk perception - lack of symptom, no family history (I)	2
Difficult sample collection (SP)	1
Complication following procedure (SP)	1
Lack of time (I)	1
Concern about being stigmatized (S)	1
Facilitators	
Partner's role (S)	18
Heterosexual self-presentation - Use other screening method rather than DRE[6] (SP)	2
Preference of female physicians to perform DRE[6] (HCP)	2
Stay healthy to take care of family (I)	2
Perceived at risk - Having symptoms, having family history, being old and following a risky event (I)	2
Inexistence of machismo attributes (I)	1
To feel in control (I)	1
Opportunistic screening (HS)	1

Convenience test procedure (SP)	1
More public education programs through media, community, school and health center (HS)	1
Recommended to attend screening (HCP)	1

DRE=Digital Rectal Examination. HCP=Healthcare Professional. HS=Health System. I=Individual. S=Social. SP=Screening Procedure.

Table 4. Barriers and facilitators to screening which are either more dominant in men (Sig-male), no significant difference (*ns*), or more dominant in women (Sig-female) based on *p*-value reported in 13 quantitative papers.

FACTORS	Sig-male	*ns*	Sig-female
Barriers			
Lack of time (I)	6	1	0
Fear of getting disease and consequence (I)	2	5	2
Painful and uncomfortable (SP)	2	2	1
Lack of knowledge about disease and screening (I)	2	1	0
Low risk perception - lack of symptom, no family history (I)	1	4	1
Embarrassing procedure (SP)	1	1	3
Complication following procedure (SP)	1	1	1
Skeptical of the benefits of screening (I)	1	1	0
Costly services (HS)	0	5	0
Difficult procedure preparation (SP)	0	2	1
Negative attitude - lazy, procrastination or forgot (I)	0	2	0
Lack of personal transport (I)	0	2	0
Concern about being stigmatized (S)	0	2	0
Inconvenient opening hour, day and location (HS)	0	2	0
Having other health concerns (I)	0	1	1
Already tested or diagnosed (I)	0	1	1
Lack of physician's recommendation (HCP)	0	1	1
Avoiding and denying illness (I)	0	1	0
Health is not a priority (I)	0	1	0
Lack of income and personal insurance (I)	0	1	0
Past negative health care experience (HS)	0	1	0
Difficulty in making appointment (HS)	0	1	0
Lack of confidentiality (HS)	0	1	0
HCP's negative attitude (HCP)	0	1	0
Difficult sample collection (SP)	0	1	0
Lack of encouragement (S)	0	0	1
Facilitators			
Having knowledge about disease and screening (I)	1	0	0
Recommended to screening (HCP)	1	0	0
Perceived at risk - Having symptoms, having family history, being old and following a risky event (I)	0	2	1
Availability of screening program or policy - workplace, marriage (HS)	0	2	0

Perceived benefits of screening - early intervention and peace of mind (I)	0	1	0
Partner's role (S)	0	1	0
Positive attitude - Health conscious, screening as a routine and care for others (I)	0	0	1
Physician of the same gender (HCP)	0	0	1

HCP=Healthcare Professional. HS=Health System. I=Individual. S=Social. SP=Screening Procedure.

Table 5. Summary of the ten most commonly reported and male-dominant (qualitative and quantitative study) barriers and facilitators to screening in men according to domain.

DOMAIN	Barriers *k* (%)	Facilitators *k* (%)
Ten most commonly reported factors	**10 (100%)**	**10 (100%)**
Individual (I)	7 (70.0%)	4 (40.0%)
Social (S)	0 (0%)	3 (30.0%)
Health system (HS)	1 (10.0%)	2 (20.0%)
Healthcare professional (HCP)	0 (0%)	1 (10.0%)
Screening procedure (SP)	2 (20.0%)	0 (0%)
Male-dominant - qualitative study	**23 (100%)**	**11 (100%)**
Individual (I)	14 (60.9%)	4 (36.4%)
Social (S)	2 (8.7%)	1 (9.1%)
Health system (HS)	3 (13.0%)	2 (18.2%)
Healthcare professional (HCP)	0 (0%)	2 (18.2%)
Screening procedure (SP)	4 (17.4%)	2 (18.2%)
Male-dominant - quantitative study	**8 (100%)**	**2 (100%)**
Individual (I)	5 (62.5%)	1 (50.0%)
Social (S)	0 (0%)	0 (0%)
Health system (HS)	0 (0%)	0 (0%)
Healthcare professional (HCP)	0 (0%)	1 (50.0%)
Screening procedure (SP)	3 (37.5%)	0 (0%)

'Screening procedure' was another unique factor that emerged from our review. Though many studies identify screening procedures as a barrier, such as the collection of faeces for bowel cancer screening, different procedures impose different levels of reluctance for men to present for screening (Lo et al., 2013; Vart, 2010). Procedures that are most commonly cited as a barrier are digital rectal examination, colonoscopy and sigmoidoscopy. Such procedures, involving anal penetration, have a sexual connotation and heterosexual men are concerned that they might be perceived as being gay. Clinicians should emphasize that these procedures are recommended for all men and the invasive nature of the procedure is necessary to detect tumors in the colon; therefore, men should not perceive the procedures as being gay. Unlike other factors, such as individual, social, healthcare system and healthcare professional factors, which are non-disease specific, screening procedure is therefore disease-specific. More work needs to be done to overcome this barrier.

