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Impact of co-located welfare advice in healthcare settings: prospective quasi-experimental controlled study

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Background
Evaluations of primary healthcare co-located welfare advice services have been methodologically limited.

Aims
To examine the impact and cost-consequences of co-located benefits and debt advice on mental health and service use.

Method
Prospective, controlled quasi-experimental study in eight intervention and nine comparator sites across North Thames. Changes in the proportion meeting criteria for common mental disorder (CMD, 12-item General Health Questionnaire); well-being scores (Shortened Warwick and Edinburgh Mental Well-being Scale), 3-month GP consultation rate and financial strain were measured alongside funding costs and financial gains.

Results
Relative to controls, CMD reduced among women (ratio of odds ratios (rOR) = 0.37, 95% CI 0.20–0.70) and Black advice recipients (rOR = 0.09, 95% CI 0.03–0.28). Individuals whose advice resulted in positive outcomes demonstrated improved well-being scores (β coefficient 1.29, 95% CI 0.25–2.32). Reductions in financial strain (rOR = 0.42, 95% CI 0.23–0.77) but no changes in 3-month consultation rate were found. Per capita, advice recipients received £15 per £1 of funder investment.

Conclusions
Co-located welfare advice improves short-term mental health and well-being, reduces financial strain and generates considerable financial returns.

Declaration of interest
None.

Associations between poor mental health and social disadvantage such as indebtedness and unstable housing are well documented.[1] Individuals with mental ill health are also more likely to have difficulties accessing support and advice for social welfare issues.[2–5] Subjective experiences of financial difficulties ('financial strain') predict onset and duration of common mental disorders.[6] The impact on patients of economic hardships associated with recession and austerity exert additional strain on general practitioners (GPs), particularly those working in socially disadvantaged areas.[7,8] One approach to reducing psychological distress linked to social disadvantage has been to co-locate welfare advice services (for example for issues related to debt and access to welfare benefits) in healthcare settings.[9,10] Previous evaluations report an impact on increased income and debt management but there is limited evidence in terms of health or service use.[11] Existing research is limited by small sample sizes, lack of robust comparator groups, attrition and lack of exploration of underlying pathways of effect,[10] which may have an impact on continued funding of such services.[9] We undertook a prospective controlled quasi-experimental study of the effects of co-located welfare benefits and debt advice on mental health and GP consultation frequency. We also compared funding costs of the service to the financial gains for advice recipients.

Method

Setting and study design

This quasi-experimental study (online supplement DS1) was part of a mixed-methods evaluation of co-located welfare advice services within North London conducted between December 2015 and December 2016; qualitative findings are reported elsewhere.[11] Co-location involves local Citizens Advice service staff providing specialist in-depth advice at general practices, primarily about welfare benefits and debts. Patients can self-refer or be signposted by practice staff. We prospectively compared individuals accessing co-located advice at eight GP sites with a propensity score weighted comparison group. Individuals were recruited over 8 months and followed up for 3 months. The evaluation received National Health Service (NHS) ethical approval from the London-Harrow Research Ethics Committee (REC) (NHS REC reference: 15/LO/1260).

Sample size

Intervention group size was limited by the number of individuals that the services had the capacity to support per week and time constraints linked to deadlines for subsequent commissioning decisions. The target sample size ($n = 816$; $n = 204$ intervention and $n = 612$ control) therefore included a larger comparison group to increase analytical power. Sample size was calculated to detect a moderate effect size (d) of 0.4 with 90% power and was sufficient to detect smaller effect sizes ($d = 0.35$) with 80% power (online supplement DS1).[10]

Recruitment

Advice group

All individuals aged 18+ years accessing co-located welfare advice services in eight sites during the recruitment period were eligible. Individuals waiting to see an adviser were approached by researchers. Those whose English was insufficient to understand the information sheet and consent form were excluded (3.2% of

those approached). In line with recommendations from prior reviews of research with 'hard to reach' groups,[12,13] individuals were offered £15 supermarket vouchers per survey.

Comparison group

We identified individuals aged 18+ years from which to generate a propensity score weighted comparison group.[14] The propensity score estimates the probability that a given individual would receive co-located advice, summarising a range of variables associated with receiving advice into a single probability value.[15] Weighting reduces confounding from selection bias by assigning more weight to controls whose propensity scores are closer to those of advice recipients.[16]

We contacted potentially eligible comparator participants in three ways (Fig. 1, online supplement DS1). In each, no identifiable data were disclosed to researchers before individuals provided informed consent. First, individuals of similar age group, ethnicity and gender to those accessing local co-located advice services in the past 12 months (assessed using Citizens Advice data) were identified from practice lists of nine local general practices. These practices did not host advice services but were in areas with similar levels of social disadvantage.[17] Based on an anticipated response rate of 10%, 5419 patients over all practices were identified and posted recruitment packs on behalf of their practice. Packs included information sheets, consent forms, baseline surveys and two return envelopes for consent forms and surveys (addressed to different locations). We expected that responders to these contact attempts may differ to advice recipients. Therefore, we worked with a local housing association to contact 490 tenants comparable with advice recipients in terms of age group, gender and ethnicity. Finally, as Black African and Caribbean individuals were underrepresented in GP-based returns, and to achieve the required sample size, we worked with community organisations to advertise the study.

