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The effectiveness of public health interventions, initiatives, and campaigns designed to improve pathways to care for individuals with psychotic disorders: A systematic review

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ABSTRACT

Purpose: Lengthy duration of untreated psychosis (DUP) and duration of untreated illness (DUI) in people at clinical high-risk for psychosis (CHR-P) and first episode psychosis (FEP) is associated with poorer outcomes. However, individuals with FEP often experience negative pathways to care involving contacts with police, crisis services and requiring compulsory admissions, and evidence suggests individuals with both FEP and CHR-P often experience lengthy delays to treatment. Early detection interventions, such as public health interventions, may be one way to reduce delays. This systematic review aimed to synthesise the available evidence on such interventions.

Methods: The EMBASE, PsychINFO, CINAHL, and MEDLINE databases were searched. Studies were included if they compared an intervention designed to improve timely access to treatment for individuals with FEP or CHR-P to standard treatment provision. Interventions may be targeted at potential patients, their families, the general public, or non-healthcare professionals. Outcomes of interest were DUP or DUI, and/or characteristics of pathways to care.

Results: Nineteen studies met the inclusion criteria. All consisted of FEP populations, none of CHR-P populations. Employing narrative synthesis, we found mixed results about the effectiveness of interventions at reducing DUP and interventions appeared to differentially impact groups. Pathways to care information was limited and mixed.

Conclusion: Findings on the effectiveness of interventions designed to improve timely access to treatment were inconclusive. More research is warranted to better understand where delays occur and factors which may influence this for both FEP and CHR-P populations which may help to develop targeted interventions to address delays.

1. Introduction

Accessing treatment at the earliest opportunity improves outcomes for individuals with first episode psychosis (FEP) (Singh, 2010). Longer duration of untreated psychosis (DUP) is associated with poorer clinical and functional outcomes, e.g. more severe symptoms, poorer overall functioning, quality of life and decreased chances of full remission (Harris et al., 2005; Marshall et al., 2005; Penttilä et al., 2014) as well as increased economic costs (Chong et al., 2016). Despite this, people with FEP often experience substantial delays and multiple help-seeking contacts before starting treatment (Anderson et al., 2010; Barnes et al., 2000; Norman et al., 2004). Delays in initiating help-seeking, and the accessibility and response of services appear to contribute to these complex "pathways to care" (PtC): the time between onset, help-seeking, and receiving appropriate treatment (Rogler and Cortes, 1993).

Treatment could occur at an even earlier stage, when individuals are at clinical high-risk for psychosis (CHR-P) (Fusar-Poli et al., 2013). CHR-P is an early and potentially prodromal phase of psychosis characterised by a drop in functioning and psychotic symptoms of lesser severity and duration than psychosis (Fusar-Poli et al., 2013). Intervening during this

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period could potentially reduce DUP or prevent transition to FEP (Fusar-Poli et al., 2013; Rietdijk et al., 2010). Compared to FEP, research into PtC and delays in treatment is much more limited in CHR-P (Allan et al., 2021), however there is some evidence to suggest that individuals meeting CHR-P criteria also experience lengthy delays to treatment (Chung et al., 2010; von Reventlow et al., 2014).

Early detection interventions and initiatives aimed at increasing public awareness of early signs of psychosis and treatment, promoting help-seeking behaviour, and improving recognition of psychosis amongst professionals from whom people may seek help, may be one way to address treatment delays in FEP (Norman et al., 2004) and CHR-P (Chung et al., 2010; Stowkowy et al., 2013; von Reventlow et al., 2014). In 2011, Lloyd-Evans and colleagues conducted a systematic review evaluating the effectiveness of early detection initiatives at reducing DUP. The review included 11 studies and found that education campaigns aimed at general practitioners and establishing early intervention services, both aimed at reducing service delays, were insufficient to reduce DUP overall. The findings were mixed for campaigns targeting the general public: some studies reported a reduction in DUP, others no change (Lloyd-Evans et al., 2011). The authors hypothesised the mixed findings may have been explained by differences in campaign content, intensity, and duration; and concluded that the current evidence base was limited and further research was required (Lloyd-Evans et al., 2011).

To better understand the impact of public health initiatives and interventions on DUP and pathways to care characteristics, we conducted a systematic review of interventions targeting potential patients, their families, friends, or carers, communities, the general public or non-healthcare professionals. This systematic review is distinct from, but builds upon, the review by Lloyd-Evans et al. (2011) by expanding the population to include CHR-P and assess the impact of interventions on PtC for individuals with FEP or CHR-P (for example, do such interventions alter the number and duration of PtC or source of referral?) Additionally, the review by Lloyd-Evans et al. (2011), was conducted over 10-years ago, therefore the present systematic review aimed to provide an updated synthesis of the evidence regarding the effectiveness of interventions, initiatives, and campaigns at reducing DUP and altering PtC characteristics. This is important due to extensive evidence that individuals with FEP continue to experience long treatment delays (Anderson et al., 2010; Barnes et al., 2000; Norman et al., 2004). Further, the growing evidence-base indicating that individuals with CHR-P also experience delays in treatment (Chung et al., 2010; von Reventlow et al., 2014) which may lead to unfavourable outcomes (Carrión et al., 2016; Fusar-Poli et al., 2009; Nelson et al., 2016; Zhang et al., 2019) warrants further investigation.

Our research questions were as follows:

1. What is the effectiveness of public health interventions, initiatives and/or campaigns designed to improve pathways to care for individuals with or at risk of psychotic disorders?
2. Are public health interventions, initiatives, and/or campaigns effective in reducing duration of untreated psychosis/illness for individuals with or at risk of psychotic disorders?

2. Methods

The systematic review protocol was developed according to Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) (Moher et al., 2009) and was registered with the International Prospective Register of Systematic Reviews (PROSPERO, https://www.crd.york.ac.uk/prospero, registration number CRD42022310218).

2.1. Inclusion/exclusion criteria

Table 1 outlines study eligibility criteria. Qualitative and quantitative studies published in English since 1985 were eligible for inclusion consistent with previous systematic reviews investigating PtC in CHR-P and FEP (Allan et al., 2021; Anderson et al., 2010). Unpublished articles, conference or meeting abstracts, theoretical papers or systematic reviews or meta-analyses were not included.

Table 1
Inclusion and exclusion criteria.

	Inclusion	Exclusion
Population	Individuals with a diagnosis of a psychotic disorder including CHR-P.	Individuals without a diagnosis of a psychotic disorder including CHR-P.
Intervention	Any intervention, initiative, and/or campaign designed to improve timely access to treatment for individuals with psychotic disorder. Interventions targeted at patients, family, friends, carers, communities, the general public, or non-healthcare professionals.	Interventions targeted solely at healthcare professionals.
Comparison	Standard service provision.	No comparison group.
Outcomes	DUP DUI Characteristics of PtC such as number of contacts, duration of PtC, contact type or referral source. For qualitative studies, papers reflecting on the experience of PtC in intervention sites compared to standard service provision were relevant for inclusion.	Studies not reporting any of the outcomes outlined in the inclusion criteria.