In the included studies, the most commonly reported factor influencing men's attendance at health screening relates to their knowledge regarding health and screening, which in turn, affects men's perception of their own health risk and the benefits of screening. Some men are fearful of being diagnosed with the disease if they go for screening and, therefore, choose not to know about their health status. It is important for healthcare providers to assess and provide information on individual health risks as well as to explain the benefit and risks of health screening.

We also identified several male-dominant barriers and facilitators to health screening in men. Masculinity attributes such as heterosexual self-presentation, avoidance of femininity and self-reliance are the most commonly cited male-dominant barriers to screening. It is important to note that masculinity attributes vary in different contexts. For example, a study comparing barriers to colorectal screening between two Hispanics subpopulations, Spanish Americans and first-generation Mexicans, in New Mexico, USA found that machismo is

more prominent in the latter (Getrich et al., 2012). Other barriers, such as lack of time, lack of knowledge, fear and screening procedure are also found more predominantly in men. For facilitators to screening, knowledge, partner's role and physicians' recommendation are the most important factors that motivate men to attend health screening.

We also found that while individual factors contribute to most barriers to health screening in men, it is not as commonly cited as a facilitator. Thus, for a screening intervention targeting men to be effective, it may not be enough to just address individual barriers; strategies involving external factors, such as family and friends, health system, healthcare professional and screening procedure, may need to be incorporated to enhance screening uptake. A study by Holland et al has found that combining personalized letter to men and a reminder system by the healthcare professional resulted in a higher uptake of health screening as compared to sending a personalized letter alone (Holland et al., 2005). The uptake is even higher when the intervention was supplemented by asking the partners to encourage men to go for health screening.

Another important point to note is that this systematic review only included studies that reported barriers and facilitators to screening from men themselves independent from associations with social determinants to screening uptake. Dryden et al reported that those not attending health checks were typically from low socio-economic status, less well educated, single (not married), smokers, having low self-efficacy and less likely to believe in the efficacy of health checks. In contrast attenders were usually White and older in age (Dryden et al., 2012). We did not include these social determinants because this systematic review aimed to find out the actual barriers and facilitators to screening in men irrespective of the profile of men who would or would not seek help.

Limitations

This review has several limitations. This review did not include studies focusing on men who were gene carriers, prisoners, disabled, drug users, in military service, homeless, immigrants, refugees as well as aboriginal and gay men. These groups of men face additional barriers when seeking healthcare and deserve separate reviews, some of which have been published. For example, systematic reviews have been conducted on barriers to HIV testing in men who have sex with men (MSM) (Lorenc et al., 2011) and hepatitis C testing in people who inject drugs (Jones et al., 2014).

We also did not analyze the barriers and facilitators according to age, which may influence how men decide to go for screening. Most of these studies included in this systematic review were conducted in Western countries, which may reduce their validity in the global South. We also identified four potentially relevant non-English articles (2 Japanese; 1 Korean; 1 Swedish) which we did not include in this review.

The quality of the quantitative studies included in this review was generally poor, particularly in terms of questionnaire design. The questionnaires were not validated rigorously and factor analysis was typically not performed. Some included options represent compound questions (e.g., 'costly/lack of insurance'); some responses were not meaningful (e.g., 'I do not know' and 'I just do not want to'). Unlike the findings from qualitative studies, the barriers and facilitators reported in quantitative studies lack depth and hence were less useful for the understanding of the factors that influence men's decision to attend screening. We only reported 'commonly reported barriers' rather than 'the most common barriers' due to the heterogeneity of study methods. Some studies permitted participants to choose multiple barriers while others only allowed them to choose the single most important barrier. Masculinity-related factors are less commonly reported because it is both difficult to

ask men about this and, in turn, for them to admit such issues. Many studies did not incorporate masculinity attributes in the design of the questionnaire. Additionally, only 13 out of 24 studies that compared men and women reported a *p*-value. Further evidence is required to support the male-dominant barriers or facilitators based on *p*-values, such as reported in this review. We also did not exclude lower quality studies based on the MMAT in order to elicit the widest possible range of barriers and facilitators.

Conclusion

This systematic review identified individual, social, health system, healthcare professional and screening procedure factors as important barriers and facilitators to health screening in men. In addition, it expands existing framework on factors influencing health screening uptake in men, incorporating male-dominant barriers and facilitators such as avoidance of femininity, heterosexual self-presentation and partner's role into the framework. The findings from this review also provide a better understanding of men's screening behaviour; they highlight the importance of considering the role of gender when advising men on health screening and when developing health policy on health prevention. The development of interventions to promote health screening should take into consideration the gender-specific barriers and facilitators identified in this review.

Conflict of Interest:

The authors declare that there is no conflict of interest.

Appendices:

Appendix A. Search strategy

Appendix B. Quality appraisal result (MMAT)

Appendix C. Male dominant criteria

Appendix D. Characteristics of included studies

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