Data collection

Surveys were self-report, taking approximately 15 min to complete. All materials were piloted (online supplement DS1). After survey refinement, baseline data were collected from advice recipients at general practices prior to their advice session and from controls by post. We collected follow-up data from both groups by post 3 months later. This follow-up period was chosen first, to increase confidence in a direct association between advice receipt and changes in mental health, particularly in a multiply disadvantaged population in which other factors could influence outcomes and override the benefits of advice. Second, to minimise attrition – a limitation of research with socioeconomically disadvantaged groups, optimising statistical power and reducing the risk of bias.[12,13] Third, based on Citizens Advice data indicating a mean issue resolution time of 3 months.

To determine whether the study sample was representative of co-located advice recipients, anonymised demographic data for all individuals accessing services at participating sites during the recruitment period were extracted from the Citizens Advice information technology (IT) platform.

Outcome measures

Prior research demonstrates that the relationship between low income and CMDs is mediated by experiences such as perceived financial strain and indebtedness.[3,6,18] Psychosocial theories linking such experiences with poor mental health suggest that they act as stressors, increasing the risk of poor health when demands exceed individual coping resources.[18,19] Further, patients in more deprived areas have higher rates of GP consultations associated with psychological difficulties linked to problems such as financial hardship. Outcome measures were therefore selected to examine evidence for improved mental health and reduced consultations, and whether this was influenced by reduced financial strain.

Mental health and well-being

We used the 12-item General Health Questionnaire (GHQ-12) to measure the primary outcome, presence/absence of CMD. The GHQ-12 is a widely used and validated screening instrument for common symptoms of mental distress, encompassing comorbid symptoms of anxiety and depression.[20,21] Each item has four response categories on a Likert scale ranging from 'not at all' to 'much more than usual'. The 'GHQ-method' of scoring[20] was used; assigning a score of 1 to 'rather more' or 'much more than usual', and a score of 0 to 'not at all' or 'no more than usual' responses. Total scores range from 0 to 12. Scores of four or more (GHQ 'caseness') indicate a level of symptoms likely to need further treatment.[20] We counted missing items as low scores,[22] those responding to fewer than four items were coded as missing.

Well-being was measured using the seven-item Shortened Warwick-Edinburgh Mental Well-being Scale (SWEMWBS).[23] This ordinal scale evaluates positive mental health over the past fortnight, assessing respondents' agreement with statements such as, 'I've been feeling optimistic about the future'. Responses are measured on a five-point scale ranging from 'none of the time' to 'all of the time'. Summed scores are used as a continuous variable, greater scores indicate more positive well-being. Scores range from 7 to 35 and are transformed to a total score.[24] Respondents answering three or more items were non-missing. The average score of non-missing items was imputed for remaining items.[25]

Consultation frequency

Self-reported consultation frequency was assessed by asking individuals to report numbers of GP appointments over the past 12 months (baseline), and over the past 3 months (baseline and follow-up).

Financial strain

Perceived financial strain was measured with an item used in UK household panel surveys[26] asking, 'How would you say you were managing your finances these days?' Response options are on an ordinal scale from 'living comfortably' to 'finding it very difficult'.

Financial support-seeking

We examined coping and support-seeking for financial pressures at baseline and follow-up using items adapted from previous surveys[27,28] (online supplement DS2). Participants were asked what they would do (for example 'use credit card') and who they would go to (such as 'GP'), if their income did not cover their costs. Questions about how financial stressors affected them (for example 'physical health') were asked before enquiring who they would go to for support with these experiences. Any changes since receiving advice (welfare advice group only) and access to welfare advice services since baseline were assessed at follow-up.

Propensity score covariates

Independent variables to be included in the model were measured at baseline (Table 1). These included categorical variables: age group, gender, ethnicity, marital status, employment status, educational attainment, household composition, tenure, monthly

household income, long-term health conditions and financial capability. Financial capability was assessed with four items indicating past-year problems meeting housing-related payments.[29] We summed the number of problems and created a binary variable (0/1+).

Accessing the advice service

To explore further the accessibility of co-located advice services, the baseline survey included questions about how they had heard about the service (for example 'word of mouth'); preferred location of welfare advice (GP/elsewhere); and, whether they had spoken to their GP about the issue they were seeing the adviser about (yes/no). Open-ended questions explored reasons for the latter two items, thematically coding responses for analyses (online Table DS1).

Cost-consequences analysis

As a return-on-investment measure, we divided the total financial gain for all individuals accessing the co-located advice services (income gain and debt managed) using data from the Citizens Advice IT platform, by the cost of the service to funders over the 8-month baseline data collection period.[30]

Statistical analyses

Analyses were carried out using Stata v.14. Descriptive analyses examined baseline advice recipient and propensity weighted comparator group characteristics. Propensity scores were calculated with logistic regression, with advice group membership as the dependent variable.[31,32] Data were kernel weighted[33] and comparator group members whose scores did not overlap with the distribution of advice group scores were excluded (online supplement DS1). Data were not imputed as missing covariate data were low (5.27%) and loss to follow-up was not associated with the main outcomes.

The effect of co-located advice receipt was estimated by comparing the before–after change in advice receipt and comparator groups by including an interaction term between group and time (before–after indicator) in analytical models. To account for clustering within individuals and general practices, data were analysed using mixed-effects multilevel longitudinal regression models.[34] All analyses specified robust standard errors, were weighted using the kernel weights and adjusted for indicators of missingness on propensity score covariates and loss to follow-up (educational attainment, household composition, household income and ethnicity).

