

Enablers and barriers to workplace breastfeeding in the Armed Forces: a systematic review

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ABSTRACT

Introduction The UK has no legislation protecting employees' access to breastfeeding facilities. Without specific breastfeeding policy, provisions to access workplace facilities can be inconsistent and negatively impact employees' breastfeeding duration, retention and morale, particularly servicewomen who work in varied and demanding military environments. This is an important policy area for the British Army to retain talented and trained soldiers.

Methods Using Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement principles, PubMed, Embase, CINAHL and Pro-Quest Databases were searched for studies relevant to accessing appropriate breastfeeding facilities in UK workplaces and high-income countries' Armed Forces. Factors acting as barriers and enablers to accessing facilities were identified. UK government and Armed Forces' websites were searched for grey literature on existing policies and guidance for accessing facilities.

Results Barriers and enablers to access from 16 studies were described by three thematic areas: attitudes to breastfeeding, facility provisions and use of facilities. Factors which employers could influence included specific breastfeeding policy, universal workplace education, existence of suitable facilities and individualised breastfeeding plans. The key areas for policy development identified were clearly defined responsibilities; individualised risk assessments and breastfeeding plans; appropriate, but flexible, facility provision and access; signposting of relevant workplace accommodations; and physical fitness provisions.

Conclusions Five recommendations are presented: development, implementation and evaluation of breastfeeding policy; universal workplace breastfeeding education; the need for breastfeeding risk assessments and plans based on individual breastfeeding practice; written minimal and ideal standards for breastfeeding facilities and access, which considers workplace locations; and exceptions from deployment and physical fitness testing.

INTRODUCTION

The World Health Organisation (WHO) recommends exclusive breastfeeding for six months and continuation, alongside solids, to the age of two years.^{1 2} Breastfeeding benefits infant^{3 4} and maternal long-term health,⁴⁻⁶ employee presenteeism⁷ and retention.^{8 9} However, for many complex demographic,¹⁰ cultural¹¹ and socioeconomic reasons,^{12 13} United Kingdom (UK) breastfeeding rates are among the world's lowest.¹⁴ The UK is one of 15/56 high-income countries (HICs) without legislation guaranteeing suitable workplace

Key messages

- ⇒ Facilitating breastfeeding on return to work (RTW) benefits the maternal and infant physical and mental health, and can improve employee presenteeism, loyalty and retention.
- ⇒ More research and evaluation of breastfeeding servicewomen in the United Kingdom (UK) Armed Forces or other militaries around the world are needed to better support this population.
- ⇒ A single, easily accessible breastfeeding-specific policy or guidance document that clearly states minimum and optimal standards is required for both servicewomen and commanders.
- ⇒ Facility access and appropriateness are improved by ensuring individual risk assessments and breastfeeding plans, which account for individual circumstances and career group requirements, are undertaken.
- ⇒ Organisational cultural acceptability of breastfeeding is influenced by universal workplace, commander and medical chain education covering breastfeeding on RTW specific to the setting.
- ⇒ Effective peer support and empowerment of breastfeeding servicewomen to address the unique challenges faced could be achieved through a military-specific breastfeeding network.

facilities or breastfeeding breaks.^{15 16} The only relevant legislation states: '*Suitable facilities shall be provided (for) a nursing mother to rest.*'¹⁷ This must not be the toilets.^{18 19} Consequently, access to suitable workplace breastfeeding facilities varies significantly. These uncertainties can delay maternal return to work (RTW) or shorten breastfeeding duration.^{12 20} Societal expectations of servicewomen, periods of separation, physical fitness requirements, deployments and hazardous environmental exposures²¹ make Armed Forces RTW breastfeeding even more complex.

All nations' servicewomen have similar roles, but differences in working conditions and breastfeeding provisions mean recommendations²² from other militaries are not always transferable to the British Army. Although UK triservice policy advocates private safe spaces with breastmilk storage,²³ in reality, breastfeeding expectations and provisions depend on individual commanders' approaches. Such uncertainties may contribute to decisions to terminate service or resentfully cease



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Table 1 Study characteristics

	Author	Publication year	Study design	Studies reviewed	Workplace	Relevant main outcomes	Critical appraisal score
HICs' Armed Forces	Croft ²²	1995	Literature review	16	British Army	Occupational environmental exposures health risks to breastfeeding mothers and their infants	0.7
				Sample size	Population		
	Bales <i>et al</i> ³⁵	2012	Cross-sectional telephone survey	43 servicewomen 211 service spouses	USAF base mothers	► Barriers and facilitators to meeting personal breastfeeding goals.	0.7
	Bell and Ritchie ³⁶	2003	Cross-sectional qualitative	85	US military TRICARE facility stakeholders	► Impact of workplace lactation support services on breastfeeding duration.	0.6
	Bristow ⁴³	1999	Cross-sectional qualitative	4	US servicewomen, all branches	► Workplace breastfeeding facilitators and barriers.	0.8
	Harlow ⁴⁴	1998	Cross-sectional written survey	64	US servicewomen, all branches	► Facilitators and barriers to breastfeeding initiation and workplace continuation.	0.9
	Martin <i>et al</i> ³⁷	2015	Cross-sectional online survey	318	US servicewomen, all branches	► Perceptions of breastfeeding in the workplace. ► Workplace Breastfeeding Support Scale score.	0.8
	Sleutel ³⁸	2012	Cross-sectional qualitative	1	US Army servicewomen	► Breastfeeding experiences in firm-based and deployed locations.	0.4
	Stevens and Janke ³⁹	2003	Cross-sectional qualitative	9	USAF servicewomen	► Workplace breastfeeding experiences.	0.7
	Stewart ⁴⁰	2015	Cross-sectional online survey	152	Australian Defence Force (ADF) servicewomen	► Impact of differing RTW and breastfeeding models on breastfeeding duration. ► Causes of RTW breastfeeding cessation.	0.9
	Uriell <i>et al</i> ⁴¹	2009	Cross-sectional online survey	7121 personnel 2195 breastfeeding servicewomen	US Naval personnel and breastfeeding servicewomen	► Causes of RTW breastfeeding cessation.	0.9