Abbreviations: CHR-P – Clinical High-Risk for Psychosis, DUI = Duration of Untreated Illness, DUP = Duration of Untreated Psychosis, PtC = Pathways to Care.

2.2. Search strategy

The EMBASE, PsychINFO, CINAHL, and MEDLINE databases were searched, with additional hand searches based on reference lists and citations of papers meeting the inclusion criteria. We contacted authors who reported findings at conferences or in supplements to determine if peer reviewed papers had been published. The search strategy is available in the supplemental material (Appendix A). An expert librarian's advice was sought on building the search terms, and the search strategy was informed by previous systematic reviews in the field (Allan et al., 2021; Lloyd-Evans et al., 2011) and finalised in discussion with SA and SO. Searches were carried out on the 3rd March 2022 and updated on the 12th July 2023. A broad search strategy of terms and including searches of titles, abstracts, and full text was adopted in order to capture relevant qualitative and quantitative studies, and psychosis and CHR-P populations. Our broad search strategy is in keeping with previous similar systematic reviews investigating CHR-P (Lång et al., 2022; Perrottelli et al., 2021).

2.3. Screening and quality assessment

Abstracts and full texts from the database searches were screened by RM. Ten percent of abstracts screened for eligibility were re-checked by RM (n = 764) and no discrepancies were found. Twenty percent of full text articles screened for eligibility were checked independently by HC and SA (n = 12), with two discrepancies resolved following discussion with SO. A further four full text articles were discussed in consensus meetings with SO.

Methodological quality of studies was measured using the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018). MMAT is well-established and commonly used for studies adopting quantitative, qualitative, mixed, or randomised control trial methodologies. MMAT

contains two generic questions measuring quality, followed by five further questions depending on the study method. A score is obtained by calculating a percentage of criteria questions met; higher percentages indicate better quality studies (Gronholm et al., 2017). Included studies were initially assessed by RM, with 20 % (n = 4) independently assessed by SA, with 78.6 % agreement. Discrepancies were discussed and resolved with SO.

2.4. Data extraction and narrative synthesis

Data were extracted from included studies (n = 19), 20 % (n = 4) were independently extracted by SA with 86.76 % agreement. Data extracted included: study characteristics (study aims, design, country, comparison-group, intervention target population, description of intervention, duration of intervention), sample characteristics (*n*, gender, age, ethnicity, diagnosis), DUP or DUI (definition of DUP or DUI, measurement, average length) and PtC (definition of PtC, measurement, average number of PtC, average length of PtC, type of PtC contacts, referral source). A narrative synthesis was conducted in accordance with the guidance by Popay et al. (2006). This involved a preliminary synthesis of common themes and patterns between studies. Studies were tabulated according to:

- Target population.
- Intervention components.
- Duration of intervention.
- Details of measures used and sources of information.
- Study results (DUP, DUI, and PtC characteristics).
- Study quality appraisal.

Relationships between data and studies were then explored for example by comparing findings and whether variability between studies were linked to differences in intervention approach or target populations. Consistent with the guidance, quality appraisal was conducted

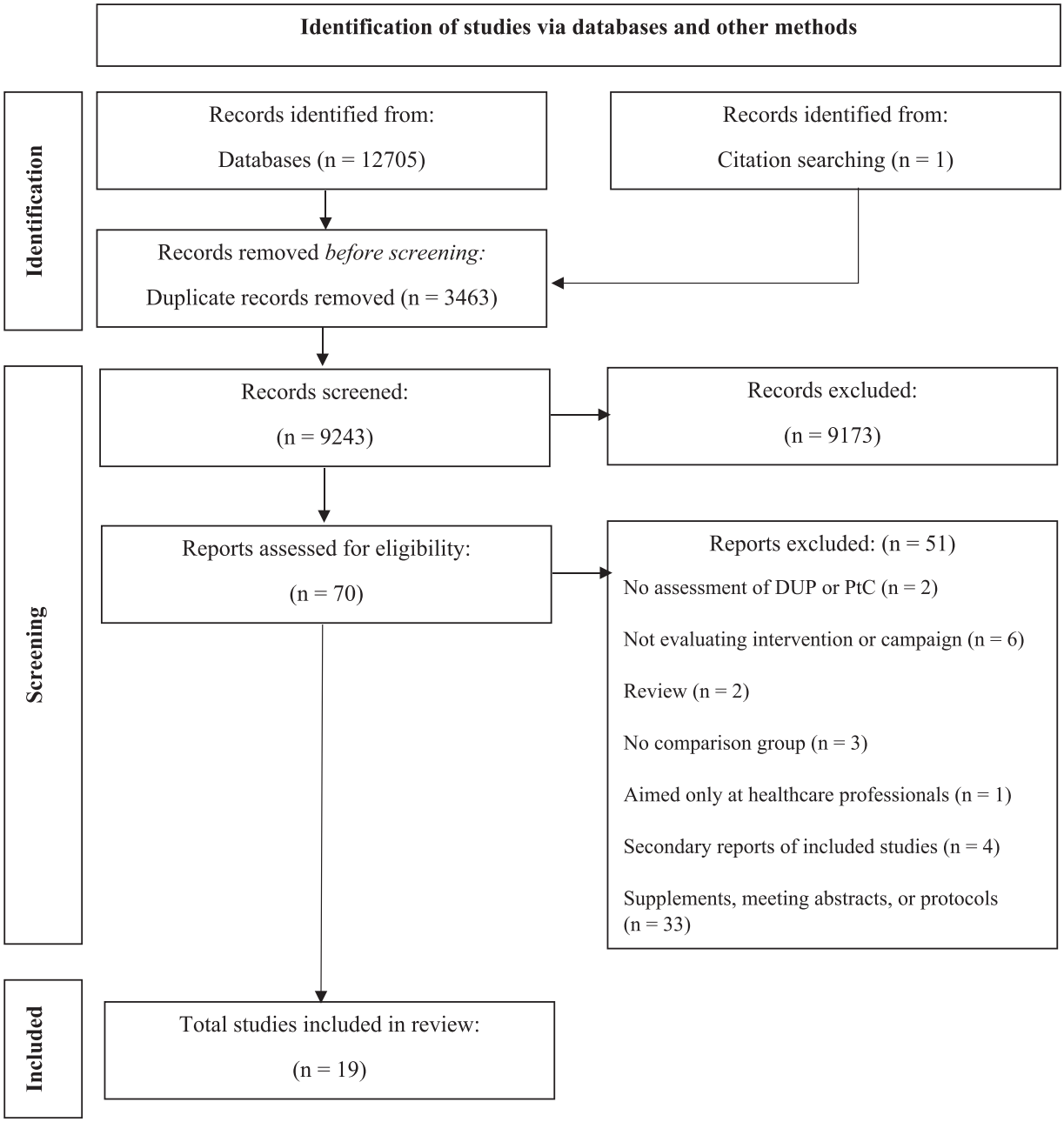

Fig. 1. PRISMA flow diagram of the selection process.

prior to the narrative synthesis.

