


A systematic review of obesity as a barrier to accessing cancer screening services

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Abstract

Introduction: Obesity is a known risk factor for the development of cancers, and a significant proportion of the population may be at risk of developing cancer owing to their weight status. There is acknowledged societal stigma towards people living with obesity, which can influence health behaviors and deter help seeking, such as cancer screening. Healthcare professionals' attitudes and views toward people living with obesity may adversely affect the patient–professional interface and treatment.

Methods: A systematic review was carried out which aimed to explore the impact of living with obesity on the uptake of three main cancer-screening services: breast, cervical, and colorectal.

Results: Ten studies were included in the review. Three main areas were identified from both a patient and healthcare professional perspective: barriers and challenges to screening, gender issues, and disparities in the population living with obesity.

Conclusion: Further research is needed to improve uptake of cancer screening services, and for education on weight bias, which is often unconscious, to be considered for healthcare professionals working in cancer screening services. This may help to increase the incidence of early differential diagnosis of potential cancers and improve health outcomes for people living with obesity.

KEYWORDS

barriers, cancer screening, obesity

1 | INTRODUCTION

Obesity (BMI kg/m²) is a known risk factor for the development of cancers^{1,2} with evidence suggesting an increase in cancers such as breast in postmenopausal women, colorectal (higher risk in males), endometrial, esophageal adenocarcinoma, gall bladder, and renal.^{1,3} Gender differences in cancer risk among people living with obesity,

including the incidence of esophageal, liver, and colorectal cancer, due in part to disparities in body fat distribution between men and women,⁴ The rates of obesity have tripled globally since 1975, and as of 2016, the World Health Organization estimated there were 650 million people living with obesity.⁵ By 2030, the rates are predicted to increase to one in five women and one in seven men, meaning over 1 billion people across the globe will be living with obesity.⁶ Notably,

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the percentage of women with obesity is higher than that of men, highlighting a gender disparity among people with obesity. This could be due to an increase in the obesity rate observed in women post-menopause, or could also be related to the longer life expectancy among women than men.⁴

Many healthcare providers hold strong negative views and attitudes toward people with obesity who present in healthcare settings, with evidence to show that such viewpoints can influence perceptions about the patient, judgment, behavior toward the patients, and influence decision-making on treatment.⁷

Many negative healthcare encounters for people living with obesity may be associated with individual, subjective experiences, perceptions, anticipation, and internalization of weight stigma,⁸ with weight stigma, whether felt or enacted, negatively impacting on mental health.^{9,10}

People with obesity may be reluctant to seek healthcare interventions for fear of being stigmatized by healthcare professionals.¹¹ Studies show patient-reported experiences of being stigmatized by healthcare professionals¹² and also existing levels of negative attitudes and opinions toward people living with obesity by physicians and other healthcare professionals.^{13,14} A synthesis of 30 studies based in community and family physician settings (no specialist or hospital settings) found 12 studies focused on patient experiences and perspectives, 10 on professional experiences and perspectives, and 8 studies on patient and professional interaction. From each standpoint, it was consistently reported that obesity negatively influenced the patient–healthcare professional interface.¹⁵

This systematic review aimed to explore the impact of obesity and obesity stigma on access and uptake of cancer screening services through reviewing all literature on the subject within community and general practice settings where a high percentage of routine preventative screening takes place.

2 | METHODS

The protocol for the review was registered with PROSPERO database, reference CRD42021223378,¹⁶ and the report followed the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) statement.¹⁷

2.1 | Eligibility criteria

All types of studies were included except review articles, conference abstracts, and articles with no full-text access. Studies published between 2010 and 2020 and in the English language were included. Studies published outside the timeframe, or in other languages where an English translation was not provided were excluded. Studies which included people living with obesity ($\text{BMI kg/m}^2 = 30>$) and cancer screening were eligible for inclusion.

2.2 | Search strategy

Searches of the following electronic databases, PubMed, Google Scholar, HDAS, CINAHL, Web of Science, Medline, and EMBASE, were made. Combinations of the following key words were used in the searches: *obesity, weight, weight bias, stigma, cancer, screening, colorectal cancer screening, breast cancer screening, cervical cancer screening, lung cancer screening, screening uptake, people, public, and barriers*. Hand searches of gray literature were undertaken. Two members of the research team carried out two independent literature searches across the included databases.

3 | SCREENING, DATA EXTRACTION, AND DATA SYNTHESIS

Studies retrieved by the two researchers were downloaded into an Endnote[®] database (163 articles). Duplicates were removed, leaving a total of 152. The research team screened the abstracts of the studies for relevance, with 106 excluded following a consensus between all members of the research team. The full texts of the 46 remaining studies were divided among four members of the research team, who screened these articles, guided by the inclusion criteria and the Critical Appraisal Skills Program (CASP) Assessment tools to assess the credibility, rigor, and relevance of included studies. This quality assessment process was used not to exclude studies, but to allow results and conclusions from the review to be weighted accordingly. A final consensus was agreed by all members of the research team for studies to be included (see Figure 1).