Continued

Table 1 Continued

	Author	Publication year	Study design	Studies reviewed	Workplace	Relevant main outcomes	Critical appraisal score
UK	Gatre ³⁰	2007	Cross-sectional qualitative	20	Professional or managerial breastfeeding mothers	<ul style="list-style-type: none"> ▶ Workplace breastfeeding experiences. ▶ Impact of personal perceptions of working environment on breastfeeding behaviours. 	0.8
	Hawkins <i>et al</i> ³¹	2007	Cohort study	6917	Employed and unemployed mothers	<ul style="list-style-type: none"> ▶ Breastfeeding duration by work pattern. 	0.9
	Kosmala-Anderson and Wallace ³²	2006	Cross-sectional online survey	46	Postpartum public-sector employees	<ul style="list-style-type: none"> ▶ Experiences of workplace breastfeeding support. 	0.6
	Skafida ³³	2011	Cohort study	5127	Employed and unemployed Scottish mothers	<ul style="list-style-type: none"> ▶ Causes of cessation at 10 months. 	0.8
	Wallace <i>et al</i> ³⁴	2008	Cross-sectional online survey	296	Breastfeeding employees	<ul style="list-style-type: none"> ▶ RTW breastfeeding experiences. ▶ Supportive factors and barriers to effective workplace breastfeeding. 	0.7
	Zilanawala ⁴²	2017	Cohort study	17 397	Employed and unemployed mothers receiving child benefit	<ul style="list-style-type: none"> ▶ Breastfeeding rates at 9 months by work pattern. 	0.7

HIC, high-income country; RTW, return to work; USAF, US Airforce.

breastfeeding.²⁴ The proportion of trained and talented women, who the British Army need to retain,²⁵ is ever increasing, and with 6.4% taking maternity leave annually,²⁶ breastfeeding policy is required. This review identifies barriers and enablers to accessing appropriate workplace breastfeeding facilities and the relevance of these factors to the British Army.

METHODOLOGY

A literature review was undertaken in 2017 in accordance with ethics approval. Standardised Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement²⁷ principles were adhered to. To account for occupational circumstances and UK workplace legislation, the search strategy combined UK workplaces and English-speaking HIC military breastfeeding studies, existing policy and guidance. Databases searched included the Cochrane Library, CINAHL, PubMed, Embase and PRO-Quest Military Collection (Supplement S3). The World Bank's definition of an HIC, as one with a per capita income of \$12 476 or more, was used. The UK Government and British-speaking Defence sites were searched for publicly available grey literature (Supplement S4). To improve search sensitivity and to ensure comprehensive study inclusion, common synonyms and Boolean operators for key concepts were used; Breastfeeding, Employment, Barrier, Enabler, Facilities and Military. Search specificity was improved following a pilot, by making 'breast' a mandatory term (Supplements S1 & S2).

Inclusion criteria for UK workplace studies were English language and peer-reviewed journal publication post-2006. HICs Armed Forces studies were limited; therefore, all publicly available studies and theses, of any age, with a formal review and ethics process, were included. For English language policies and guidance, newest versions were sought. Opinion pieces, news stories, informal advice, social media recommendations, and studies focusing on healthcare professionals (HCPs) or partner outcomes were excluded. All search results details were exported into Endnote V.X7.5 and duplicates were removed. Remaining abstracts and documents were scanned for suitability, and results are displayed in Tables 1–4.

Study quality was assessed using validated Critical Appraisal Skills Programme tools²⁸ for literature reviews, cohort and qualitative studies; the Strengthening the Reporting of Observational Studies in Epidemiology checklist assessed bias in cross-sectional studies (Supplement S5).²⁹ As each tool assessed a differing number of elements, the mean average score was calculated; each element scored fully (1.0), partially (0.5) or not (0) achieved. Mean scores were used to grade study quality as unsatisfactory (0–0.4), satisfactory (0.41–0.7) or good (0.71–1.0).

RESULTS

Figure 1 illustrates primary search strategy results.²⁷ Table 1 details the 16 included studies' characteristics, risk of bias and quality. Due to limited study availability, one unsatisfactory

Table 2 Factors enabling access to appropriate facilities

	Croft ²²	Bales et al ²⁵	Bell and Ritchie ³⁶	Bristow ⁴³	Harlow ⁴⁴	Martin et al ³⁷	Sleutel ³⁸	Stevens and Janke ³⁹	Stewart ⁴⁰	Uriell et al ⁴¹	Gatrel ³⁰	Hawkins et al ³¹	Kosmala-Anderson and Wallave ³²	Skafida ³³	Wallace et al ³⁴	Zilmanawala ⁴²	Total
Attitudes to breastfeeding																	
Initiation and duration		x	x	x	x	x	x	x			x	x	x	x		x	11
Acceptability			x	x	x	x	x					x	x				4
			x	x	x	x	x					x	x				7
			x	x		x	x					x	x				7
			x	x	x	x		x				x	x				10
Affordability			x	x		x	x										4
	x			x											x		2
Expectations		x	x	x	x	x	x					x	x		x		9
	x	x	x		x												3
	x			x		x	x	x							x	x	7
Availability			x	x		x			x				x	x	x		7
		x															2
			x										x				4
			x	x									x		x		2
			x	x				x		x			x		x		8
Suitability			x	x						x			x		x		6
			x	x			x						x		x		4
																	6
																	4
																	2
																	8
																	6

Continued

Table 2 Continued

		Croft ²²	Bales <i>et al</i> ²⁵	Bell and Ritchie ³⁶	Bristow ⁴³	Harlow ⁴⁴	Martin <i>et al</i> ³⁷	Sleutel ³⁸	Stevens and Janke ³⁹	Stewart ⁴⁰	Uriell <i>et al</i> ⁴¹	Gatrel ³⁰	Hawkins <i>et al</i> ³¹	Kosmala-Anderson and Wallave ⁴²	Skafida ³³	Wallace <i>et al</i> ³⁴	Zilanawala ⁴²	Total
Use of facilities	Knowledge			x				x						x				3
	Timely knowledge of facilities																	3
	Actioned risk assessment and breastfeeding plan	x	x					x										3
Access	Role allowing work schedule self- management				x		x		x	x	x					x	x	7
	Unrestricted access to facilities										x			x				2
	Formally agreed breastfeeding breaks			x							x							4
	Advance planning for changes to working location or pattern						x	x								x		4
	Flexible-working provisions						x		x					x	x	x	x	6
Support	Workplace breastfeeding support network						x										x	3
	Workplace support to access facilities				x		x				x			x	x			7
	Medical chain support for breastfeeding		x	x	x	x	x											6