3. Results

Fig. 1 shows the study selection process. Database searches returned 12,705 papers (9242 without duplicates). Following abstract screening, 69 full text papers were screened for eligibility, 18 of which met the inclusion criteria. One additional paper was retrieved through hand searching the reference lists of included papers (McGorry et al., 1996). Overall, 11 intervention programmes were evaluated in the 19 included papers. Seven studies evaluated the Treatment and Intervention in Psychosis (TIPS) programme (Ferrara et al., 2019; Hegelstad et al., 2014; Joa et al., 2007; Joa et al., 2008; Johannessen et al., 2001; Larsen et al., 2001; Melle et al., 2004), two examined the Prevention and Early Intervention in Psychosis Programme Ontario (PEPP-Ontario) (Cassidy et al., 2008; Malla et al., 2005), and two assessed the Early Psychosis Prevention and Intervention Centre (EPPIC) (Krstev et al., 2004; McGorry et al., 1996). The remaining studies evaluated the Early Assessment Service for Young People with Psychosis (EASY) (Chan et al., 2018), Early Psychosis Intervention Programme (EPIP) (Chong et al., 2005), Prevention and Early Intervention in Psychosis Programme Montreal (PEPP-Montreal) (Malla et al., 2014), LaCLAve (López et al., 2022), Mindmap (Srihari et al., 2022), Early Intervention in Psychosis (Tidlig Opsporing af Psykose, TOP) (Hastrup et al., 2018), an Early Detection Programme in Camden and Islington Early Intervention Service (CIEIS) (Lloyd-Evans et al., 2015) and YouthSpace (Connor et al., 2016).

3.1. Study characteristics

Table 2 summarises study characteristics. All studies were quantitative and consisted of FEP populations: none examined CHR-P populations. Programme locations varied, with PEPP-Ontario and PEPP-Montreal from Canada, LaCLAve and Mindmap from the United States, CIEIS and YouthSpace from the United Kingdom, TIPS from Norway, EPPIC from Australia, TOP from Denmark, EASY from Hong Kong, and EPIP from Singapore. Intervention durations varied between studies, ranging from six-months (Malla et al., 2014) to 120 months (Hegelstad et al., 2014) with a mean duration of 34.4 months.

Eight intervention programmes (EPIP; EPPIC; LaCLAve; Mindmap; PEPP-Ontario; TIPS; TOP; YouthSpace) were aimed at multiple targets including the general public and non-healthcare professionals such as schools, universities, youth workers, and community organisations. Two programmes (EASY; EPPIC) target population was the general public and two programmes (CIEIS; PEPP-Montreal) targeted non-healthcare professionals only.

Intervention content varied across programmes and often involved multiple components. Eight programmes (CIEIS; EASY; EPPIC; Mindmap; PEPP-Ontario; TIPS; TOP; YouthSpace) reported changes in service configuration such as the establishment of early intervention in psychosis services, easy access to early detection teams and/or open referral policies. Seven programmes (EPIP; LaCLAve; Mindmap; PEPP-Ontario; TIPS; TOP; YouthSpace) reported advertisements and information about psychosis, treatment, and available services delivered to the general public via mass media such as newspapers, local television and radio. Two programmes (Mindmap; TIPS) used mass social media to deliver information to the general public. Six programmes (EPIP; LaCLAve; Mindmap; PEPP-Ontario; TIPS; YouthSpace) reported information was delivered to the general public using visual and written resources such as posters, pamphlets, and brochures. Five programmes (EASY; LaCLAve; Mindmap; PEPP-Ontario; TIPS) hoped to increase awareness of psychosis by attending and organising community events.

Studies also targeted non-healthcare professionals likely to encounter young people including employment, educational and community organisations. Ten programmes (CIEIS; EPIP; EPPIC; LaCLAve; Mindmap; PEPP-Ontario; PEPP-Montreal TIPS; TOP; YouthSpace) reported education about psychosis, treatment and access to services was delivered to professionals via talks, training and workshops. Four programmes (CIEIS; EPIP; Mindmap; PEPP-Ontario) provided telephone consultation or professional outreach and three programmes (CIEIS; EPPIC; PEPP-Ontario) provided visual and written information to professionals such as newsletters.

3.2. Data sources and measures

Information regarding DUP and PtC definitions and measures are given in Table 3 and Table 4 respectively. Eighteen studies measured DUP. DUP measurement tools varied, with eight studies using established and validated measures (Cassidy et al., 2008; Chan et al., 2018; Krstev et al., 2004; Lloyd-Evans et al., 2015; Malla et al., 2005; Malla et al., 2014; McGorry et al., 1996; Srihari et al., 2022). Of the studies using non-validated and non-specific measures of DUP, four assessed interrater reliability and reported this to be good (Hegelstad et al., 2014; Joa et al., 2008; López et al., 2022; Melle et al., 2004). Ten studies reported information relating to PtC. Definitions of PtC and tools used to measure PtC varied between studies (Table 4). Four studies used established measures of PtC (Cassidy et al., 2008; Malla et al., 2005; Malla et al., 2014; Srihari et al., 2022).

3.3. Impact of intervention programmes on DUP

Table 3 shows results regarding the impact of intervention programmes on DUP. Across studies, the median DUP ranged from 28 (Joa et al., 2007) to 227.5 days (Cassidy et al., 2008) in intervention groups, and from 30 (McGorry et al., 1996) to 430 days (Srihari et al., 2022) in control groups. Significant reductions in mean or median DUP were reported by three programmes (EPIP; TIPS; YouthSpace) targeting multiple populations. Two of these papers were of lower quality meeting 42.86 % (Johannessen et al., 2001) and 57.14 % (Joa et al., 2007) of quality criteria. Whereas four programmes targeting multiple populations (EPPIC; LaCLAve; Mindmap; PEPP-Ontario) reported no significant difference in mean or median DUP as a result of the intervention programme. All of which were deemed to be of medium to high quality, meeting >70 % of quality criteria. Of the two programmes targeting the general public only, one found a significant decrease in the median DUP for the adult population but not the youth population (EASY) and one study found a significant increase in the median DUP following the intervention programme (EPPIC), both are of medium quality. Neither programmes targeting only non-healthcare professionals (CIEIS; PEPP-Montreal) found significant differences in mean or median DUP. Both studies were of relatively high quality.

When duration of intervention was explored, none of the programmes with an intervention duration of one-year or less (CIEIS; EPPIC; PEPP-Montreal) found a significant reduction in mean or median DUP, in fact, McGorry et al. (1996) found a significant increase in median DUP (EPPIC). Three programmes (EPIP; TIPS; YouthSpace) with an intervention duration between 13- and 26-months found a significant reduction in mean or median DUP whereas two programmes (LaCLAve; PEPP-Ontario) with the same intervention duration did not find a significant difference in DUP. Two programmes (Mindmap; TIPS) had an intervention duration of more than four years. The TIPS programme demonstrated a significant reduction in median DUP whereas the Mindmap programme found no significant reduction in total mean DUP.

Several medium to high quality studies conducted additional analysis on DUP to determine if the intervention programmes had a differential impact on DUP based on various factors. The TIPS and EPPIC programmes found that there were significantly more cases with longer DUP (over two or three year respectively) in the intervention group compared to control, suggesting the programmes may have brought individuals into treatment who may previously not have been seen. The PEPP-Ontario programme observed a trend for cases with DUP of less than one-year moving towards lower values, i.e., DUP of less than two

Table 2
Included study characteristics.