4 | RESULTS

A total of 10 studies were included in the review (see Table 1). The studies were carried out across five countries, Australia ($n = 1$), Denmark ($n = 1$), Estonia ($n = 1$), France ($n = 2$), and the United States ($n = 5$). The majority of the studies involved survey methodology ($n = 6$), followed by qualitative studies ($n = 2$), mixed methods research ($n = 1$), and prospective cohort studies ($n = 1$). Studies examined both individual and multiple screening types, including colorectal ($n = 3$), breast ($n = 2$), cervical ($n = 1$), breast and cervical ($n = 3$), and breast, cervical, and prostate ($n = 1$). The findings from the 10 studies are grouped into five areas, namely; (1) barriers to screening from the patient perspective, (2) barriers to screening from healthcare professional perspectives, (3) gender issues, (4) disparities in the screening population living with obesity, and (5) issues specifically related to the population living with obesity. Two studies included both overweight and obesity but met the appraisal criteria and the aims of the review and were included.

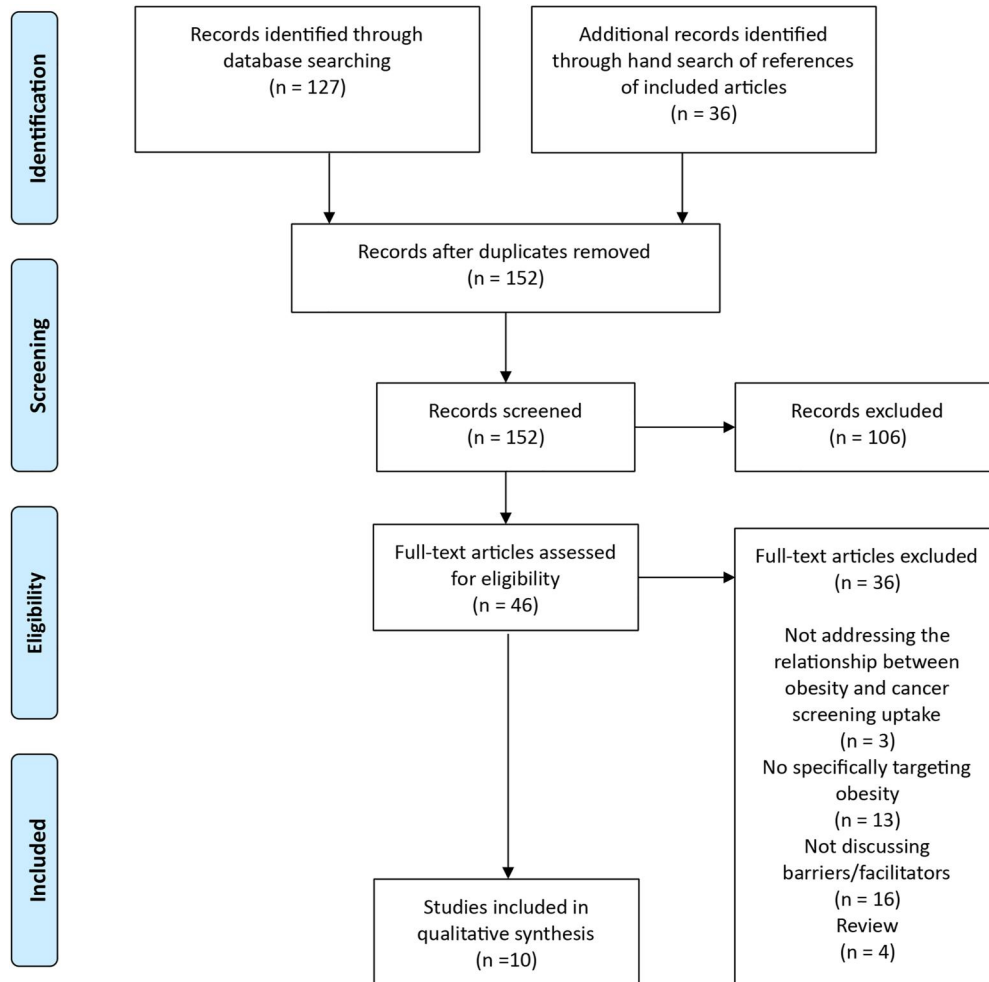


FIGURE 1 Search strategy

4.1 | Barriers to screening from the patient perspective

There were two qualitative studies^{21,24} which had self-reported views on barriers to cancer screening from the patient perspective, but the latter also included perspectives from healthcare providers. Primary research from the patient perspective allowed for a greater understanding of the experiences of the patient, which has the potential to inform service development in relation to reduce self-reported barriers to increase screening uptake rates.