Table 3 Barriers to accessing appropriate facilities

		Croft ²²	Bales <i>et al</i> ³⁵	Bell and Ritchie ³⁶	Bristow ⁴³	Harlow ⁴⁴	Martin <i>et al</i> ³⁷	Sleutel ³⁸	Stevens and Janke ³⁹	Stewart ⁴⁰	Uriell <i>et al</i> ⁴¹	Gatrell ³⁰	Hawkins <i>et al</i> ³¹	Kosmala-Anderson and Wallace ³²	Skafida ³³	Wallace <i>et al</i> ³⁴	Zilanawala ⁴²	Total
Attitudes to breastfeeding	Initiation and duration																	
	Maternal attitudes																	
	Practical difficulties expressing																	
	Negative perceptions of workplace breastfeeding																	
	Lack of knowledge about breastfeeding at work																	
	Lack of workplace support																	
	Financial costs of facilities																	
	Career ramifications																	
	Perceived impact on workplace effectiveness																	
Provision of appropriate facilities	Unrealistic expectations for provisions																	
	Lack of HCP workplace breastfeeding advice																	
	Non-existent facility																	
	Actual or expected changes to workload, working location or pattern																	
	Lack of workplace breastfeeding research																	
	Lack of policy or awareness of it																	
Suitability	Unsuitable location for breastfeeding																	
	Hazardous occupational environmental exposures																	
	Lack of suitable amenities																	
	Lack of breastmilk storage or logistical challenges transporting it to infant																	

Continued

Table 3 Continued

	Croft ²²	Bales et al ²⁵	Bell and Ritchie ³⁶	Bristow ⁴³	Harlow ⁴⁴	Martin et al ²⁷	Sluiter ³⁸	Stevens and Janke ³⁹	Stewart ⁴⁰	Uriell et al ⁴¹	Gatrell ³⁰	Hawkins et al ³¹	Kosmala-Anderson and Wallace ³²	Skafida ³³	Wallace et al ³⁴	Zilanawala ⁴²	Total
Use of facilities																	
Knowledge			x	x									x			x	4
Lack of knowledge of available facilities																	
Male-dominated workplace						x					x				x		3
Supervisor unaware mother is breastfeeding			x														1
Access																	
Access to facilities physically restricted							x			x						x	4
Occupational stress or high workload		x				x		x		x					x	x	6
Lack of time			x			x		x		x			x				6
Non-standard working patterns								x		x					x	x	4
Support																	
Tolerance of negative workplace behaviours										x							2
Separation from external support network		x						x		x		x				x	7
Lack of workplace support									x						x		9
HCP, healthcare professional.																	

quality study was included; however quality was considered in the discussion. Fourteen studies were peer-reviewed^{30–41} (1995–2017),^{22,42} including two US theses (1998–1999).^{43,44} Six studied UK mothers^{30–34,42} and 10 HIC servicewomen,^{22,35–44} of which 80% were US-centric. Differences in gender, ethnicity and role composition made studies less representative of a contemporaneous British Army, demonstrating why a review was required.

Study design varied significantly and included one literature review of otherwise not-included studies²²; three large UK^{31,33,42} population cohort studies; seven quantitative cross-sectional studies, using online,^{32,34,37,38,41} written⁴⁴ or telephone surveys³⁵; and five cross-sectional qualitative studies, using interviews^{30,36,39} servicewomen^{30,38,39,43} or stakeholder³⁶ narratives.^{38,43} Only three recognised limitations of recall bias in cross-sectional studies, especially where workplace recollections may be corrupted by overall breastfeeding experience. Only two addressed^{33,41} selection bias and temporality⁸ of including only currently working mothers^{30,32,34,35,37–41,43}; excluded mothers may delay RTW to breastfeed longer. UK civilian employees may also differ from servicewomen; characteristics which drive enlistment may also influence responses to breastfeeding barriers.

Differing study methodologies, sizes (range 1–17 597 mothers) and outcomes measures limited comparability and accurate quantification of factor dominance or breastfeeding outcome. Additionally, no single concept of access model⁴⁵ could be used to explain all identified factors or their interconnectivity. However, inclusion of multiple complementary study designs offered scope to identify a more comprehensive range of enabling factors and barriers (Tables 2 and 3).⁴⁶ Findings were based only on factors which emerged from thematic analysis of the included studies and therefore may not be exhaustive. All themes interacted through feedback loops within a complex system. While some connections were explored, conclusions drawn may oversimplify, may not fully explain or may underestimate the root cause factors influencing access to breastfeeding facilities.

Table 4 details characteristics of the 16 RTW policy and guidance documents. Table 5 identifies the five key areas from policy analysis, in which recommendations can be made: employer, employee and medical responsibilities; individualised risk assessments and breastfeeding plans; requirements for breastfeeding facility provision and access; provisions for RTW physical fitness; and workplace accommodations.

Attitudes

The most common enabler to accessing breastfeeding facilities, identified by six military^{35,37–39,43,44} and five UK studies,^{30–33,42} was maternal motivation to reach a predetermined goal. Maternal disclosure of breastfeeding status, as well as behaviour actively seeking access to breastfeeding facilities on RTW, was positively influenced by actual or perceived supervisor, military HCP^{35–38,43,44} or colleague support.^{30,32,34,36,37,39,42–44} Workforce acceptance was strongly influenced by knowledge of the benefits of breastfeeding to the employer.^{37,38,43}

Lack of support,^{33,34,37,39,41} workplace pressure to stop and separation from external breastfeeding support networks all reduced breastfeeding duration.^{31,35,39,41–44} Hostile behaviours^{30–41} were fuelled by limited employer education and subsequent misconceptions.^{30,32,34,37,41} These included maternity leave being the only acceptable time and place to breastfeed,^{40,43} support for breastfeeding conveying a subversive feminine organisational image³² and negatively impacting workforce effectiveness.^{30,32,33,39,43} Military studies identified concerns that breastfeeding could threaten operational deployability and capability, but all concluded