Logistic regression models were used for binary outcomes (CMD caseness, financial strain), interaction coefficients were exponentiated and expressed as ratios of odds ratios (rOR). For count (consultation frequency) and continuous (well-being) outcomes we used Poisson and linear regression models respectively, interaction coefficients indicated the difference between the changes in outcome score by group. To examine the role of financial strain, associations between financial strain, advice receipt and the main outcomes were assessed. Adjustments were made for financial strain where a significant impact of advice on the main outcomes was found.

We re-ran analyses for the main outcomes, generating separate propensity scores for specific subgroups identified *a priori* on the basis of utility for commissioners (because of limited subgroup sample sizes to detect small effect sizes): gender (male/female); ethnicity (White, Black/Black British and other); long-term conditions status; and, whether or not individuals were recorded with, or self-reported, improvements since receiving advice in income, housing or employment.

Results

Participants

We recruited 278 of the 397 service users approached at baseline (70.0%) (Fig. 1). Reasons for non-participation were 'refusal unknown reason' (48, 11.9%), 'trust' (35, 8.7%), 'no time' (23, 5.7%) and 'language' (13, 3.2%). Among the cohort of unique contacts recorded on the Citizens Advice IT platform over the baseline recruitment period, those recruited to the advice group were similar in terms of gender, age group, ethnic group and health status (online Table DS2). In total, 633 controls were recruited, of which 623 were included in analyses. We excluded controls whose propensity scores were outside the range of common support ($n = 4$) and who reported receiving welfare benefits/debt advice between baseline and follow-up ($n = 6$) (Fig. 1). We followed up 199 (71.6%) individuals in the advice group and 530 (85.1%) in the control group. Table 1 shows the

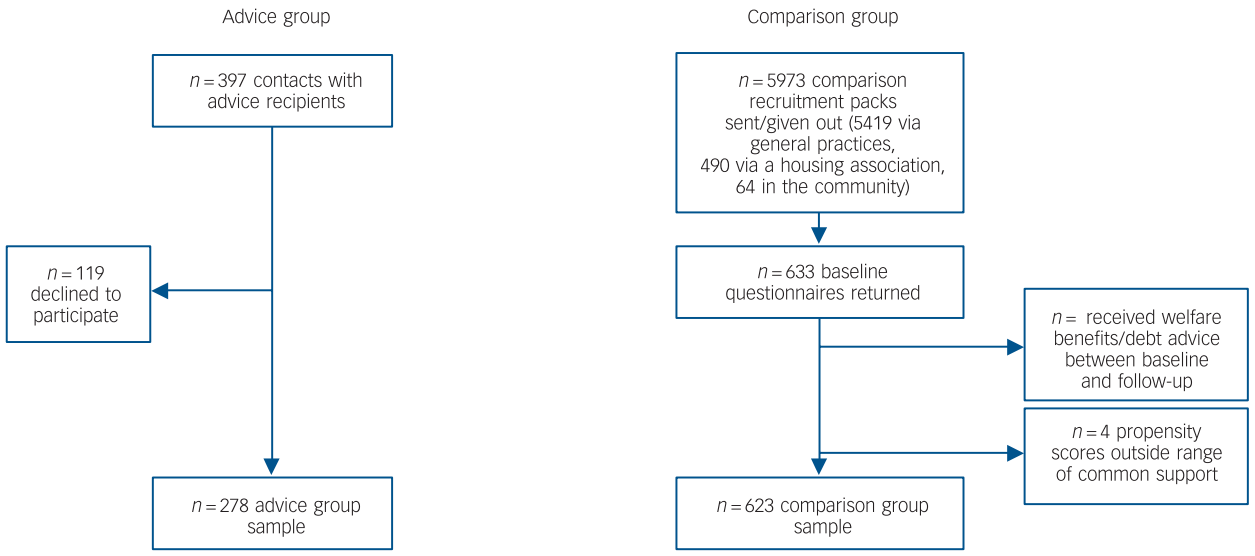

Fig. 1 Advice and comparison group sample flow chart.

Table 1 Covariate distribution across propensity score weighted advice group and comparison group members

	%	
	Advice ($n = 278$)	Comparison ($n = 623$)
Gender		
Male	36.7	39.5
Female	63.3	60.5
Age group, years		
18–24	1.5	1.6
25–34	9.3	11.7
35–44	22.2	16.9
45–54	26.8	32.7
55–64	28.4	25.0
65–74	6.3	8.5
75+	5.4	6.3
Ethnicity		
White	48.6	43.6
Black/Black British/mixed	30.8	41.1
Asian/Asian British/mixed	10.7	9.7
Other	9.9	5.7
Marital status		
Single	42.9	41.9
Long-term relationship	27.7	24.6
Ex-relationship	29.5	33.5
Educational attainment		
None	41.3	33.5
Up to GCSE level	24.1	30.7
Up to A level	18.5	22.6
Degree and above	16.1	13.3
Employment status		
Unemployed	18.9	22.2
Employed	24.4	18.6
Retired	14.0	13.3
Outside labour force	42.7	46.0
Tenure		
Owned/part owned	10.2	9.3
Rented	69.6	72.6
Rent free	20.2	18.2
Household composition		
Live alone	43.6	40.3
Lone parent	12.0	22.2
Live with partner with or without children	27.8	21.0
Live with others/family	16.6	16.5
Household income, £		
0–549	57.9	53.6
550–999	24.3	30.2
>1000	17.8	16.1
Problems paying for housing		
0	34.7	41.9
1+	65.3	58.1
Health status		
Disabled/long-term health condition	72.6	74.6
Not disabled/no health condition	27.5	25.4

propensity score covariate distribution across the two groups following weighting.