A survey of colorectal cancer screening uptake found that people of all weights reported a lack of awareness of the need for screening as the biggest barrier to screening uptake.²⁶ Men with obesity in this study were more likely than their normal weight counterparts to report a lack of physician recommendation as a barrier to screening uptake, while women with obesity were more likely to report barriers related to the test experience such as pain and embarrassment.²⁶

Many of the barriers experienced by women with obesity were the same as women of normal weight, including modesty/embarrassment, fear of pain, competing demands/time, and a belief that they were at a low risk of developing cancer, and that the magnitude

of these barriers may be intensified as a result of weight-related issues and stigma.²¹

Focusing on women with obesity aged 45–80 and their views on breast cancer screening, McBride et al.²⁴ found three themes that emerged from the patient perspective; understanding and awareness of screening and the effect on participation (*family history, influencers, lack of priority, and fear of pain*), body image concerns and their impact on screening attendance (*body image concerns, self-consciousness, sensitivity, and attitude of radiographer*), and finally, negative experiences of screening as a potential barrier to future uptake of screening (*psychological or physical events, perceived impact on the radiographer*)²⁴ (see Table 2).

4.2 | Barriers to screening from healthcare professional perspectives

Two of the studies examined screening and people living with obesity from the perspective of healthcare providers, using qualitative methodologies which are useful for providing rich, descriptive narratives and underlying meanings.²⁸

TABLE 1 Studies included in the review

Ref	Title and author	Year	Country	Aim of study	Participant type and number	Type of study	Type of screening	Main findings	Recommendations
¹⁸	Family physicians' barriers to cancer screening in extremely obese patients Ferrante JM, Fyffe DC, Vega ML, et al. <i>Obesity</i> , 18(4):1153-1159	2010	USA	To better understand the barriers that family physicians face in performing breast and cervical screening examination in women living with higher levels of obesity	Family physicians (n = 270)	Mixed methods (interviews, n = 15 and surveys, n = 255)	Breast/cervical	<ul style="list-style-type: none"> Main barriers: Difficulty performing breast and pelvic exams Inadequate equipment, Challenges overcoming patient barriers and refusal of screening 	<p>Future interventions should focus on educating physicians on specific exam techniques, provision of adequate equipment and supplies, and identifying resources to assist with patient barriers and refusal of screening</p>
¹⁹	The determinants of cervical cancer screening uptake in women with obesity: Application of the Andersen's behavioral model to the CONSTANCES survey Franck JE, Ringa V, Coeuret-Pellicier et al. <i>Cancer Causes and Control</i> , 31(1):51-62	2020	France	To explore the clinical and healthcare related determinants of CCS uptake among women living with obesity	Women aged 25-65 years living with obesity (n = 2934)	Survey	Cervical	<ul style="list-style-type: none"> Women with obesity were more likely to uptake CCS if they had regular follow-up by a gynecologist, good quality of primary care, and comorbidities. Being older, single, having no children, having limited literacy, and financial strain were barriers to screening uptake. 	<p>Further efforts are needed to increase CCS uptake, including reducing obstacles to CCS among women living with obesity</p>
²⁰	Patterns of gynecological check-up and their association with Body Mass Index within the CONSTANCES cohort Franck JE, Ringa V, Rigal L, et al. <i>Journal of Medical Screening</i> , 10.1177/0969141320914323	2020	France	To identify patterns of gynecological check-up and regularity of breast and cervical cancer screening and the association of body mass index	Women aged 54-65 years (n = 6182)	Survey	Cervical/Breast	<ul style="list-style-type: none"> Women living with obesity were most commonly found to have no or inappropriate check-ups. Women living with obesity and overweight were screened for breast cancer more than cervical cancer and were not over-screened as often as normal weight women. 	<p>The healthcare system should adapt to be a more supportive and welcoming environment for women with obesity in order to increase cancer screening uptake.</p>

TABLE 1 (Continued)