Table 4 Characteristics of breastfeeding policy and guidance documents

Owner	Document type and target audience	Publication year	Main purpose
HSE ¹⁸	Guide for UK mothers during pregnancy or on RTW	2013	► Informing employees of health and safety at work legislation protecting pregnant and breastfeeding mothers.
ACAS ¹⁹	Guide for UK employees and employers on accommodating workplace breastfeeding	2017	► Guidance on managing workplace breastfeeding requests and the legislation and good practice recommendations for facilities.
NHS ⁵¹	Information for breastfeeding mothers on RTW	2008	► Information for mothers about continuing breastfeeding on RTW. ► A resource to show employers.
MOD ⁵⁹	Leave policies for UK service personnel	2016	► Policy on all leave types, including maternity leave.
MOD ⁴³	Health and safety in defence policy	2016	► Policy on health and safety requirements for service personnel
The Royal Navy ⁶⁰	Personnel management policies	2016	► Policy on personnel management, including pregnant and postpartum servicewomen.
RAF ⁵²	Guide for pregnant and postpartum servicewomen	2014	► Handbook for pregnant and postpartum servicewomen on RTW.
RAF ⁵³	Pregnancy and postpartum guide for CoC	2017	► Handbook for pregnant and postpartum servicewomen's CoC.
USAF ⁵⁴	Medical care management instruction	2017	► Guidance on the medical care and management, including of pregnant, postpartum and breastfeeding servicewomen.
USAF ⁴⁴	COC memorandum for deployment and physical exercise deferment	2015	► Guidance on extending posting, deployment or physical assessment deferrals.
US DOD ⁴⁸	US Army memorandum to breastfeeding support policy for servicewomen and the CoC	2016	► Policy on provisions for access to appropriate breastfeeding facilities. ► Outlines individual, CoC and medical chain responsibilities. ► Provides paperwork for an individualised breastfeeding plan.
DOD ⁴²	US Army breastfeeding support plan for servicewomen and the CoC	2016	► Universal educational on breastfeeding. ► Guidance for supporting workplace breastfeeding. ► Provides paperwork for a workplace breastfeeding plan.
US Coast Guard ⁵⁵	Pregnancy and postpartum policy	2016	► Policy on managing pregnant and postpartum servicewomen.
DOD ⁵⁶	US Marines pregnancy and postpartum policy	2004	► Policy on managing pregnant and postpartum servicewomen.
DOD ⁵⁷	US Naval pregnancy and postpartum instruction	2007	► Policy on managing pregnant and postpartum servicewomen.
RAAF ⁴⁹	Line managers handbook for managing breastfeeding mothers	2014	► Guidebook for managers on breastfeeding, breastfeeding practices and different management models for breastfeeding in the workplace.

ACAS, Advisory, Conciliation and Arbitration Service; CoC, Chain of Command; DOD, Department of Defense; HSE, Health and Safety Executive; MOD, Ministry of Defence; RAAF, Royal Australian Air Force; RAF, Royal Air Force; RTW, return to work; USAF, US Airforce.

long-term benefits for retention needed to be recognised.^{36 39 44} Workplace attitudes can be addressed by changing organisational culture and adopting protective breastfeeding-specific policies.^{31 32 34 36–38 43}

Facility provision

Organisational policies for provision,^{30 32 34 36 38} knowledge of and facility existence^{32 36 38} are prerequisites for access.^{32 34 36} However, without national legislation and sufficient research on RTW breastfeeding, policy development often stalls.^{31 37} All studies identified timely knowledge of workplace facility existence as vital in preventing mothers prematurely ceasing breastfeeding on false assumptions. This was most common in male-dominated organisations,^{30 32 35 42 43} as was maternal concealment of breastfeeding, which prevented supervisors from facilitating appropriate access.^{22 35 38 43}

Restricted physical access, through limited opening times for mothers working non-standard hours,^{39 41 42} or need of a key,³⁴ was a barrier. Advance warning of changes in working patterns, hours⁴² or location^{37–39} enabled arrangements for ongoing access to be made. Where employers offered only indirect breastfeeding facilities, mechanical,^{32 41} psychological^{33 39 43 44} and financial³⁹ difficulties transitioning from direct breastfeeding were frequently cited barriers. While an on-site nursery can facilitate access,^{32 34} this is not always practical. Alternative off-site access^{32–34 37 40 42 43} can be enabled by workplace accommodations, including shift pattern changes,^{33 42} flexible^{32–34 41} or part-time working,^{32–34 42} or additional leave.^{33 40–43}

Use of facility

Facility suitability influenced maternal use. Synthesising these findings, we found that essential requirements were privacy and safety.^{30 32 34 36 39 41–43} Ideal facilities were designated and lockable,^{30 32 34 36 39 41–43} with basic amenities, including electricity and running water,^{32 34 36 38 41 43} even in austere military working environments.^{37 38} Optimal use of facilities^{34 36–39 43} came with provision of refrigerated storage or equipment loans of hospital-grade pumps.^{34 36–39 43} Unsuitable locations were toilets, public spaces and thoroughfares,^{32 34–37 39 41 43} and those which exposed mothers to breastmilk transmissible hazards.^{22 32 38 41} Lack of advice or logistical support for transporting breastmilk during periods of separation resulted in breastfeeding cessation.³⁸

Appropriate access was enabled through maternal antenatal^{35 36 44} and universal workforce education,^{30–32 34–38 43} which in three military studies was best received when delivered by HCPs.^{36 38 44} Addressing maternal and supervisor expectations was equally important with use of facilities and time to breastfeed optimised through formally written and agreed breastfeeding plans.^{34 35 37–39 42 43} Six studies^{32 36 37 39 41 43} identified insufficient time as a barrier to accessing facilities. This was caused by occupational stress^{34 35 37 39 41 42}; time-consuming, unpredictable workloads; inability to manage one's own schedule^{34 42}; or limited flexible-working options.^{32–34 37 39 42} Unplanned changes to workload,^{35 39} working location³⁹ and patterns⁴² all negatively impacted use of facilities.