Estimating the impact of advice

At follow-up, 64% of the 199 people in the advice group reported at least one improvement since receiving advice. Of these the most common were: improved stress (25.9% of responses), income (20.6%), housing circumstances (17.7%) and confidence (15.9%) (online Fig. DS1).

Mental health and well-being

The proportion of individuals meeting criteria for CMD decreased over time to a greater extent among the advice group than the control group. However, the group × time interaction was not statistically significant (Table 2). Subgroup sample sizes and analyses are shown in Table 3. The reduction in proportion meeting CMD criteria was significantly greater for the advice group relative to the controls among women (rOR = 0.37, 95% CI 0.20–0.70, $P = 0.002$) and Black/Black British participants (rOR = 0.09, 95% CI 0.03–0.28, $P < 0.001$).

We found no evidence for any difference in change in well-being scores between the two groups (Table 2). In subgroup analyses (Table 3), recipients who received a positive outcome from advice demonstrated significantly improved well-being scores compared with controls (β = 1.29, 95% CI 0.25–2.32, $P = 0.015$)

Consultation frequency

The welfare advice group reported more frequent consultations than controls (12 month mean consultation frequency of 13.1 (s.d. = 12.8) compared with 8.6 (s.d. = 9.1)). There was no evidence for an impact of advice on 3-month consultation frequency (Tables 2 and 3).

Role of perceived financial strain

Perceived financial strain was associated with CMD, well-being, consultation frequency and advice receipt (all $P < 0.001$). There was a significant improvement (rOR = 0.42, 95% CI 0.23–0.77, $P = 0.005$) in financial strain among the advice group compared with controls (Table 2). Advice receipt was associated with significant reductions in financial strain among women (rOR = 0.33, 95% CI 0.14–0.78, $P = 0.011$), those with long-term conditions (rOR = 0.30, 95% CI 0.16–0.58, $P < 0.001$) and those with positive advice outcomes (rOR = 0.45, 95% CI 0.28–0.74, $P = 0.001$) (Table 3).

For CMD, adjustments for financial strain reduced the strength of the interaction among women (rOR = 0.48, 95% CI 0.24–0.97, $P = 0.040$) but not among Black/Black British participants (rOR = 0.12, 95% CI 0.04–0.38, $P<0.001$). For well-being, adjustment for financial strain only partly accounted for

Table 2 Before-and-after comparison of primary outcomes among those receiving co-located welfare advice and propensity score weighted controls

	Baseline		Follow-up		Interaction group × time, rOR/β coefficient (95% CI)	*P*
	Advice	Comparison	Advice	Comparison		
Participants with common mental disorder,[a] %	79.5	68.6	62.6	56.5	0.57 (0.30 to 1.07)	0.078
Well-being,[b] mean (s.d.)	18.1 (5.2)	18.7 (5.0)	18.0 (5.5)	19.7 (4.4)	0.10 (−0.74 to 0.94)	0.814
Consultation frequency,[c] mean (s.d.)	4.1 (3.8)	2.7 (3.1)	4.0 (3.6)	2.5 (2.5)	0.04 (−0.20 to 0.29)	0.730
Financial strain,[d] %	66.9	39.9	58.6	43.2	0.42 (0.23 to 0.77)	0.005

a. Twelve-item General Health Questionnaire, scores 4+ identified as 'cases' (logistic regression, ratio of odds ratios (rOR)).
b. Shortened Warwick and Edinburgh Mental Well-being Score (linear regression, β coefficient).
c. Self-reported general practitioner appointments in the past 3 months (Poisson regression, β coefficient).
d. Self-reported financial situation 'difficult/very difficult' (logistic regression, rOR).

Table 3 Subgroup analyses estimating the impact of co-located welfare advice receipt relative to propensity score weighted controls