Ref	Title and author	Year	Country	Aim of study	Participant type and number	Type of study	Type of screening	Main findings	Recommendations
21	Obese women's barriers to mammography and Pap smear: The possible role of personality Friedman AM, Hemler JR, Rossetti E, et al. <i>Obesity</i> , 24(8):1611-1617	2012	USA	To explore the perspectives of obese women in relation to barriers to both cervical and breast cancer screening	Women with obesity aged ≥ 40 (n = 51)	Qualitative (interviews n = 33, focus groups n = 18)	Breast/cervical	<ul style="list-style-type: none"> Barriers to screening included fear, modesty, competing demands, low perceived risk of cancer, insensitive comments from healthcare professionals, embarrassment, and unsuitable gowns and equipment. Personality traits such as self-motivation and self-discipline may play a role in some women with obesity overcoming barriers to screening. 	<p>Interventions are warranted to decrease weight bias in healthcare settings. Future research should explore the role of personality as a potential mediator in health behavior, including cancer screening uptake</p>
22	Body mass index and participation in organized mammographic screening: a prospective cohort study Hellman SS, Njor SH, Lyngø E et al. <i>BMC Cancer</i> , 15:294	2015	Denmark	To explore the association between BMI and breast cancer screening participation	Women aged 50-64 and free of cancer (n = 5134)	Prospective cohort	Breast	<ul style="list-style-type: none"> Underweight and postmenopausal women with obesity were less likely to participate in breast screening than women of normal weight. BMI was not related to screening uptake in premenopausal women. 	<p>Targeted information about breast cancer screening should be provided for women living with obesity and underweight postmenopausal women in an attempt to increase breast cancer screening uptake.</p>
23	Race moderates the relationship between obesity and colorectal cancer screening in women Leone LA, Campbell MK, Satia JA, et al. <i>Cancer Causes Control</i> , 21(3):373-385	2010	USA	To determine whether or not race moderates the relationship between CRC screening and obesity in women	White and African-American women aged ≥ 50 years of age (n = 7469)	Survey	Colorectal	<ul style="list-style-type: none"> White women with obesity were less likely to participate in colorectal cancer screening than white women of a normal weight (excluding fecal occult blood test where participation rates did not differ). Conversely, African-American women with obesity had a higher rate of colonoscopy than 	<p>Further qualitative research is warranted to explore how weight affects women's decisions regarding cancer screening.</p>

(Continues)

TABLE 1 (Continued)

Ref	Title and author	Year	Country	Aim of study	Participant type and number	Type of study	Type of screening	Main findings	Recommendations
24	Double discourse: qualitative perspectives on breast screening participation among obese women and their healthcare providers. McBride KA, Fleming CAK, George ES, et al/ International Journal of Environmental Research and Public Health, 16:534	2019	Australia	To identify facilitators and barriers in the uptake of breast cancer screening among obese women and to explore healthcare provider perspectives on service provision for breast cancer screening among obese women	Women aged 45–80 with obesity/healthcare providers (n = 29)	Qualitative	Breast	<p>African-American women without obesity.</p> <ul style="list-style-type: none"> White women with obesity had the lowest colonoscopy rates. Physician recommendation had the largest impact on screening uptake across all participants. <p>3 key themes were identified from women living with obesity which impacted on screening uptake:</p> <ul style="list-style-type: none"> Women living with obesity's awareness and understanding of screening Body image concerns among women with obesity Women living with obesity's negative screening experiences 2 key themes were identified from healthcare providers: <ul style="list-style-type: none"> Provider reported experiences with women living with obesity attending screening Providers do not see obesity as a barrier to screening 	<p>Novel health promotion strategies should be trialled to raise awareness of the increased risk of cancer among obese women. Improvements to the healthcare system are warranted including the provision of appropriate equipment for women with obesity, education for staff, and information for women living with obesity regarding issues like longer screening times due to increased weight.</p>

TABLE 1 (Continued)

Ref	Title and author	Year	Country	Aim of study	Participant type and number	Type of study	Type of screening	Main findings	Recommendations
25	Body Mass Index and screening for colorectal cancer: gender and attitudinal factors Messina CR, Lane DS, Anderson JCCancer Epidemiology. 35:400-408	2012	USA	To explore the association between BMI and colorectal cancer screening uptake, the role of gender in this relationship, and the impact of attitudes and perception about colorectal cancer and screening.	Women and men aged 50-75 (n = 1098)	Survey	Colorectal	<ul style="list-style-type: none"> Women with obesity and overweight were less likely to partake in colorectal cancer screening than women with normal weight. BMI category did not influence screening uptake in men. Women with obesity were less aware of the increased risk of colorectal cancer among people with obesity, and were less worried about colorectal cancer. 	<p>Future research is warranted to fully understand the process by which BMI affects colorectal cancer screening uptake. There is a need for interventions to increase awareness of the need for colorectal cancer screening, including discussions about weight-associated risk for colorectal cancer.</p>
26	National disparities in colorectal cancer screening among obese adults Seibert RG, Hanchate AD, Berz JP, et al American Journal of Preventive Medicine, 53(2):e41-49	2017	USA	To explore the uptake of colorectal screening among obese older adults and identify obesity-specific screening barriers.	Men and women aged 50-75 (n = 8550)	Survey	Colorectal	<ul style="list-style-type: none"> Men with severe and complex obesity were less likely to be up to date with screening. There was no difference in screening uptake among women according to weight status. Men living with obesity reported a lack of physician screening recommendation as the most important screening barrier. Women with obesity were more likely than women with normal body weight to report pain and embarrassment as a barrier to screening uptake. 	<p>Healthcare providers should recognize obesity-specific screening barriers and tailor strategies to encourage screening uptake in this population.</p>

(Continues)

TABLE 1 (Continued)