Intervention name †, (Country)	Author(s), date	Duration of intervention	Target population	Features of intervention	*N*	Mean age (SD)	% Male	Intervention ethnicity
CIEIS (UK)	Lloyd-Evans et al. (2015)	12 months.	Non-health community organisations.	Half-day workshops about psychosis and treatment. One-hour top-up sessions after 6–9 months. Educational materials. Link worker offering monthly meetings. Open referral policy.	Intervention: 110 Control: 70	Intervention: 24.3 (6.5) Control: 24.4 (5.9)	Intervention: 67 Control: 71	37 % White British 17 % White Other 26 % Black Ethnic Groups 13 % Asian Ethnic Groups 4 % Mixed and Other Ethnic Groups 3 % Missing
EASY (Hong Kong)	Chan et al. (2018)	Not stated.	General public.	Established early intervention services. Information campaigns including educational talks and exhibits. Accessible referral system.	Youth Intervention: 126 Youth Control: 34 Adult Intervention: 353 Adult Control: 88	Youth Intervention: 19.82 (2.72) Youth Control: 21.15 (2.05) Adult Intervention: 36.55 (8.74) Adult Control: 35.72 (7.18)	Youth Intervention: 49.21 Youth Control: 58.82 Adult Intervention: 44.19 Adult Control: 38.64	Not reported.
EPIP (Singapore)	Chong et al. (2005)	2 years.	General public. Primary healthcare workers.	Information about psychosis and treatment via public forums, newspaper, radio, postcards, TV docudrama, radio, website, books, and art exhibitions. Newsletters, talks, forums, workshops, and telephone consultations.	Intervention: 287 Control: 107	Intervention: 28.3 (7) Control: 38 (12.4)	Intervention: 55 Control: 57	71.7 % Chinese 20.6 % Malay 5.6 % Indian 2.1 % Other
EPPIC (Australia)	McGorry et al. (1996)	12 months.	General public.	Mobile early detection teams and treatment programme. Networking and community education about psychosis and treatment.	Intervention: 51 Control: 51	Intervention: 22.4 (3.9) Control: 22 (3.7)	Intervention: 65 Control: 65	Not reported.
	Krstev et al. (2004)	12 months.	Young people. Parents. General practitioners. Teachers. Youth workers.	Mobile detection teams. Awareness activities in schools. Education delivered to target populations. Information about psychosis and treatment in workshops, newsletters, and videos.	Intervention: 40 Control: 58	Intervention: 22.1 (3.4) Control: 22.3 (3.4)	Intervention: 70.7 Control: 67.5	Not reported.
LaCLAve (United States)	López et al. (2022)	24 months.	General public. Community organisations. Health and mental health professionals.	Information about psychosis and treatment in bilingual brochures, posters, radio, TV, websites, buses, and billboards. Community events. 60–90-min workshops.	123	25 (8.87)	72	All participants identified as Latinx.
Mindmap (United States)	Srihari et al. (2022)	4 years.	Potential patients. Peers. Family. Community and clinical agencies. College and high schools. Judicial systems. Local government.	Information about psychosis in newspapers, transit, cinemas, postcards, billboards, and social media channels. Community events. Professional outreach.	Intervention (including historical): 171 Control: 75	Intervention (including historical): 22.5 (3.8) Control: 21.8 (2.8)	Intervention (including historical): 70.2 Control: 72	33.9 % White 44.4 % Black 15.8 % Interracial 5.8 % Other
PEPP-Ontario (Canada)	Malla et al. (2005)	26 months.	General public. Education	Information about psychosis and treatment in posters, pamphlets,	Intervention: 100	Intervention: 25.9 (8.3)	Intervention: 78	Not reported.

(*continued on next page*)

Table 2 (*continued*)

Intervention name †, (Country)	Author(s), date	Duration of intervention	Target population	Features of intervention	*N*	Mean age (SD)	% Male	Intervention ethnicity
			professionals. Family physicians.	calendars, TV, and university cinemas. Community fundraising events. Clinicians at monthly school counselling meetings. Education delivered to target populations. Open referral policy.	Control: 88	Control: 25 (7.3)	Control: 78.4	
	Cassidy et al. (2008)	2 years.	General public. Potential patients. Non-healthcare professionals. Family physicians.	Information about psychosis and treatment in posters, pamphlets, and radio. 60–90-min training and education sessions. Open referral policy.	Intervention: 99 Post-Intervention: 98 Control: 88	Intervention: 25.6 (8) Post-Intervention: 24.4 (7.1) Control: 25.1 (7.2)	Intervention: 79 Post-Intervention: 75 Control: 78	Not reported.
PEPP-Montreal (Canada)	Malla et al. (2014)	6 months.	Primary health. Education. Hospitals. Mental health services.	60–90-min educational sessions. Films about psychosis and intervention. Booster session after 6 months.	Intervention: 159 Control: 136	Intervention: 21.9 (4) Control: 21.95 (4.03)	Intervention: 69.4 Control: 68.4	Not reported.
TIPS (Norway)	Johannessen et al. (2001)	2 years.	General public. Schools. Health professionals.	Mobile early detection teams. Information about psychosis and treatment in radio, TV, newspapers, cinemas, brochures to households, postcards, and other promotional materials. Public meetings and free lectures. School outreach. Education programmes to target populations.	Intervention: 60 Control: 43	Not reported.	Not reported.	Not reported.
	Larsen et al. (2001)	As above.	As above.	As above.	Intervention: 66 Control: 43	Not reported.	Intervention: 59 Control: 65	Not reported.
	Melle et al. (2004)	4 years.	As above.	As above.	Intervention: 141 Control: 140	Intervention: 26.2 (7.6) Control: 31.1 (10.5)	Intervention: 62 Control: 56	Not reported.
	Joa et al. (2007)	As above.	As above.	As above.	Intervention (Early): 79 Intervention (Late): 59 Control: 75	Not reported.	Not reported.	Not reported.
	Joa et al. (2008)	As above.	As above.	As above.	Intervention: 108 Control: 75	Intervention: 24.4 (7.5) Control: 26.4 (10.8)	Intervention: 61 Control: 63	Not reported.
	Ferrara et al. (2019)	As above.	As above.	As above.	Intervention: 77 Control: 74	Intervention: 22.5 Control: 21.6	Intervention: 68 Control: 62	48 % White British 4 % White – Other 3 % Asian Bangladeshi 3 % Asian Indian 4 % Asian-Other 6 % Asian Pakistani 1 % Asian British Pakistani 5 % Black African

(*continued on next page*)

Table 2 (*continued*)