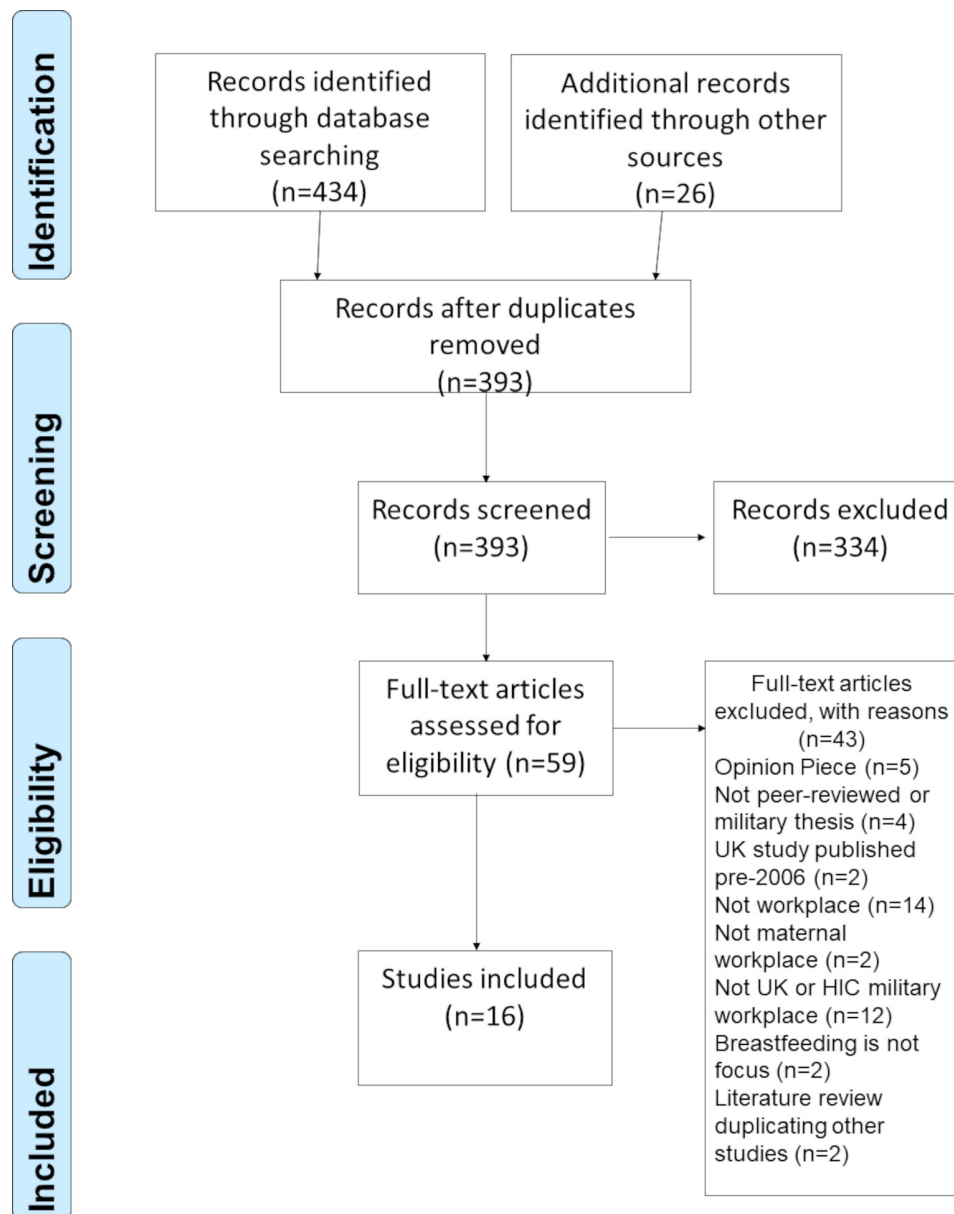


Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.²⁷ HIC, high-income country.

DISCUSSION

Maternal motivation to breastfeed, which is predominantly driven by factors external to the workplace, was the most commonly identified factor enabling access of facilities.^{30 33–35 37–44} The five key areas identified from policy analysis and the potential options for future policy development are explored and discussed based on the key barriers and enablers are identified. Recommendations focus on those factors which the British Army, as an employer, could influence.

Specific responsibilities

Maternal duty to inform her employer^{18 19 23 47–59} and medical officer^{47 48 52–54 59} of breastfeeding status was the most commonly identified responsibility and is required in the UK.²³ However, numerous studies found actual or perceived lack of support,^{34 37 39 41 42} pressure to stop or tolerance of hostile behaviours towards breastfeeding mothers^{30 41} was a barrier to disclosure and accessing facilities. Non-disclosure could harm both maternal and infant health. The British Army has a duty

to protect the breastfeeding servicewoman and risk assess the potential impact of exposure to any of the known harmful occupational hazards identified in two observational studies and a comprehensive literature review.^{18 22}

Disclosure, facility provision, access and use can be improved through breastfeeding-specific policy^{18 19 42 51} and universal workplace education.^{42 54 57} Workplace breastfeeding policy is supported as good practice by Advisory, Conciliation and Arbitration Service¹⁹ and recommended by the NHS,⁵¹ HSE¹⁸ and the US Army.⁴² Following good practice from the USA, a multi-disciplinary working group to evaluate policy implementation and breastfeeding outcome should be established.⁴² However, policies must be appropriate^{38 43}; promoting extended maternity leave for breastfeeding fuels the misconception that it is unacceptable in the workplace.^{30 40 43} To be effective, policies must empower the servicewomen, must be widely available^{30 32 34 36} and must be provided in a timely manner before RTW,^{32 36 38} ideally in the antenatal period.^{32 34 36 44}

Table 5 Key areas in document

		Identifies specific maternal, employer, CoC and medical chain responsibilities	Identifies requirement for individualised breastfeeding plans or risk assessments	Details requirements and recommendations for breastfeeding facility access and provisions	Advises on provisions for postpartum physical fitness assessment	Signposts possible workplace accommodations for postpartum mothers
UK	HSE ¹⁸	x	x	x		
	ACAS ¹⁹	x	x	x		x
	NHS ⁵¹	x	x	x		x
HICs' Armed Forces	MOD ⁵⁹	x	x			x
	MOD ⁴³		x	x		
	RN ⁶⁰	x			x	
	RAF ⁵²	x		x	x	
	RAF ⁵³	x		x		
	USAF ⁵⁴	x	x	x		x
	USAF ⁴⁴				x	x
	DOD ⁴⁸	x	x	x		x
	DOD ⁴³	x	x	x	x	x
	USCG ⁵⁵	x	x	x		x
	DOD ⁵⁶	x	x	x		x
	DOD ⁵⁷	x		x		x
	RAAF ⁴⁹	x	x	x	x	x

ACAS, Advisory, Conciliation and Arbitration Service; CoC, Chain of Command; DOD, Department of Defense; HSE, Health and Safety Executive; MOD, Ministry of Defence; RAAF, Royal Australian Air Force; RAF, Royal Air Force; RN, Royal Navy; USAF, US Airforce; USCG, US Coast Guard.

Policy implementation is most successful when accompanied by universal workforce education, which tackles stigma and barriers and improves practical knowledge and awareness of the benefits of breastfeeding.^{30–32 34–38 43} All US military studies which trialled educational programmes found military HCP delivery to have the greatest efficacy.^{36 38 44} The US Army medical chain is now responsible for breastfeeding self-learning⁴² and education delivery,^{42 54} and any British Army programme would need to start with HCP education. HCP engagement was crucial in 60% of studies in advocating and supporting improved access and use of facilities.^{35–38 43 44} While policy and education are commonly cited organisation responsibilities which demonstrate support and organisational acceptance,^{31 32 34 36–38 43} alone they are insufficient; true change comes through creation of a supportive organisation culture where inappropriate behaviours are challenged.