Ref	Title and author	Year	Country	Aim of study	Participant type and number	Type of study	Type of screening	Main findings	Recommendations
27	Use of mammography, Pat test and prostate examination by body mass index during the development period of cancer screening in Estonia Tekkel M, Veideman T, Rahu M Public Health, 125:697-703	2011	Estonia	To explore the uptake of breast, cervical and prostate cancer screening according to BMI	Men aged 50-64, women aged 25-64 (n = 7286)	Survey	Cervical/Breast/Prostate	<ul style="list-style-type: none"> Women with overweight were more likely to partake in breast cancer screening compared to normal weight women. women living with severe and complex obesity were less likely to partake in cervical cancer screening. Prostate examination did not differ according to BMI. 	<ul style="list-style-type: none"> Clinicians should ensure people living with obesity are referred for cancer screening due to the increased risk and worse prognosis people with a higher BMI

First, Ferrante et al. utilizing interviews, followed by a postal survey, found that physicians were reluctant to perform cervical smears on women living with obesity owing to inability to get women onto the examination table, lack of larger speculums, and other medical issues.¹⁸ Of the 255 physicians who took part in the survey, 11% stated that they did not perform cervical smears on women living with obesity. Many physicians found it difficult to palpate lumps in breast tissue (80%) and required extra time to perform breast examinations. Participants reported using specific techniques to examine women living with obesity, such as palpating breasts in a different manner to patients of a normal body weight. Physicians expressed a need for further education and training in examination techniques to facilitate breast and cervical screening in women with obesity.¹⁸

Second, McBride et al. found four themes that underpinned healthcare providers' experiences with breast screening in women with obesity; patient body size impacts on mammogram efficiency and safety (*size of breasts, problems positioning patients, technical difficulties, and patient comfort*), women with obesity cannot use mobile screening vans (*accessibility to enter van, small waiting room, and small changing rooms*), work health and safety (*ensuring provider safety in handling heavier bodies, potential increased physical manhandling*), and prioritizing quality imaging over patient considerations (*needing to ensure adequate compression*).²⁴ Providers reported feeling that weight was a difficult topic to discuss, there were other barriers such as cultural and lack of education, and that weight alone was not a barrier to screening²⁴ (see Table 3).

These studies identified strategies used to deal with the issues and/or barriers to screening given by patients, including continuous patient education, addressing fears and misconceptions, motivating patients to take care of themselves for the sake of their families, persistent engagement, referring to OB/GYN, using scare tactics, not persisting owing to feelings that the actions were futile, and asking patients to sign a waiver stating they have refused the screening offer.

4.3 | Emerging gender issues

There appeared to be issues around gender reported in nearly half the studies, which were noted to exist both with healthcare professionals and with patients.

4.4 | Physician involvement and likelihood of interprofessional referral

Female physicians were more likely to perform cervical smears in their offices, while male physicians reported fewer difficulties palpating pelvic masses and were less likely to report the incidence of embarrassment by female patients with severe and complex obesity. It was noted that male physicians were more likely to refer female patients who refused mammograms or cervical smears to OB/GYN colleagues¹⁸; the reasons for this are not known.

TABLE 2 Patient reported barriers and challenges to screening

Barrier	Studies (n = 3)
Modesty/embarrassment	21 (Friedman et al.) 24 (McBride et al.) 26 (Seibert et al.)
Fear of pain	21 (Friedman et al.) 24 (McBride et al.) 26 (Seibert et al.)
Competing demands on time	21 (Friedman et al.) 24 (McBride et al.)
Belief of being at low risk of developing cancer	21 (Friedman et al.)
Lack of awareness of the need for screening	24 (McBride et al.) 26 (Seibert et al.)
Lack of physician recommendation (discussed in more detail in Section 3.4)	26 (Seibert et al.)
Previous negative experiences of screening	21 (Friedman et al.) 24 (McBride et al.)

4.5 | Screening uptake and risk awareness

Women living with overweight and obesity were found to be less likely to undergo colorectal screening than women of normal weight, but this variation did not apply to men.²⁵ The reasons why less women with obesity are less likely to present for colorectal screening compared with men were not clear. It was also noted that women with obesity were less aware of the risks of obesity and development of colorectal cancer compared with women of a normal weight, suggesting that further education and awareness are needed in this group, who may be at increased risk.²⁵ In terms of reported motivations to attend screening, very few men replied to a survey question about what prompted them to have a prostate examination.²⁷ Men living with obesity reported a lack of physician screening recommendation as the most important barrier to uptake of colorectal cancer screening, whereas women with obesity were more likely to report pain and embarrassment as barriers.²⁶

Women living with mild obesity were more likely to have a mammography following a written invitation to attend screening than normal weight women, who generally attended on their own initiative.²⁷ Women living with severe obesity were most likely to have a cervical smear following a referral to screening by a doctor.²⁷ Women living with obesity were found to be less likely to routinely visit a gynecologist, and even when they did, they were less likely to be screened for cervical cancer than normal weight women.²⁰ Physician recommendation for screening was also found to be a key factor in colorectal cancer screening uptake among both women living with obesity and women with overweight or normal body mass index^{23, 26} and among men living with obesity.²⁶ A smaller number of men and women with obesity reported a physician recommendation