	Common mental disorder[a]		Well-being[b]		Consultation frequency[c]		Financial strain[d]	
	Interaction group × time (rOR, 95% CI)	*P*	Interaction group × time (β coefficient, 95% CI)	*P*	Interaction group × time (β coefficient, 95% CI)	*P*	Interaction group × time (rOR, 95% CI)	*P*
Gender								
Female (*n* = 595)	0.37 (0.20 to 0.70)	0.002	0.26 (−0.52 to 1.05)	0.514	0.11 (−0.11 to 0.33)	0.325	0.33 (0.14 to 0.78)	0.011
Male (*n* = 316)	1.15 (0.29 to 4.51)	0.843	0.27 (−1.16 to 1.70)	0.712	−0.19 (−0.77 to 0.38)	0.514	0.91 (0.21 to 3.93)	0.899
Ethnicity								
White (*n* = 466)	0.69 (0.33 to 1.46)	0.331	0.02 (−1.59 to 1.63)	0.981	0.14 (−0.11 to 0.39)	0.291	0.67 (0.36 to 1.27)	0.220
Black/Black British (*n* = 252)	0.09 (0.03 to 0.28)	<0.001	−0.21 (−1.44 to 1.03)	0.744	−0.01 (−0.45 to 0.44)	0.977	0.32 (0.06 to 1.76)	0.189
Other (*n* = 176)	0.83 (0.13 to 5.20)	0.845	0.69 (−1.03 to 2.42)	0.432	−0.02 (−0.45 to 0.41)	0.928	0.53 (0.13 to 2.13)	0.374
Long-term conditions								
Yes (*n* = 438)	0.41 (0.15 to 1.13)	0.085	−0.24 (−1.03 to 0.56)	0.558	−0.01 (−0.31 to 0.30)	0.970	0.30 (0.16 to 0.58)	<0.001
No (*n* = 468)	0.71 (0.31 to 1.64)	0.429	1.15 (−0.17 to 2.46)	0.087	0.37 (−0.08 to 0.83)	0.109	0.72 (0.39 to 1.32)	0.283
Advice outcome								
Yes (*n* = 708)	0.45 (0.20 to 1.02)	0.055	1.29 (0.25 to 2.32)	0.015	0.13 (−0.16 to 0.41)	0.385	0.45 (0.28 to 0.74)	0.001
No (*n* = 816)	0.64 (0.39 to 1.03)	0.063	−0.52 (−1.44 to 0.41)	0.271	0.03 (−0.24 to 0.30)	0.828	0.61 (0.31 to 1.21)	0.156

a. Twelve-item General Health Questionnaire, scores 4+ identified as 'cases' (logistic regression, ratio of odds ratios (rOR)).
b. Shortened Warwick and Edinburgh Mental Well-being Score (linear regression, β coefficient).
c. Self-reported general practitioner appointments in the past 3 months (Poisson regression, β coefficient).
d. Self-reported financial situation 'difficult/very difficult' (logistic regression, rOR).

the impact of advice among those with a positive advice outcome (β = 1.12, 95% CI 0.04–2.20, *P* = 0.042).

Financial support-seeking

There was a significant impact of advice on reduced use of a credit card or overdraft if income did not cover participants' costs (rOR = 0.48, 95% CI 0.26–0.90, *P* = 0.021). Among support-seeking behaviours for financial-related problems, the advice group became more likely to report not knowing where to go to for support over time, compared with controls (rOR = 2.33, 95% CI 1.14–4.76, *P* = 0.021). Similarly, there was a significantly greater increase in the proportion of advice recipients who did not know where they would seek help for the health impact of financial issues, relative to controls (rOR = 8.8, 95% CI 1.56–49.27), *P* = 0.014). Controls became proportionately more likely to talk to their GP about the health impact of financial strains but there was no change over time among advice recipients, generating a significant group × time interaction (rOR = 0.56, 95% CI 0.36–0.89, *P* = 0.015).

Cost-consequences

In total, £793 135 additional income (debt managed, income increases and one-off payments) was gained during the study period by recipients (average £2689 per capita). The annual costs of the service to funders in 2015/16 was £79 ,000, equating to £52 667 over the 8-month recruitment period. Dividing income gain by cost over 8 months translates to £15 income gain per £1 funder contribution.

Accessing the advice service

Co-located advice recipients had most commonly heard about the service through their GP or practice staff, followed by Citizens Advice elsewhere, or other advice services (online Table DS1). Nearly all reported a preference to see a GP-located adviser. Open-ended responses indicated that this was because the service was easier to access (for example because of mobility problems or travel anxiety), nearer home or more convenient (129, 64.8%); or, because it was a more familiar or less anxiety-provoking environment (42, 21.1%). If the service had not been available almost half of recipients would either not have sought advice at all, or would have spoken to their GP/other practice staff. Two-fifths of recipients had already spoken to their GP about their advice issue. Of these, over half said this was because it was affecting their mental health or was otherwise health related.

Discussion

To our knowledge, this is the first controlled prospective summative evaluation of co-located welfare advice services in healthcare settings. The provision of co-located advice led to significant improvements in mental health and well-being. Specifically, CMD caseness reduced among women and Black/Black British advice group recipients; and, those with a positive advice outcome also reported improvements in well-being. The strongest evidence was for a significantly greater reduction in perceived financial strain among the advice group compared with controls. This was reflected in an average financial gain of £2689 per capita among recipients. Compared with controls, advice recipients also reported enhanced coping strategies for dealing with financial strains; however, they were also more likely to report not knowing where to go to for support with financial

strain or the health impact of such strains over time. No differences in self-reported consultation frequency were found.

Explanations for the findings and comparison with literature

Mental health and well-being

Our hypothesis that improvements in mental health and well-being linked to advice receipt would be mediated by reductions in perceived financial strain was partially borne out. Thus, financial strain was associated both with poor mental health and receipt of advice; and, where a significant impact of advice on mental health and well-being was found, this was partially accounted for by adjustments for financial strain. The hypothesis was not supported among Black individuals. This suggests there may be other underlying mechanisms between receipt of advice and improved symptoms of CMD in this group or that financial strain insufficiently captured any reductions in stress. A generalised measure of perceived stress may be a more useful gauge of the impact of advice and may also capture improvements linked to other non-directly financial outcomes (for example, housing circumstances). Improvements in mental health may also arise from other psychosocial factors such as perceived social support and/or from material changes in circumstances.[18,35]

Reduction in indebtedness may also underlie changes in mental health and well-being. We found a significant reduction in reported use of a credit card or overdraft if income did not cover costs among advice recipients, relative to the control group. This may be linked to debt management outcomes of advice and/or to budgeting information provided. This is important since use of credit cards and unauthorised overdrafts incur high interest rates, further increasing the likelihood of indebtedness, which is prospectively associated with poor mental health.[3]

Consultation frequency

It is possible that a reduction in appointments was not found because of the short follow-up period and/or recall bias, although validity of self-reported healthcare use has been reported as fair.[36] Previous research using routinely collected medical record data found small reductions in GP consultation frequency and antidepressant prescription 6 months before and after receipt of co-located welfare advice.[37] However, this research was small and uncontrolled, precluding causal inference.