Intervention name †, (Country)	Author(s), date	Duration of intervention	Target population	Features of intervention	*N*	Mean age (SD)	% Male	Intervention ethnicity
								5 % Black Caribbean 8 % Mixed White and Black Caribbean 3 % Mixed – Other 1 % Mixed White Asian 9 % Missing
	Hegelstad et al. (2014)	11.5 years. (18 month pause 2001–2002).	As above.	As above. TIPS 1: brochures to all households. TIPS 3 and 4: social media and online newspaper adverts. TIPS 4: information on substance induced psychosis.	Intervention (TIPS1): 146 Intervention removed (TIPS2): 115 Intervention (TIPS3): 95 Intervention (TIPS4): 202	Intervention (TIPS1): 25 (7.8) Intervention removed (TIPS2): 26.7 (11.6) Intervention (TIPS3): 28.2 (10.8) Intervention (TIPS4): 27.2 (11.3)	Intervention (TIPS1): 59.6 Intervention removed (TIPS2): 60.9 Intervention (TIPS3): 56.8 Intervention (TIPS4): 55.4	Not reported.
TOP (Denmark)	Hastrup et al. (2018)	4 years.	General public. Professionals.	Mobile early detection teams. Open referral policy. Information about psychosis and treatment in newspapers, cinemas, TV, social media, public transport, and videos. Education sessions to target population.	Intervention: 613 Control: 3686	22.95 (4.9)	Intervention: 57.6 Control: 55	Not reported.
YouthSpace (UK)	Connor et al. (2016)	23 months.	Local community. Families. Young people. Emergency services. Youth community groups. Employment agencies. Education agencies.	Direct youth mental health pathways and website. Information about psychosis and treatment in posters, leaflets, postcards, newspapers, magazines, and websites. Telephone information line. Bespoke training for target populations.	Intervention: 77 Control: 74	Intervention: 22.5 Control: 21.6	Intervention: 68 Control: 62	48 % White British 4 % White – Other 3 % Asian Bangladeshi 3 % Asian Indian 4 % Asian-Other 6 % Asian Pakistani 1 % Asian British Pakistani 5 % Black African 5 % Black Caribbean 8 % Mixed White and Black Caribbean 3 % Mixed – Other 1 % Mixed White Asian 9 % Missing

months, however this was only statistically significant for individuals with schizophrenia spectrum psychosis ($p = .02$) and did not appear to reduce delays in individuals with longer DUP (over one-year). Two programmes (TIPS; Mindmap) divided DUP into quartiles with TIPS finding a significant reduction in DUP in the 50th and 75th percentile ($p = .0008$ and $p = .009$ respectively) but not in the 25th percentile ($p = .18$) (Ferrara et al., 2019). In contrast, Mindmap, found significant reductions in DUP per campaign year in the first and second quartile ($p = .01$ and $p < .0001$) but not in the third quartile. In their adult population, the EASY programme found a significant reduction in DUP for adults with gradual onset psychosis of more than four weeks ($p = .003$) but not for individuals with acute (<1 week) or sub-acute (1–4 weeks) onset. In addition, they found individuals with no family history of psychiatric illness had significantly shorter DUP than prior to the intervention ($p = .01$).

The TIPS programme found a differential impact on DUP based on sex, with Larsen et al. (2001) finding the median DUP of men was significantly reduced ($p = .0001$) but not the median DUP of women (p

Table 3
Duration of untreated psychosis.

Intervention name †	Author(s), Date	DUP definition	Measure of DUP	Median (range) DUP		
				Intervention	Control	Statistical test/ Sig. *p*
CIEIS	Lloyd-Evans et al. (2015)	Time between first psychotic symptoms to first contact with early intervention service.	Nottingham Onset Schedule (participant, significant other, and other healthcare professionals)	116.5 days	133.5 days	Non-parametric test:0 .875
EASY	Chan et al. (2018)	Time between onset of psychosis (one or more positive symptoms) and receipt of antipsychotic treatment.	Interview for the Retrospective Assessment and Onset of Schizophrenia (participant and significant other). Review of medical records.	Youth: 90 days Adult: 93 days	Youth: 120 days Adult: 180 days	Non-parametric: Youth:0 .63 Adult:0 .01
EPIP	Chong et al. (2005)	Time between the onset of psychotic symptoms and when a definitive diagnosis and treatment were established.	Interview (participant and significant other). Review of medical records.	4 (0–240) months	12 (0.1–336 months)	Non-parametric:0 .002
EPPIC	McGorry et al. (1996)	Not defined.	Royal Park Multidiagnostic Instrument for Psychosis (RPMIP)	52 days	30 days	Non-parametric: Significant. P value not reported.
	Krstev et al. (2004)	Time between the onset of psychosis and commencement of treatment.	As above.	59 days	207.5 days	Log transformed *t*-test:0 .0557
LaCLAve	López et al. (2022)	DUP-Any: Time between onset of first episode psychosis (positive symptoms) and any treatment. DUP-Med: Time between onset of first episode psychosis (positive symptoms) and medication.	Interview (participant and significant other). Review of medical records.	Not reported.	Not reported.	Log-transformed data ANOVA: Main effect of campaign (onset to any treatment):0 .13 Main effect of campaign (onset to medication):0 .43
Mindmap	Srihari et al. (2022)	Time between the onset of psychosis and enrollment in first episode schizophrenia service.	The Structured Interview for Psychosis-Risk Syndromes (SIPS) (input from all available stakeholders).	149 (2–1189) days	Historical Control: 311.5 (8–1060) days Comparable Site Control: 430 (13–1416) days	Log-transformed ANOVA: Non-significant main effect of site or campaign (no *p* value reported). Site by campaign interaction0 .39
PEPP-Ontario	Malla et al. (2005)	The time between onset of psychotic symptoms and adequate treatment with antipsychotic medication (1 month unless remission of positive symptoms is earlier).	Circumstances of onset and relapse schedule (CORS) (participant and significant other). Review of medical records.	24.3 weeks	21.9 weeks	Non-parametric: Non-significant. P value not reported.
	Cassidy et al. (2008).	As above.	As above.	Intervention: 32.5 weeks Post Intervention: 24.5 weeks	22.8 weeks	Non-parametric: Non-significant. *P* value not reported.
PEPP-Montreal	Malla et al. (2014)	The time between onset of current psychotic episode and adequate treatment with antipsychotic medication (30 days unless remission of positive symptoms is earlier).	Circumstances of onset and relapse schedule (CORS) (participant and significant other). Review of medical records.	109 days	124 days	Non-parametric: Non-significant. P value not reported.
TIPS	Johannessen et al. (2001)	Not defined.	Not defined.	5 weeks	26 weeks	Non-parametric: <0.0005
	Larsen et al. (2001)	Time from onset of psychosis (positive symptoms) to initiation of adequate treatment.	Not defined.	4.5 weeks	26 weeks	Non-parametric:0 .0005
	Melle et al. (2004)	As above.	Interview (participant and significant other).	5 (0–1196) weeks	16 (0–996) weeks	Non-parametric:0 .003
	Joa et al. (2007)	As above.	Not defined.	Early Campaign: 4 weeks Late Campaign: 7 weeks	14 weeks	Non-parametric:0 .017 (Early campaign and no campaign) No other significant differences reported.
	Joa et al. (2008)	As above.	Interviews (participant and significant other).	5 weeks	15 weeks	Non-parametric: <0.005
	Hegelstad et al. (2014)	As above.	Interview (participant and significant other). Review of medical records.	Intervention (TIPS1; 1997–1998):	Historical Control: 26 (0–936)	Non-parametric: TIPS1 to TIPS2: <0.014

(*continued on next page*)

Table 3 (*continued*)