TABLE 3 Healthcare professional reported barriers and challenges to screening (all types)

Barrier	Studies (n = 2)
Lack of knowledge/difficulties performing examination techniques (breast and cervical) in women with obesity	18 (Ferrante et al.)
Lack of equipment which is suitable for women with obesity	18 (Ferrante et al.)
Lack of resources to support healthcare professionals to deal with and support women with obesity who are reluctant or refuse to undergo screening interventions	18 (Ferrante et al.)
Patient size impacts on mammogram efficiency and safety	24 (McBride et al.)
Patient inaccessibility to mobile screening vans	24 (McBride et al.)
Health and safety issues for the healthcare professional	24 (McBride et al.)
Maintaining quality of image against patient comfort	24 (McBride et al.)
Difficulties in discussing weight	18 (Ferrante et al.) 24 (McBride et al.)
Cultural	24 (McBride et al.)
Health and safety concerns (moving patients/ service users)	18 (Ferrante et al.)
Extra time needed to carry out breast examinations in women with obesity	18 (Ferrante et al.)

for colorectal cancer screening than those who were overweight or normal weight.²⁵ Physician recommendation with a discussion of personal risk for colorectal cancer was the strongest predictor of colorectal cancer screening uptake among both men and women of any weight,²⁵ highlighting the importance of physician recommendation and tailored information about cancer risk status in relation to screening uptake.

4.6 | Disparities in screening in the population living with obesity

Several studies highlighted disparities in the population living with obesity. A prospective cohort study of breast screening participation in women aged 50–64 years found that both women with underweight or obesity had significantly higher levels of non-participation with mammography compared with normal weight women, but this was limited to postmenopausal women, with no effect modification with hormone replacement therapy.²² A mechanism of sequence analysis was utilized, clustering to illuminate specific patterns of attendance and experience of gynecological diagnostic check-ups, within which obesity was specifically highlighted as a key determinant.²⁰ This encompassed an evaluation of the regularity of attendance in relation to breast and cervical cancer screening by 6182 women aged 54–65 years. Clear delineation was made between

women who were neglecting to attend regular gynecological check-ups and screening and those who were infrequent in their uptake of breast screening services. There was a clear differential between women living with obesity and overweight in terms of the cancer screening they accessed, with greater levels of uptake of breast screening as opposed to cervical cancer screening.²⁰ What was apparent from this study was the correlational evidence that the higher a woman's BMI was the statistically less likely she was to engage and uptake with cancer screening services.

In a parallel investigation, the specific determinants of cervical cancer screening uptake by women living with obesity were further explored. Factors precluding screening were identified, which included embarrassment, negative body image, and imaging with medical equipment, which posed a barrier to screening in practice.¹⁹ There was a reciprocal correlation between patients and their healthcare providers, both of whom acknowledged difficulties associated with obesity and cancer screening. Healthcare providers specifically identified pragmatic issues of the physical difficulty of performing pelvic examination and the generalized reluctance of women living with obesity to engage with cervical cancer screening. Stigma was a core identifiable preventable issue in relation to the negative attitudes toward women living with obesity, particularly for those women with extant comorbidities, which overshadow the need for regular and appropriate levels of preventative diagnostic screening. Several issues, which were reported as barriers to all types of screening for people living with obesity, were identified. It is acknowledged that some of these issues, for example, modesty and embarrassment, have also been shown to exist in the general population who seek cancer screening interventions but may have context-specific properties related to weight and body size (see Table 4).

5 | DISCUSSION

This systematic review aimed to explore the impact of obesity and obesity stigma on the access and uptake of cancer screening services. None of the included studies referred to the concept stigma of obesity. The studies did, however, discuss situations and experiences, which are a result of the consequences of stigma, giving clear evidence that there is stigma present in cancer screening situations. The findings of this review show that excess weight is a barrier to accessing cancer screening services for both sexes. The review highlighted the importance of healthcare professionals to understand the concerns and fears of people living with obesity when attending for cancer screening, whether perceived or real, for example, feeling stigmatized, and make every attempt to ensure that facilities are weight-friendly, from equipment, language used, and overall environment.