Financial support-seeking

In contrast to the advice group, controls were more likely to talk to their GP about the impact on health or functioning of financial strain, and less likely to seek advice from the welfare agencies if unable to meet payments. Further, there was an increase among advice recipients of not knowing where to seek help. Since many recipients had been directed to the co-located service from high street Citizens Advice, these findings could be related to concurrent closures of such local services.

Impact on GP non-health workload

Our findings are in line with two recent UK GP surveys,[38,39] in which GPs reported patient health, GP workload and practice staff time demands had been adversely affected by greater patient financial hardship and welfare provision changes. Our results suggest that reductions in financial strain could reduce practice burden and that co-location in health settings can target individuals less able to self-manage. This was evidenced by the proportion of advice recipients who would talk, or had already spoken, to their GP about their advice issue; by a preference to access advice at their general practice; and, by the proportion reporting that they would have gone to their GP, or would have not have sought advice, had the service not been there.

Strengths and limitations

A major strength of our research was the robust comparator group, allowing us to infer causality. Second, unlike previous research[40] our study was sufficiently powered to detect significant differences over time. Third, we achieved similar or higher follow-up rates than have previously been reported.[10] Fourth, we demonstrated that changes in perceived financial strain may be one, although not the only, underlying pathway linking advice to mental health. Fifth, by collecting data on health outcomes, service use and financial benefits accrued, we could provide data of direct value to commissioners.

This was a multisite study that increases the external validity of our results. However, all the sites examined were in London and served areas with high levels of multiple social disadvantage. Although these services are likely to be similar to other inner metropolitan areas, other urban and rural populations have differing sociodemographic population profiles and welfare needs. Nonetheless, co-located services provided in less urban UK locations also report that welfare benefits and debt are the main presenting issues and the income gain per capita is in line with other services.[41] This supports the generalisability of our findings but further empirical testing is required.

Self-reported consultations data may be less accurate than those extracted from practice records. Capacity to extract such data was limited as appointments were not routinely recorded. Reduced accuracy (underreporting) has been linked to older age, longer time frame of recall, more frequent service utilisation and use linked to stigmatised issues.[36] Although participants in both groups reported frequent GP consultations, the short recall time frame would have minimised inaccuracies. Further, as analyses compared change between the two groups (rather than absolute numbers), we have no reason to believe that the accuracy of self-report would have differed systematically over time. However, given the importance of this outcome to commissioners, future work should assess any change in service use over longer periods using objective measures.

As a quasi-experimental study, residual bias may arise if unmeasured variables exerted different influences on change over time in either group. However, we consider this risk to be small given the short follow-up and that the direction of change in the primary outcome was the same in both groups.

A potential disadvantage of the 3-month follow-up period is underreporting of the benefits of welfare advice. Data extracted from the Citizens Advice IT platform demonstrated that some individuals receive several episodes of advice over a longer period. We may therefore have collected outcome data for individuals in whom issues of concern are not fully resolved or for whom benefits may accumulate over time. Further, any impact of reduced financial strain on mental health and well-being may take longer to fully emerge and/or be muted among those chronically exposed to such stressors.[42] Finally, our approach to assessing return on investment may underestimate the value of co-located welfare advice since analyses excluded non-monetised benefits, such as from mental health or housing improvements.

Implications

Co-located welfare advice can reach people who would not otherwise have sought advice or may otherwise turn to their GP

for support. Advice recipients may experience improvements to short-term mental health, reduced financial strain and receive considerable financial returns. Although this study focuses on primary care, provision of advice services may benefit secondary mental healthcare service users at risk of underclaiming entitled welfare benefits, financial, housing and employment instability and poor financial capability.[43,44] Pathways for the impact on reduced NHS and social care costs for this group have been hypothesised but not yet empirically tested.[45] Further research on the impact of advice in different health settings and within new models of care that include aims to address wider determinants of health and health inequalities (such as multi-speciality community providers and primary and acute care models), using objective measures of service use is needed.

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Data supplement to Woodhead et al. Impact of co-located welfare advice in healthcare settings: prospective quasi-experimental controlled study**.** Br J Psychiatry doi: 10.1192/bjp.bp.117.202713

Supplement DS1

Methodological details

Study design

Our study utilised a quasi-experimental design. This decision was based on two key reasons:

1. In the areas under study, which were selected as commissioners requested an independent evaluation, co-located welfare advice services had already been established. It would therefore not have been appropriate to take away services from certain settings in order to randomly allocate practices to intervention and control arms.