Intervention name †	Author(s), Date	DUP definition	Measure of DUP	Median (range) DUP		
				Intervention	Control	Statistical test/ Sig. *p*
				6 (0–416) weeks Intervention (TIPS1; 1999–2000): 8 (0–364) weeks Intervention (TIPS3): 14 (0–520) Intervention (TIPS 4; 2007–2008): 25 (0–1530) Intervention (TIPS 4; 2009–2010): 8 (0−1300)	weeks Intervention Removed (TIPS2): 15(0–2080)	Historical control to TIPS1 1997–1998):0 .001 TIPS 3 to TIPS4 (2007–2008): 0.093 No other comparisons reported.
	Ferrara et al. (2019)	As above.	As above.	5 weeks (0–1196)	16 weeks (0–966)	Quartile regression:0 .0008
TOP	Hastrup et al. (2018).	Not defined.	Not measured.	Not reported	Not reported	Not reported
YouthSpace	Connor et al. (2016)	The time between onset of psychosis (positive symptoms) and the start of adequate treatment (at least 1 month or until a significant reduction in symptoms).	Regularly collected from all clients entering the service via interviews and review of electronic records.	39 days	79.5 days	Linear transformed regression:0 .0039 (Relative reduction 0.75, 95 % CI 0.348–0.893)

Abbreviations: DUP = Duration of Untreated Psychosis, GP = General Practitioner.
† Studies ordered by intervention programme name for ease of comparison.

= .33). Similarly, Ferrara et al. (2019) observed significant reductions of DUP for men, but only in the 75th percentile ($p = .03$); no significant reduction in DUP was observed for women. TIPS also found a significant reduction in DUP for single individuals in the 75th percentile ($p = .02$) but not for individuals in relationships; higher financial adequacy was associated with longer DUP in the 25th percentile ($p = .04$) and increasing episodes of police arrests was associated with increased reduction in DUP in the 25th percentile ($p = .047$). The impact of the intervention was not found to be significantly associated with having a diagnosis of narrow schizophrenia spectrum disorder, Premorbid Adjustment Scale (PAS) scores (Cannon-Spoor et al., 1982), Global Assessment of Functioning (GAF) scores (American Psychiatric Association, 1987) or number of family contacts.

3.4. Impact of intervention programmes on PtC

Eight programmes reported PtC characteristics. Only the CIEIS programme reported the mean number of PtC (mean number of contacts with mental health services) between first help-seeking contact and referral to EIP and found a significant increase following the intervention programme ($p = .002$). The authors argued that this may have been due to improved recording of PtC information during the study.

Three programmes reported mean duration of PtC, these were defined and measured differently across studies (described in Table 4). The Mindmap programme found no significant main effect or interaction of site or intervention programme on demand delays (days between onset of psychosis and first antipsychotic medication) or supply delays (days between first antipsychotic medication and referral to EIP). However, the authors observed a significant reduction in demand delay days per intervention year in the 75th percentile ($p = .006$) and supply delay days in the 50th ($p = .008$) and 75th percentile ($p = .03$). PEPP-Montreal found no significant difference in mean help-seeking delays (days between onset of psychosis and first mental health contact) or mean referral delays (days between first mental health contact and referral to EIP) between intervention and control groups. Youthspace reported the mean delay in help-seeking and mental health services, however, did not compare these statistically. These studies were of relatively high quality.

Three programmes (from high quality studies) compared key pathway contacts, two of which found significant differences between intervention and control group contacts. CIEIS found a significantly higher proportion of new referrals reached EIP without the involvement of other mental health services, however the authors argue that most referrals came through GPs who were not the target of the intervention. TOP found the intervention group had significantly fewer mental health contacts and consultations with GPs, but significantly more GP telephone contacts than the control group. PEPP-Montreal found no significant differences in contacts between the intervention and control group.

Four programmes (EPIP; PEPP-Ontario; TIPS; TOP) compared referral sources, three of which (EPIP; TIPS; TOP) found significant differences between the intervention and control groups. The EPIP programme found a significant increase in self and family referrals and a significant reduction in police involvement. The TOP programme found no difference between GP or hospital referrals, however individuals in the intervention group were more likely to be referred through other, unspecified, sources. The TIPS programme found a significant increase in internal referrals such as hospital emergency and outpatient, and a significant reduction in GP referrals following the end of the intervention programme. PEPP-Ontario found no significant differences in referral sources between the intervention and control group.

3.5. Quality appraisal

The quality assessment ratings are given in Table 5. The methodological quality of studies varied, ranging from 42.86 % (Johannessen et al., 2001) to 100 % (Connor et al., 2016; Hastrup et al., 2018; Hegelstad et al., 2014; Joa et al., 2008; Krstev et al., 2004; Melle et al., 2004; Srihari et al., 2022). Overall, studies used appropriate measurements, it was agreed during consensus meetings that measures would be scored as appropriate if DUP and PtC were appropriately defined and how data were collected was consistent with this definition. Only CIEIS

Table 4
Pathways to care information.

Intervention name †	Author(s), date	PtC definition	Measure of PtC	Mean (SD) PtC Delay		
				Intervention	Control	Sig. *p*
CIEIS	Lloyd-Evans et al. (2015)	Number of steps in the referral pathway and type of referral from first contact point to date of appropriate referral to early intervention service.	Computerised assessment package	Not reported.	Not reported.	Not reported.
EASY	Chan et al. (2018)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
EPIP	Chong et al. (2005)	Not defined.	Interview (participant and significant other). Review of medical records.	Not reported.	Not reported.	Not reported.
EPPIC	McGorry et al. (1996)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
	Krstev et al. (2004)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
LaCLAve	López et al. (2022)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
Mindmap	Srihari et al. (2022)	Demand: Time between onset of psychosis to first antipsychotic medication. Supply: Time between first antipsychotic medication and enrollment in a first episode schizophrenia service.	Pathways to care instrument modified for the study.	Demand 145.3 (234) days Supply 138.7 (242.2) days	Demand Historical Control: 173.5 (177.2) days Comparable Site Control: 186.4 (236.7) days Supply Historical Control: 153 (218.7) days Comparable Site Control: 180.8 (175.5) days	Non-significant main effect of site or campaign (no p value reported). Demand Site by campaign interaction0.60 Supply Site by campaign interaction0.23
PEPP-Ontario	Malla et al. (2005)	Not defined.	Circumstances of onset and relapse schedule (CORS) (participant and significant other). Review of medical records.	Not reported.	Not reported.	Not reported.
	Cassidy et al. (2008).	Not defined.	As above.	Not reported.	Not reported.	Not reported.
PEPP-Montreal	Malla et al. (2014)	Help-seeking: Time between onset of current episode of psychosis and first mental health contact for the presenting psychotic symptoms. Referral: Time between the mental health first contact and final referral resulting in assessment at PEPP.	Circumstances of onset and relapse schedule (CORS). Review of medical records.	Help-Seeking: 183.81 (373.93) days Referral: 90.8 (240.88) days	Help-Seeking: 146.8 (265.46) days Referral: 93.04 (250.90) days	Help-Seeking:0.431 Referral:0.928
TIPS	Johannessen et al. (2001)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
	Larsen et al. (2001)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
	Melle et al. (2004)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
	Joa et al. (2007)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
	Joa et al. (2008)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
	Hegelstad et al. (2014)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
	Ferrara et al. (2019)	Not defined.	Not measured.	Not reported.	Not reported.	Not reported.
TOP	Hastrup et al. (2018)	Contacts with mental health services and GP in the two years prior to first diagnosis of schizophrenia.	Extracted from national databases. No formal tool reported.	Not reported.	Not reported.	Not reported.
YouthSpace	Connor et al. (2016)	Help-seeking delay: Time between onset of psychosis and first help-seeking contact. Mental health service delay: Time between first contact with secondary mental health services after onset of psychosis and onset of criteria treatment.	Interviews. Review of electronic care records.	Help-seeking delay: 41.49 (105.93) days Mental health service delay: 42.32 (86.74) days	Help-seeking delay: 116.97 (229.02) days Mental health service delay; 124.19 (216.45) days	Not reported.