The review also identified that many healthcare professionals were not comfortable or experienced in undertaking screening procedures with people living with obesity, and that education on techniques for performing screening interventions with this population, along with learning how to deal with refusals and other barriers,

TABLE 4 Issues specifically related to the population living with obesity

Barrier	Studies (n = 4)
Embarrassment/modesty	19, 23, 25, 27
Reluctance to get undressed	19
Restricted mobility/range of motion	19, 27
Fears of equipment not being able to accommodate or fit people with obesity	19, 23, 27
Will only see a specific physician	19
Experience of previous stigma from healthcare providers	19, 25, 27
Too hard to enter the office/examining room (lack of space, room layout, etc.)	19, 27
Healthcare professionals' misconceptions of the impact of weight on a patient/service user accessing of screening	27
Fear of cancer	19, 25
Avoidance of a discussion about their weight	19
Competing demands on time	25, 27
Fear of pain	19, 23, 25, 27
Belief of low risk of cancer//lack of awareness of increased risk of cancer	25, 27, 35
Guilt	25
Understanding and awareness of screening	23, 27
Physician recommendation/written invitation for screening	23, 35, 36, 38

and providing a supportive environment which is weight-friendly is needed.

The anatomical differences documented between those of a high BMI (kg/m^2) versus their low or average BMI counterparts is another historically reported issue, particularly in relation to breast screening and processes of physical examination.²⁹ This issue not only acts as an actual and potential barrier to the uptake of screening by patients with obesity but also influences the likelihood of healthcare professionals being able to achieve valid and reliable diagnostic imaging procedures and, in some cases, to be confident in carrying out physical examinations in people with a higher BMI. This review consolidates these findings and highlights the need to consider further training and education when screening people living with obesity.

The findings of this review draw together the corpus of literature as related to the concept of weight as a barrier to access and uptake of cancer screening services. Most concerning is the historical existence of research detailing this, which yet remains largely unaddressed in consequent research within the field.³⁰ A 2008 review of cancer screening in women with obesity, including 32 studies (10 breast, 14 cervical, and 8 colorectal), showed a relationship between decreased cervical cancer screening and increased body size, with the association occurring more often in white than black women in breast screening.³¹

With colorectal cancer screening, some studies reported body size impacting on screening and others reporting no impact, with authors suggesting that efforts to address barriers to increase uptake in all three screening programs for women with obesity are warranted.³¹

Weight, obesity, and weight gain account for 20% of all cancers, with weight loss, especially in postmenopausal women, reducing risk for breast cancer, with a small body of evidence to suggest poor outcomes after breast cancer in women with obesity.³² A retrospective cohort study of 35 women showed that women with obesity were less likely to present for follow-up mammogram appointments and recommended strategies to reduce barriers related to weight to improve attendance.³³ Franck et al.³⁴ highlighted the significant barriers perceived by women living with obesity and overweight and the need for a radical overhaul of healthcare infrastructures, which were supportive and empowering in their approach to the early identification, assessment, diagnosis, and long-term management of cancer.

A systematic review of 11 studies examining the association between obesity and cancer screening found that women with obesity were less likely to access cervical screening, but this was only seen in white women, and not in black women.³⁵ This was also found in the study on race, obesity, and colorectal screening included in our systematic review,²³ which revealed that women living with obesity have some of the lowest levels of detection and highest risks of cervical cancer, which was found in other studies.³⁶ A retrospective review of 1080 cases of cervical screening in a single center, with 29.5% ($n = 311$) women living with obesity, and 10% ($n = 107$) women living with severe and complex obesity, found a significant association between BMI and cytology screening was evidenced with the severe and complex cohort having the highest incorrect rate (64.4%), followed by women living with obesity (51.5%). Findings suggest that women living with obesity and severe and complex obesity have disproportionate inappropriate screening before cervical cancer diagnosis, and women living with severe and complex obesity have worse overall survival rates than normal weight counterparts.³⁷ This raises important potential areas for future research in relation to the availability of cancer screening, which is context-specific and situationally determined for many women.

A study from 2004 showed that after adjusting for variables, such as age, insurance status, race, and smoking status, men with overweight and obesity were more likely than men of normal weight to have undergone colorectal screening. Women with obesity were less likely to have been screened compared with women of a normal weight³⁰ demonstrating that the situation has largely remained the same. Similarly, having financial strain was identified as a barrier to screening uptake,³⁸ and there was a clear disparity between White and African-American women in colorectal screening uptake, particularly with regards to colonoscopy uptake.³⁹ The impact of race is an area for future exploration, as encouraging screening uptake across all populations is key to increasing early cancer detection; thus, gaining an understanding of the underlying reasons behind this disparity will be imperative.

This systematic review was undertaken during the COVID-19 pandemic, and the studies included in the review were all

undertaken before March 2020. During this time, screening services globally were adversely affected, with services postponed or decreased, with many patients worried about the risks of infection.³⁴ During this time, evidence showed that overweight and obesity predispose to severe symptoms and negative prognosis of COVID-19.³⁹ Studies have found that people living with obesity who contract COVID-19 are likelier than people with normal weight to require intensive mechanical ventilation.⁴⁰ The COVID-19 pandemic has also highlighted the need to examine how people living with obesity potentially face an exacerbation of those characteristics associated with weight stigma, such as how people's coping mechanisms, the potential of binge eating and anxiety and mental health may be impacted upon by the need for social isolation.³⁸ This study raises important implications for our own in terms of whether healthcare access for people living with obesity we focus upon is also further impacted and exacerbated by the global pandemic. With restart strategies now underway,⁴¹ the potential impact of the risks of obesity and COVID-19 may be a further barrier to screening uptake in a population where the actual uptake has been shown to be low.