Individualised plans and risk assessments

Three military studies^{32 36 38} and most policies^{42 48 49 54–56} identify line managers' and medical officers as respectively responsible for completing individualised risk assessments^{18 19 23 42 48 49 51 54–56} and medical grading assessments,^{42 48 52 53 60} ideally prior to RTW.^{19 23 42 48 55 56} Line manager risk assessment should not, however, be replaced by medical grading.^{49 54 55} In most cases,

reasonable adjustments for breastfeeding should be an employer and not a medical responsibility; however, it may be appropriate to apply medical workplace restrictions due to individual postpartum functionality.^{22 59} In line with HSE legislation,¹⁸ triservice British Armed Forces policy does recommend individualised risk assessment.^{23 59}

In addition to risk assessments, eight studies and six policies, including from the US Army and Royal Air Force, which provide the paperwork for completion, recommend individualised breastfeeding plans either concurrently or independently.^{35 37–39 43} Well-considered and successfully implemented plans help manage expectations of the servicewomen, line managers and colleagues and counter misconceptions about workforce cohesion and operational capability.^{36 39} Plans should be thorough, account for maternal breastfeeding practices and infant breastmilk requirements; notice for changes to work pattern or location^{37–39 42 47 48}; and what facilities can be optimally provided in a range of settings, including the home base, courses, exercises and deployments.^{47 49}

Although only identified by a few studies, mothers need time to psychologically prepare and practically plan adjustments to breastfeeding practices, storage and transportation. If cessation is required and timelines are insufficient, or facilities in a new location are inappropriate or inaccessible, medical

Table 6 Five key recommendations to enable access to breastfeeding on return to work in the British Army

1	<i>Easily accessible breastfeeding-specific policy is required, optimised by online available guides.</i>
2	A Women's Health Special Interest Group should ensure appropriate materials are available for <i>military HCP education</i> on breastfeeding in <i>Universal Workplace and Commanders Education</i> , and awareness is a responsibility of unit medical officers and personnel branches. Support and education for breastfeeding servicewomen particularly focusing on the challenges of military occupation and breastfeeding should be complemented by the development of a <i>military-specific servicewomen's breastfeeding network</i> .
3	Commanders and servicewomen must ensure <i>individual risk assessments and breastfeeding plans</i> are completed. Regular review as maternal and infant breastfeeding requirements change is also required. A breastfeeding model framework, as laid out by the RAAF, could be included in breastfeeding guides. This will manage maternal expectations and give line managers a framework within which to practically manage individual needs.
4	Breastfeeding policy must clarify <i>minimum breastfeeding facility standards</i> and those which should be aspired to. This should consider what is achievable in the home base, on courses, exercises and deployments. At an individual level, the breastfeeding plan should document expected provisions for each setting or workplace.
5	Employment policy should consider the option to extend <i>exemptions from deployment</i> , on an individual basis, to 24 months, allowing servicewomen to meet the WHO's 2-year breastfeeding target. Outcomes of ongoing postnatal research should be used to inform any recommendations on <i>physical activity or fitness testing</i> .

HCP, healthcare professional; RAAF, Royal Australian Air Force.

complications such as engorgement, pain or mastitis⁵⁰ can occur and a period of absence and treatment may be required. Compromise and circumstantially appropriate plans should be agreed, balancing the needs of the service; the servicewoman's career; and her practical, psychological and medical breastfeeding needs.^{34 35 37–39 42 43}

Breastfeeding facilities

For mothers to access facilities, they must exist.^{33 34 36 43} Most policies and studies^{30 32 34 36 39 41–43} identify privacy and safety as the minimum standard, even for exercises and deployments.⁴⁷ This, along with space to rest, is legally required in UK workplaces.¹⁸ Toilets, public thoroughfares and locations with hazardous exposures were universally recognised as unsuitable.^{18 19 22 23 32 34–37 39 41 42 47–49 51–57} US and Australian policies specify minimum requirements for exercises and deployments,⁴⁷ and recommend access to running water and electricity.^{47–49 54–58} Water is required for hygiene reasons and to prevent infection.^{7 9 16 17 20 23} Electricity is a necessity for electric pumps, but manual pumps and hand expression could be considered; it is also ideal for refrigerated storage; however, cold storage boxes can be temporarily used.

Refrigerated storage was recommended in the UK,^{19 51} Australia⁴⁹ and the USA for shifts over 12 hours.⁵⁵ Although UK workplace legislation is lacking,¹⁵ Ministry of Defence (MOD) policy does make provisions for privacy and breast-milk storage,^{23 53 59} and this is identified as an enabler. In other countries, cold-storage provision is a maternal responsibility, although support with arranging cold chains for transportation from deployments or austere environments is an enabler.^{19 47 48 54} Provision of pumping equipment was consistently a maternal responsibility; however, access to hospital-grade loan pumps was viewed as beneficial by servicewomen and employers.^{47 48 54} Firm-based locations²³ should provide electricity and refrigerated storage. To enable appropriate planning,^{37–39} locations and circumstances where these cannot be provided, alongside the essentials of privacy, safety and running water, should be made clear.

Sufficient time to access facilities should be provided,^{19 47 49 51 54–60} determined by maternal needs,^{49 51 56} individual breastfeeding practices⁴⁹ or medical recommendations.⁵⁶ Facility provision is a futile gesture if mothers cannot access them. For mothers unable to manage their own schedule,^{34 37 39–43} formally agreed breastfeeding plans are the most commonly identified enabler.^{33 36 41 43} RAAF breastfeeding models⁴⁹ provide guidance and frameworks to manage expectations of break duration and frequency.

Physical fitness provisions

Two studies identify fear of career ramifications, secondary to failure to meet physical fitness requirements or to attend career courses, as a barrier to accessing workplace facilities.^{39 41} However, challenges of physical fitness are not just restricted to breastfeeding mothers and are considered in various nations' policies on military RTW physical fitness provisions for all postpartum mothers.^{48 49 52 58 60} These include providing specialist postnatal Physical Training (PT),^{49 52 60} deconflicting breastfeeding breaks with scheduled PT,⁴⁸ and exempting physical testing for 90 days and 6⁵⁸ or 12 months.⁵² British Army policy makes provisions for this; however, future recommendations will be reviewed, in line with results from ongoing postpartum musculoskeletal studies.

Workplace accommodations

Fear or actual infant separation can cause practical storage and transportation and psychological difficulties when transitioning from direct breastfeeding to expressing.^{33 39 43 44} Longer and uncertain duration often results in breastfeeding cessation. Separation from a formed breastfeeding support network is also a barrier to continuation of breastfeeding, although many military studies found a virtual military-specific peer network to be enabling.^{35 39 41 43 44} To protect from early separation, all HICs' Armed Forces recommend exemption from deployment,^{47 49 54–59} but duration varies from 6 to 24 months postpartum.^{47 49 54–59} The British Army offer 6 months, with provision to extend to 12 months at the commanders discretion.⁵⁹ Numerous studies and policies^{47 49 51} recognise the beneficial impact flexible-working and part-time working policies can have on maternal access of appropriate facilities.^{32 33 37 40 43} Such workplace accommodation policies are now offered subject to the needs of the service, but should be signposted in breastfeeding policy.