Abbreviations: PtC = Pathways to Care, GP = General Practitioner.
† Studies ordered by intervention programme name for ease of comparison.

Table 5
Quality appraisal.

Domain	Quality criteria	Quality assessment of included studies																	
		Cassidy et al. (2008)	Chan et al. (2018)	Chong et al. (2005)	Connor et al. (2016)	Ferrara et al. (2019)	Hastrup et al. (2018)	Hegelstad et al. (2014)	Joa et al. (2007)	Joa et al. (2008)	Johannessen et al. (2001)	Krstev et al. (2004)	Larsen et al. (2001)	Lloyd-Evans et al. (2015)	López et al. (2022)	Malla et al. (2005)	Malla et al. (2014)	McGorry et al. (1996)	Melle et al. (2004)	Srihari et al. (2022)
Screening Questions	Are there clear research questions?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Do the collected data allow to address the research questions?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Quantitative Non-Randomised Studies	Are the participants representative of the target population?	–	–	?	+	?	+	+	?	+	?	+	+	+	–	?	?	+	+	+
	Are measurements appropriate regarding both the outcome and intervention (or exposure)?	+	+	+	+	+	+	+	?	+	?	+	?	+	+	+	+	+	+	+
	Are there complete outcome data?	+	?	?	+	?	+	+	?	+	?	+	+	+	+	+	+	?	+	+
	Are the confounders accounted for in the design and analysis?	+	+	+	+	+	+	+	+	+	?	+	+	+	?	+	+	+	+	+
	During the study period, is the intervention administered (or exposure occurred) as intended?	+	+	+	+	+	+	+	+	+	+	+	+	–	+	+	+	+	+	+
Total percentage		85.71	71.43	71.43	100	71.43	100	100	57.14	100	42.86	100	85.71	85.71	71.42	85.71	85.71	85.71	100	100

+yes, – no,? can't tell.

(Lloyd-Evans et al., 2015) reported that the intervention was not administered as intended. In addition, most papers considered potential confounders in their design and analysis procedures. Data was considered complete if it reached 60 %, consistent with quality assessment guidelines (Thomas, 2003) and a previous review (Lloyd-Evans et al., 2011). Limitations were generally due to a lack of comparison of the sample to the population or failure to compare participants to non-participants, making it difficult to assess if the participants were representative of the target population.

4. Discussion

4.1. Main findings

This systematic review aimed to explore the effectiveness of interventions, initiatives, and campaigns at reducing DUP or DUI, and improving PtC, for individuals with psychotic disorders (including FEP or CHR-P). The review found no studies investigating the impact of such initiatives aimed towards an CHR-P population and 19 studies evaluating 11 intervention programmes aimed towards a FEP population. Given the lack of CHR-P papers, it was not possible to investigate the impact of interventions at reducing DUI. There were mixed findings about the effectiveness of interventions at reducing DUP and few studies reported on the impact of these interventions on PtC. Of the studies that reported PtC information there was heterogeneity in definition and measurement. Interventions targeting multiple populations (general public and non-healthcare professionals) and those lasting >12-months, appeared to be more likely to result in a reduction in DUP, however this was not a universal finding. There were differences in how interventions impacted the DUP for different groups.

4.2. Interpretation of findings

The fact that no papers were identified investigating interventions to reduce delays for individuals with CHR-P suggests that PtC continues to be a more neglected area in CHR-P than FEP (Allan et al., 2021). A recent systematic review was identified in our searches (Estradé et al., 2022) investigating the extent to which CHR-P services implement public health strategies. The authors concluded that CHR-P services implement a range of public health prevention initiatives and interventions, however few studies addressed these initiatives in their primary aims. The authors argue that research in this area is still emerging. None of the included papers in the review (Estradé et al., 2022) met our inclusion criteria as they did not compare interventions to standard service provision and did not investigate the impact of the intervention on DUI or PtC characteristics.

In their earlier review, Lloyd-Evans et al. (2011) identified 11 papers, seven of which met the inclusion criteria for the present review. The remaining four did not meet the inclusion criteria due to being aimed solely at healthcare professionals. The present review identified an additional 12 papers evaluating seven intervention programmes not included in the earlier review. Additionally, our review explored the impact of intervention programmes on PtC characteristics.

The included FEP studies originate from a variety of countries with different healthcare contexts and processes and therefore collective findings should be interpreted with caution. In addition, population and intervention characteristics differed across studies. These differences may help to explain some of the variation in findings across intervention programmes. Mixed findings regarding the effectiveness of interventions on DUP were consistent with the earlier review by Lloyd-Evans et al. (2011). The authors found that multi-focus campaigns with greater intensity appeared to be more successful in reducing DUP. Similarly, our review suggested that interventions targeting multiple populations were more successful than those targeting non-healthcare professionals only. However, it should be noted that results were still mixed for multi-focus interventions and only two interventions targeted non-healthcare professionals only (Lloyd-Evans et al., 2015; Malla et al., 2014). Further, interventions that were longer in duration appeared to be more likely to find a significant reduction in DUP (Chong et al., 2005; Connor et al., 2016; Ferrara et al., 2019; Hegelstad et al., 2014; Joa et al., 2007; Joa et al., 2008; Johannessen et al., 2001; Larsen et al., 2001; Melle et al., 2004; Srihari et al., 2022).

Some studies observed more individuals with longer DUP over two-years following the intervention programme (Hegelstad et al., 2014; Krstev et al., 2004; Malla et al., 2005). It may be that intervention programmes, at least initially, identify cases with long DUP who may not otherwise have been detected, and therefore any effect of intervention campaign on DUP may have been masked. Given that a long DUP is associated with poor outcomes, identifying more patients with longer DUP who may otherwise have gone undetected may in itself be an important and valuable outcome (Lloyd-Evans et al., 2011).

Several studies found that the intervention programmes differentially impacted the DUP of different groups. For example, greater reductions in DUP were seen in adult participants with gradual onset psychosis (Chan et al., 2018), no family history of psychiatric illness (Chan et al., 2018), men (Ferrara et al., 2019; Larsen et al., 2001) single individuals (Ferrara et al., 2019), and more episodes of police arrest (Ferrara et al., 2019). Of note, none of the studies investigated whether the intervention programme differentially impacted DUP based on ethnicity, employment status, or urban or rural living. Research suggests that unemployment, ethnic minority status, and rural living are all associated with longer and more negative PtC which may contribute to longer DUP (Boonstra et al., 2012; Kvig et al., 2017; Morgan et al., 2005; Nishii et al., 2010; Singh and Grange, 2006). The differential impact of interventions warrants further investigation to determine what works best and for whom.