2. Due to concerns about the generalisability of a randomised controlled trial. External validity would likely have been limited by recruitment of atypical participants, engagement by atypical GPs/practice staff and low recruitment rates. (1) For example, this was borne out by findings from our linked qualitative study (2) which indicated a range of barriers to referring patients to co-located advice services among GPs which was influenced by macro, meso and micro level contextual factors; thus, the implementation in practice may not reflect that occurring within an experimental environment. Further, recruitment to a trial in which individuals must agree to randomly receive advice at their practice or not have access to such advice would be both impracticable and unethical, and would likely lead to recruitment of a sample unrepresentative of the wider population in need of advice.

By including a propensity score weighted comparison group, and assessing impact through comparing change in two groups over time, our design was able to assess the impact of advice through comparison with a counterfactual. The propensity score weighting minimised differences between the two groups in terms of observed variables (see below), while comparing change over time in the two groups (rather than absolute differences before and after) mitigated the impact of selection bias.

Sample size calculations

The intervention group size was limited by the number of individuals that the services had the capacity to support per week and time constraints linked to deadlines for subsequent commissioning decisions. We based the sample size calculation on a significance level of α=0.05 (two tailed); an allocation ratio of 1:2 (intervention:control); a within-GP practice intra-class correlation of 0.10; a Variance Inflation Factor for adjusting for confounders of 1.33 (assuming a correlation of 0.5); (3, 4) and a retention rate of 75% (based on advice from an experienced contract research company). The target sample size (n=816, 204 intervention group and 612 controls) therefore included a larger comparison group to increase the power of analyses. Sample size was calculated to detect a moderate effect size (d) of 0.4 (5) with

90% power and was more than sufficient to detect smaller effect sizes (d=0.35) with 80% power

Comparator group sampling

We contacted potentially eligible comparator participants using three methods. In all three methods, no identifiable data were disclosed to the research team before individuals provided informed consent. First, we identified nine local GP practices based in areas with similar levels of social disadvantage as co-located practices (using the Index of Multiple Deprivation (IMD) 2015), (6) but which did not host advice services. Comparator patients within each of these nine practices were identified by an NHS Primary Care Research Support Service who ran practice list searches to identify patients of similar age group, ethnicity and gender. The Support Service then randomly selected records within each demographic group so that those selected were representative of the profile of individuals who used the co-located advice service in the 12 months prior to study data collection. This demographic information had been elicited using past-year data from the Citizens Advice (CA) IT platform. Primary care research colleagues advised us to anticipate a patient response rate of 10%. We therefore identified 500-700 patients from each practice, i.e., 5419 in total from the nine practices. Practices securely uploaded comparator patients' contact details to a secure print and mailing company which posted recruitment packs to the patients on behalf of their GP practice. We expected that those responding to the contact attempts may be different to advice group members. Therefore, we also worked with a local housing association to contact 490 tenants who were comparable in terms of age group, gender and ethnicity to patients receiving welfare advice. Finally, as Black African and Black Caribbean individuals were underrepresented within the returns from the GP-based sampling, and to achieve the required sample size, we carried out further sampling locally. We worked with community organisations to advertise the study, particularly among individuals who were under-represented in the GP-based returns.

Survey piloting

We piloted the materials since we anticipated that English would not be a first language and/or that literacy levels may be low for some study participants. 40 CA clients accessing (non-co-located) services locally and eight individuals from a local tenant's association group read all recruitment pack materials and tested the baseline survey to check for acceptability and understandability. Materials were refined and revised based on feedback from the pilot.

Propensity score weighting

Propensity scores could be used to either match advice group members to one or more comparison group members with similar scores, or to weight comparison group members. Matching may result in loss of information if some comparison group members are unmatched, and/or lead to bias if a nearest match to an advice recipient has a largely different propensity score. As sample size was important, we used a weighting rather than a matching strategy to retain information from all comparison group members, reducing bias by assigning more weight to those whose propensity scores were closer to advice recipient scores. (7) Propensity scores were calculated with logit regression, with advice group

membership as the dependent variable. (8, 9) The sample was divided into blocks of observations with similar propensity scores, t-tests were run to check for propensity score balance across each group within each block, and for covariates within each block across the two groups. Data were then kernel weighted (10) and post-estimation analyses assessed the extent to which the distribution of propensity scores in the advice and comparison groups overlapped ('common support'), those outside the range of common support were excluded.

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Supplement DS2

Coping and help-seeking behaviour items

What would you do if your income did not cover your costs? PLEASE TICK ALL THAT APPLY (1)

☐Draw money from savings ☐Borrow money/take out loan
☐Use credit card/overdraft ☐Miss payments
☐Sell something ☐Do nothing
☐Cut back on spending ☐Seek advice
☐Work extra hours ☐Other

If you ever had a problem linked to being behind and unable to pay, for example:

- Credit or store cards, or Hire Purchase/credit purchases
- Personal loans/owed money
- Utility bills (e.g. electricity) or TV licence, or council tax/income tax
- Court fines
- Other payments

Or in terms of your entitlement to/how any of these were being dealt with:

- Welfare benefits or tax credits
- State pension/Pension credits
- Student loans or grants

What would you do? PLEASE TICK ALL THAT APPLY

☐Do nothing ☐No one to talk to about these issues
☐Talk to GP/other health professional ☐Talk to Citizens Advice/other adviser
☐Talk to faith leader/member of religious organisation ☐Other
☐Talk to friends or family ☐Don't know