Recommendations

Five key recommendations were drawn from this work (Table 6), and these have been presented to the Director of Personnel department, Women's Health Advisory Group and Primary Care Women's Health Special Interest Group.

CONCLUSIONS

RTW breastfeeding benefits the infant, mother and employer. However, numerous factors can either enable or present a barrier to breastfeeding. Thematic analysis identified three key areas impacting access: attitudes towards breastfeeding, issues relating to facility provision and those related to use. Dominant workplace themes influencing access included breastfeeding policy protecting mothers and facilities, workplace support to access facilities, universal workforce education, provision of suitable breastfeeding facilities, individualised risk assessments and breastfeeding plans, and planning for infant and breastfeeding support network separation. Five key recommendations were made when these themes were considered in relation to British Army employment. There remains a need for further research and appropriate monitoring, evaluation and oversight of British Army breastfeeding implementation to inform subsequent policy amendments.

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Supplementary Material

SUPPLEMENT 1: Search Concepts and terms for Breastfeeding, Employment, Enablers, Barriers and the Military

Breastfeeding Terms
Breast Breastfe* Lactati* “Nursing Mother” Pump* “Breast Milk” Express*

Employment Terms
Work* Employ* Occupation* Job Profession* “Return to Work” “Maternity Leave”

Enabler Terms	Barrier Terms
Enabl* Facilitat* “Support* factor*” Policy Break* Time Room “Private Space” Facility Stor* Fridge Freezer Pump* Equipment “Power Supply” “Cold storage”	Policy Barrier Block* Challeng*

Military Terms
Military Army Armed Force* Navy Naval “Air Force” Defence* Guard Soldier Sailor Aircraft

SUPPLEMENT 2: Search Concepts and terms for Policies and Guidance

Policy and Guidance Terms
Policy Guid* Recommendation* Instruction Memorandum Publication Directive Manual Handbook Order

SUPPLEMENT 3: Search Strategy by Database

No	CINAHL DATABASE SEARCH	Hits
1	Breastfeeding terms Breast AND (Breastfe* OR Lactati* OR "Nursing Mother" OR Pump* OR "Breast Milk" OR Express*)	18,892
2	Employment terms Work* OR Employ* OR Occupation* OR Job OR Profession* OR "Return to work" OR "Maternity Leave"	805,430
3	1 AND 2	2,820
4	3 AND Enabler terms Enabl* OR Facilitat* OR "Support* factor*" OR Policy OF Break* OR Time OR Room OR "Private Space" OR Stor* OR Fridge OR Freezer OR Pump* OR Equipment OR "Power Supply" OR "Cold storage"	1,287
5	3 AND Barrier terms Policy OR Barrier OR Block* OR Challeng*	656
6	4 OR 5	1,441
7	6 limited to UK	154
8	7 limited to Human	154
9	8 limited to articles published since 2006	109
	TOTAL (non-military)	109
10	Military terms Military OR Army OR Armed OR Force* OR Navy OR Naval OR "Air Force" OR Defence* OR Guard OR Soldier OR Sailor OR Aircrew	79,246
11	3 AND 10	38
12	6 AND 10	1
13	12 limited to Human*	1
	TOTAL (military)	1
	TOTAL (military and non-military)	110

*Military studies not limited to UK due to lack of data from British Armed Forces, or since 2006 due to limited data from all Armed Forces

No	PubMed DATABASE SEARCH	Hits
1	Breastfeeding terms Breast AND (Breastfe* OR Lactati* OR "Nursing Mother" OR Pump* OR "Breast Milk" OR Express*)	107,869
2	Employment terms Work* OR Employ* OR Occupation* OR Job OR Profession* OR "Return to work" OR "Maternity Leave"	2,196,146
3	1 AND 2	9,032
4	3 AND Enabler terms Enabl* OR Facilitat* OR "Support* factor*" OR Policy OF Break* OR Time OR Room OR "Private Space" OR Stor* OR Fridge OR Freezer OR Pump* OR Equipment OR "Power Supply" OR "Cold storage"	1,357
5	3 AND Barrier terms Policy OR Barrier OR Block* OR Challeng*	1,340
6	4 OR 5	3,901
7	6 limited to UK	378
8	7 limited to Human	326
9	8 limited to articles published since 2006	28
	TOTAL (non-military)	28
10	Military terms Military OR Army OR Armed OR Force* OR Navy OR Naval OR "Air Force" OR Defence* OR Guard OR Soldier OR Sailor OR Aircrew	621,392
11	3 AND 10	218
12	6 AND 10	7
13	12 limited to Human*	7
	TOTAL (military)	7
	TOTAL (military and non-military)	35

*Military studies not limited to UK due to lack of data from British Armed Forces, or since 2006 due to limited data from all Armed Forces

No	EMBASE DATABASE SEARCH	Hits
1	Breastfeeding terms Breast AND (Breastfe* OR Lactati* OR "Nursing Mother" OR Pump* OR "Breast Milk" OR Express*)	187,542
2	Employment terms Work* OR Employ* OR Occupation* OR Job OR Profession* OR "Return to work" OR "Maternity Leave"	2,775,280
3	1 AND 2	14,858
4	3 AND Enabler terms Enabl* OR Facilitat* OR "Support* factor*" OR Policy OF Break* OR Time OR Room OR "Private Space" OR Stor* OR Fridge OR Freezer OR Pump* OR Equipment OR "Power Supply" OR "Cold storage"	4,924
5	3 AND Barrier terms Policy OR Barrier OR Block* OR Challeng*	2,307
6	4 OR 5	6,063
7	6 limited to UK	298
8	7 limited to Human	241
9	8 limited to articles published since 2006	226
	TOTAL (non-military)	226
10	Military terms Military OR Army OR Armed OR Force* OR Navy OR Naval OR "Air Force" OR Defence* OR Guard OR Soldier OR Sailor OR Aircrew	608,269
11	3 AND 10	251
12	6 AND 10	43
13	12 limited to Human*	43
	TOTAL (military)	43
	TOTAL (military and non-military)	269

*Military studies not limited to UK due to lack of data from British Armed Forces, or since 2006 due to limited data from all Armed Forces

No	PRO-QUEST MILITARY COLLECTION DATABASE SEARCH	Hits
1	Military terms Military OR Army OR Armed OR Force* OR Navy OR Naval OR "Air Force" OR Defence* OR Guard OR Soldier OR Sailor OR Aircrew	19,400
2	Breastfeeding terms Breast AND (Breastfe* OR Lactati* OR "Nursing Mother" OR Pump* OR "Breast Milk" OR Express*)	5,840
3	Employment terms Work* OR Employ* OR Occupation* OR Job OR Profession* OR "Return to work" OR "Maternity Leave"	15,500
4	1, 2 AND 3	20
	TOTAL (military)	20

* Access is through the Ministry of Defence and therefore access is only for military articles. Searching in this database is more limited than in other databases.