Studies investigating the impact of intervention programmes on PtC were limited. Direct comparison between studies is difficult given the variability in definitions of PtC and lack of a consistent, validated measurement tool. This is surprising given that a validated measure of PtC in FEP has been recommended for many years (Singh and Grange, 2006) and standardised measures completed with several relevant informants is best practice (Schiffman et al., 2015). There is a need for the development of such a tool for both FEP (Singh and Grange, 2006) and CHR-P (Allan et al., 2021). Of the studies that reported data on PtC, findings were heterogenous about the effectiveness of intervention programmes in altering PtC (Cassidy et al., 2008; Chong et al., 2005; Hastrup et al., 2018; Joa et al., 2007; Lloyd-Evans et al., 2015; Malla et al., 2014; Malla et al., 2005; Srihari et al., 2022). Lloyd-Evans and colleagues (Lloyd-Evans et al., 2011) recommended in their systematic review that even if intervention programmes do not reduce DUP, they may alter PtC which may result in reduced economic costs and increased patient satisfaction. It is therefore an important consideration for future research.

Effective public health interventions rely on behaviour change, it is therefore important that interventions are theory driven and draw on models of behaviour (Michie et al., 2011), as recommended by the UK Medical Research Council (Michie et al., 2005). This is necessary to understand the nature and mechanisms of behaviour change and implement an appropriate intervention based on this understanding (Michie et al., 2011). Few of the included studies (n = 5) explicitly reported using any theoretical framework to inform the development of their intervention programmes (Connor et al., 2016; Krstev et al., 2004; López et al., 2022; Malla et al., 2014; Srihari et al., 2022). Future research should report what and how theoretical models have been used which may support the adaptation and implementation of interventions in different contexts.

4.3. Limitations

It is possible that some literature may have been missed in the searches either due to availability in databases or being contained in

grey literature. Whilst a broad approach was taken to the literature search terms around psychosis, papers may have been missed which used only CHR-P terminology. However, on balance other reviews investigating CHR-P have used similar search strategies to ours (Lång et al., 2022; Perrottelli et al., 2021). Interventions were categorised similarly to the previous systematic review by Lloyd-Evans and colleagues (Lloyd-Evans et al., 2011) by dividing them into those targeting multiple populations, the general public only, or non-healthcare professionals only. This may have resulted in missing differences in specific components of the interventions which may account for some of the variability in results. Due to the lack of cut-offs for quality ratings in the MMAT, it is difficult to objectively qualify the quality of included studies.

Results of this review should be interpreted with caution for several reasons. The studies originated from several different countries with different healthcare contexts and processes. Many of the papers did not use validated measures of PtC. Some studies reported small sample sizes which may have limited the power to detect differences between groups (Cassidy et al., 2008; Chan et al., 2018; Krstev et al., 2004; Srihari et al., 2022). In addition, none of the studies were randomised controlled trials which would have strengthened their validity and reduced potential confounders.

4.4. Research and clinical implications

The findings in this review present a mixed picture and the intervention programmes do not appear to have a uniform effect. It would be useful for future research to investigate PtC to better understand where delays may occur in help-seeking and factors which may influence these delays. For example, current research suggests that certain social and demographic factors are associated with longer and more negative PtC, such as unemployment (Morgan et al., 2005; Nishii et al., 2010), ethnic minority status (Morgan et al., 2005; Singh and Grange, 2006) and rural living (Boonstra et al., 2012; Kvig et al., 2017). Understanding sources of delay and associated factors will help to inform the development of targeted interventions to address these. Additionally, a meaningful benefit of public health interventions at improving PtC and reducing DUP and/or DUI would be improvement of patient clinical and functional outcomes. Future research would therefore benefit from investigating whether such changes lead to an improvement in longer-term outcomes.

Understanding PtC will be particularly important in the CHR-P population in which research is lacking. A recent systematic review highlighted only ten studies which explored the characteristics of PtC for individuals with CHR-P (Allan et al., 2021). Furthermore, reducing treatment delays in CHR-P may help to improve the outcomes for individuals who do not transition to FEP or help to reduce DUP for individuals who do transition as individuals will already be in contact with specialist services (Cotter et al., 2014; Lloyd-Evans et al., 2011).

Qualitative approaches may provide a detailed understanding of the PtC and sources of delay for individuals with both FEP and CHR-P. These types of studies may also help to understand individual experiences of interventions. For example Lloyd-Evans and colleagues (Lloyd-Evans et al., 2015) found that following their intervention programme, staff continued to have uncertainties about where to refer young people who may be experiencing FEP and concerns around stigma or damaging their working relationships. This may help to understand why the intervention was ineffective at reducing delays and could inform intervention development and adaptations. No other studies adopting qualitative approaches to explore experiences of intervention programmes were identified, future research would benefit from exploring these qualitative perspectives.

Our review highlights some promising findings about the effectiveness of interventions at reducing DUP, particularly those aimed at multiple populations and lasting >12-months. Interventions also appear to differentially impact the DUP of different groups. It is important that local services are aware of potential barriers and delays in care for their local population in order to develop strategies to address these (Cocchi et al., 2013; Lloyd-Evans et al., 2011; Srihari et al., 2014). These would benefit from being devised alongside experts by experience (Bradley, 2015). Mental health services are well positioned to deliver such interventions as they are situated within their local communities and have the opportunity to target specific groups to raise awareness of psychosis and potentially reduce delays to treatment and improve long-term outcomes (Singh, 2010).

Despite this, EIP services in the UK are impacted by underfunding and lack of resources (Rethink Mental Illness, 2014). This has resulted in delays in treatment, reduced access to care, and variation in the care services are able to provide (Gilburt, 2018). For instance, services are often having to focus on acute intervention rather than prevention (Gates and Killackey, 2020). This highlights the need for commissioning groups and policy makers to prioritise preventative care, to make funding and resources available to services to deliver such interventions. Public health interventions are often expensive (Chong et al., 2004), however reducing treatment delays has the potential to improve outcomes (Singh, 2010) and offset costs by providing savings in other areas associated with such delays (Cocchi et al., 2011; Chong et al., 2004).

5. Conclusion

The findings from this review suggest that intervention programmes may differentially impact the DUP of different groups and research into their effect on PtC for FEP individuals is lacking. The lack of studies evaluating interventions to reduce DUI or improve PtC for CHR-P also highlight the urgent need for investigating delays and influencing factors within this population to help develop appropriate interventions to address these and potentially improve outcomes.

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Rhiannon Murden: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Sophie M. Allan:** Conceptualization, Investigation, Methodology, Supervision, Writing – review & editing. **Jo Hodgekins:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Sheri Oduola:** Conceptualization, Investigation, Methodology, Supervision, Writing – review & editing.

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Appendix. Supplementary data

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