The pandemic negatively disrupted routine clinical care, with cancer programs such as screening no exception. Many programs were canceled or postponed, especially in 2020, a period of isolation measures such as lockdowns put in place to contain the spread of the virus.⁴² These measures left people without access to recommended routine screening interventions, which were suggested to impact patients, healthcare professionals, and healthcare systems.⁴³ In the United States, men and black people were disproportionately affected by decreased colorectal cancer screening, and to redress this deficit, it is estimated that rates of colorectal cancer screening need to increase by 50%.⁴²

Although many screening programs have resumed, the long-term impact of the pandemic on cancer screening and the prevalence of cancer as a result is not yet known.⁴¹ A systematic review of the impact of the pandemic on colorectal cancer diagnosis and treatment, found a reduction in diagnosis and treatment, and that redressing the deficit requires strong and effective action to prevent negative consequences such as the number of people with advanced stages of cancer, potential increased treatment costs, quality of life and survival rates.⁴³ At the time of writing this review, no studies examining the impact of the pandemic and screening for people living with obesity were identified.

The strengths of this review were the systematic and rigorous approach to the identification, screening, and selection of key literature to understand obesity and its impact on the access and uptake to cancer screening services. Limitations of this review are that the studies included in this review were carried out before the COVID-19 pandemic, and the findings may not be applicable in the context of the current climate with factors such as social distancing and other infection-control mandated regulations in place in the majority of countries. As there is no consensus on infection control measures globally, we acknowledge there is variance in the impact of the pandemic with respect to screening programs. This study was also limited by the exclusion of articles not available in the English language,

meaning that some key issues may have been missed if studies were published solely in another language.

The findings should be considered in the context of the healthcare systems in the countries in which the studies took place, as there are varying healthcare systems globally that may differ from the UK National Health System free at point of access care where this review was carried out.

Based on the findings of this review, the following recommendations should be taken into consideration. The review identified a paucity of studies from both patients living with obesity and healthcare professional perspectives which would illuminate subjective individual experiences, and subsequently give context and meaning to inform the development of future service development and professional education to support people living with obesity and cancer screening access and uptake. Further qualitative studies should be undertaken with both patients and healthcare professionals, to further understand barriers, enablers, and the lived experience of people who have the potential to access cancer screening services, and healthcare professionals who carry out these services.

Training and education on obesity stigma and its consequences should be developed and carried out with healthcare professionals working in screening services. Screening information and other promotional materials (printed, website, etc.) should be reviewed to ensure that the language is "people-first"^{44,45} and that any potential concerns regarding weight stigma are identified and addressed prior to screening taking place. In addressing the excessive mortality of these women, raising awareness of the need to educate both healthcare providers and women living with obesity is fundamental to cultural and contextual change management interventions.

The wider impact of the pandemic on cancer screening services is currently in the early stages of investigation. The risks associated with obesity and related comorbidities in the context of COVID-19 and social distancing rules may be a further contributing factor to an already low uptake of screening services in the population living with obesity. It is recommended that these risks and potential resultant fears be taken into consideration when planning and promoting screening, to put the risk in perspective, and reinforce the safety and social distancing regulations that are in place to minimize spread of infection, allay concerns, and demonstrate that it is safe to be screened.

6 | CONCLUSION

The findings of this study reaffirm a paucity of research in relation to obesity stigma and the corresponding decrease in uptake of cancer screening opportunities. This has the direct implication that the early clinical interventions needed to assess, diagnose, and treat common cancers may be avoidably delayed with the consequential outcome of adverse outcomes and increased cancer mortality for those living with obesity. Existing literature provides a broad basis for the understanding of the physiological and anatomical impact of obesity in society but minimal insight into lives lived within a

judgmental and value-laden society. The integration of learning opportunities for those working with people living with obesity is essential if these assumptions and presuppositions are to be challenged in practice, where the desired outcome is to improve the numbers of people engaging with the cancer screening opportunities afforded to them. The intersectional differences in perception of screening on behalf of patients living with obesity and healthcare professionals are profound and are reflective of wider societal stigma. While actual anatomical and physiological differences impact upon healthcare professionals' capacity and capability in relation to optimal screening, it is actually a shift in psychological perspectives for both those living with obesity and the professionals caring for them that lies at the heart of a service that ought to be equitable, compassionate and understanding of the need for optimal cancer screening provision.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

YG, CH, HY, and JC designed the review. YG and HY carried out independent searches. All authors were involved with the selection of studies included in the review, writing of the manuscript, and approved the submission.

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