SUPPLEMENT 4: Websites used to search for guidance and policies on breastfeeding in the workplace

UK Guidance
www.gov.uk sub-search from UK Government website led to: www.nhs.uk www.acas.org.uk
HICs' Armed Forces' Policy and Guidance
DII www.mod.uk www.army.mod.uk www.royalnavy.mod.uk www.raf.mod.uk www.defence.gov.au www.airforce.gov.au www.navy.gov.au www.army.gov.au www.defense.gov www.army.mil www.airforce.com www.navy.mil www.forces.gc.ca www.navy-marine.forces.gc.ca www.army-armee.forces.gc.ca www.rcaf-arc.forces.gc.ca www.defence.govt.nz www.nzdf.mil.nz www.army.mil.nz www.navy.mi.nz www.airforce.mil.nz www.military.ie

SUPPLEMENT 5: Critical Appraisal Scoring Exercise

CASP Systematic Review	
Study	Croft AMJ⁴⁹
Did the review address a clearly focussed issue?	1.0
Did the authors look for the appropriate sort of papers?	0.5
Do you think the important, relevant studies were included?	1.0
Did the review's authors do enough to assess the quality of the included studies?	0.0
If the results of the review have been combined, was it reasonable to do so?	1.0
What is the overall result of the review?	1.0
How precise are the results?	0.0
Can the results be applied to the local population?	1.0
Were all important outcomes considered?	0.5
Are the benefits worth the harms and costs?	1.0
TOTAL	7.0
Total on 0-1 scale	0.7

CASP Cohort Study			
Study	Skafida V ⁶⁴	Zilanawala A ⁶⁶	Hawkins SS ⁶²
Did the study address a clearly focused issue?	1.0	1.0	0.5
Was the cohort recruited in an acceptable way?	1.0	1.0	1.0
Was the exposure accurately measured to minimise bias?	0.5	0.5	1.0
Was the outcome accurately measured to minimise bias?	1.0	0.5	0.5
Have the authors identified all important confounding factors? Have they taken account of the confounding factors in the design/analysis?	1.0	1.0	1.0
Was the follow up of subjects complete enough? Was the follow up of subjects long enough?	1.0	1.0	1.0
What are the results of this study?	1.0	1.0	1.0
How precise are the results?	0.5	0.5	0.5
Do you believe the results?	0.5	0.5	1.0
Can the results be applied to the local population?	0.5	0.5	1.0
Do the results of this study fit with other available evidence?	1.0	0.5	1.0
What are the implications of this study for practice?	1.0	0.5	1.0
TOTAL	10.0	8.5	10.5
Total on 0-1 scale	0.8	0.7	0.9

STROBE Cross-Sectional Quantitative Study Checklist							
Study	Martin SE ⁷¹	Harlow BA ⁷⁰	Uriell Z ⁷⁵	Bales K ⁶⁷	Kosmala-Anderson J ⁶³	Stewart K ⁷⁴	Wallace LM ⁶⁵
Title and Abstract	1.0	0.5	1.0	0.5	1.0	1.0	1.0
Background and Rationale	1.0	1.0	1.0	0.5	1.0	1.0	1.0
Objectives	0.5	0.5	0.5	1.0	0.5	1.0	1.0
Study Design	1.0	1.0	1.0	1.0	0.0	1.0	1.0
Setting	1.0	1.0	1.0	1.0	0.5	1.0	1.0
Participants	1.0	1.0	1.0	1.0	1.0	1.0	0.5
Variables	1.0	1.0	1.0	0.0	0.5	1.0	0.5
Data Sources	1.0	1.0	1.0	0.5	0.5	0.5	0.5
Bias	0.5	0.5	1.0	1.0	0.0	1.0	0.5
Study Size	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Quantitative Variables	1.0	1.0	1.0	0.5	0.5	1.0	0.5
Statistical methods	1.0	1.0	1.0	0.0	0.5	1.0	0.0
Participants	1.0	1.0	0.5	1.0	0.5	1.0	1.0
Descriptive data	0.5	1.0	1.0	0.0	0.5	0.5	0.5
Outcome Data	1.0	1.0	1.0	1.0	1.0	1.0	0.5
Other Analyses	0.5	1.0	1.0	0.5	0.5	0.5	0.5
Key Results	0.5	1.0	1.0	1.0	1.0	1.0	1.0
Limitations	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Interpretation	1.0	1.0	1.0	1.0	1.0	1.0	0.5
Generalisability	0.5	0.5	1.0	1.0	1.0	1.0	0.5
Funding	1.0	1.0	0.0	1.0	0.0	1.0	0.5
TOTAL	17.0	19.0	19.0	15.5	13.5	19.5	14.5
Total on 0-1 scale	0.8	0.9	0.9	0.7	0.6	0.9	0.7

CASP Qualitative Study					
Study	Bristow MK ⁶⁹	Sleutel MR ⁷⁴	Stevens KV ⁷³	Bell MR ⁶⁸	Gatrel CJ ⁶¹
Was there a clear statement of the aims of the research?	1.0	0.5	1.0	1.0	0.5
Is a qualitative methodology appropriate?	1.0	1.0	1.0	0.5	1.0
Was the research design appropriate to address the aims of the research?	0.5	0.5	0.5	1.0	1.0
Was the recruitment strategy appropriate to the aims of the research?	0.5	0.0	0.5	0.5	0.5
Was the data collected in a way that addressed the research issue?	1.0	0.5	1.0	1.0	1.0
Has the relationship between researcher and participants been adequately considered?	1.0	0.0	0.0	0.5	0.5
Have ethical issues been taken into consideration?	1.0	0.0	0.0	0.0	1.0
Was the data analysis sufficiently rigorous?	1.0	0.5	0.5	0.0	1.0
Is there a clear statement of findings?	0.5	0.5	1.0	0.5	0.5
How valuable is the research?	0.5	0.5	1.0	0.5	1.0
TOTAL	8.0	4.0	6.5	5.5	8.0
Total on 0-1 scale	0.8	0.4	0.7	0.6	0.8



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	Title Page
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4 & Tables
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Supplement
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	4
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	4 & Tables
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	4
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	4 & Tables
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	4 (Qualitative)



PRISMA 2009 Checklist

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Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	4
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	NA
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	4/5/6 Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	4/5/6 & Tables
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	4/5/6 Tables
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	4-6
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	5/6
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Tables
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	7-9
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	Title Page, 4-6
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9-10
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	NA

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