If you have had any of the financial issues listed above (or similar), did you experience any of the following as a result? PLEASE TICK ALL THAT APPLY (2)

☐Physical ill health ☐Loss of confidence
☐Stress related ill health ☐Fear
☐Other mental ill health ☐Problems sleeping
☐Drinking more alcohol ☐None of these
☐Using drugs

If you were to experience any of the above issues (e.g. ill health, loss of confidence etc.) as a result of your financial situation or benefits, what would you do? PLEASE TICK ALL THAT APPLY

☐Do nothing ☐No one to talk to about these issues
☐Talk to GP/other health professional ☐Talk to Citizens Advice/other adviser
☐Talk to faith leader /member of religious organisation ☐Other
☐Talk to friends or family ☐Don't know

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Table DS1 Accessing the advice service

	Advice group (n=278)	
	n	%
How did you hear above the advice service here?		
My GP/the GP practice	114	41.2
Word of mouth	45	16.3
CAB/Other information & advice service	90	32.5
Other	28	10.1
If the advice service were not available here, where would you go?		
GP/GP practice staff	44	15.8
Other information & advice service	160	57.6
Would not have sought advice/don't know	86	31.5
If you had a choice, would you rather see a welfare adviser at a GP practice or somewhere else?		
GP practice	249	92.9
Somewhere else	19	7.1
Why (coded from open ended question)?		
More accessible/more convenient	129	54.7
Familiar/safer environment	42	17.8
More chance of being seen	15	6.4
Adviser/advice is better	14	5.9
Will have access to health records	13	5.5
Trust GP, GP understands my problem	12	5.1
Would prefer to keep separate	11	4.7
Have you spoken to your GP about the issue you are seeing the adviser about today?		
Yes	106	39.0
No	166	61.0
Why/why not (coded from open ended question)?		
Affecting health/health-related	54	25.8
Needed medical evidence	20	9.6
GP first port of call	21	10.1
Not relevant/not health-related	72	34.5
GP not supportive/cannot help/cannot access GP	42	20.1

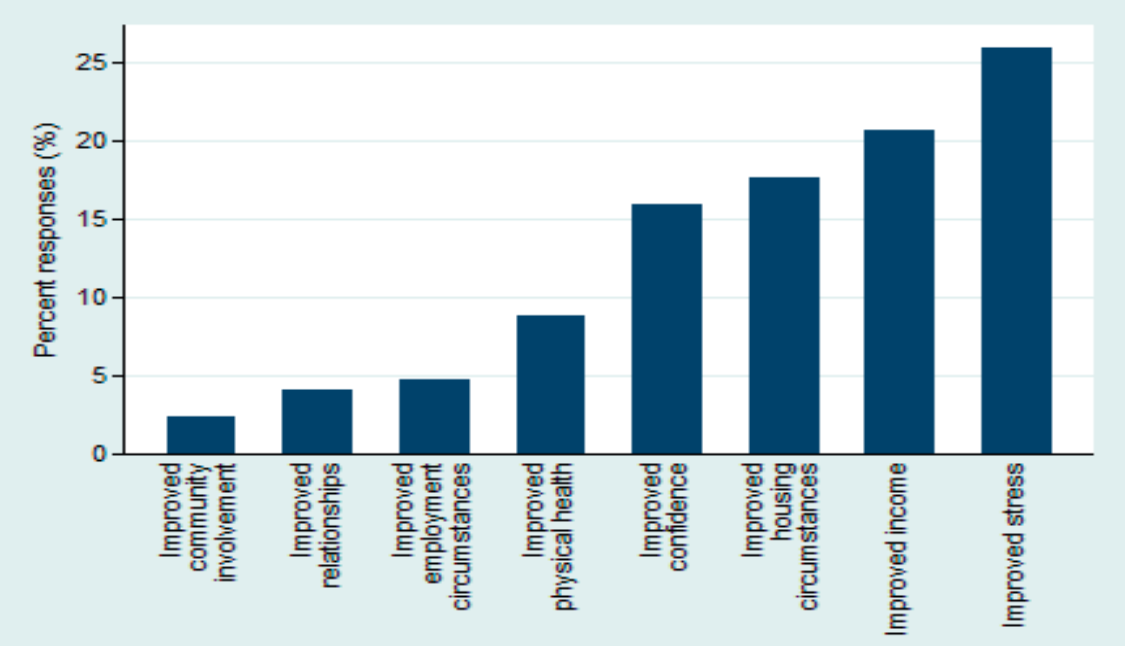
† Numbers do not add to totals due to missing data.

Table DS2 Comparison of advice group participants recruited during baseline recruitment period (December 2015 to July 2016) to all those receiving co-located advice during the same period that were recorded on the Citizens Advice (CA) platform.

	All clients (n=295†)		Advice group participants (n=278)	
	n	%	n	%
Gender				
Male	106	35.9	107	38.5
Female	188	64.1	171	61.5
Age group (years)				
18-24	4	1.4	6	2.2
25-34	26	9.0	32	11.6
35-44	43	14.9	48	17.4
45-54	92	31.8	87	31.5
55-64	85	29.4	70	25.4
65-74	25	8.7	24	8.7
75+	14	4.8	9	3.3
Ethnicity				
Black/Black British	116	41.7	109	39.9
White	101	36.3	112	41.0
Asian/Asian British	32	11.5	24	8.8
Mixed/multiple	13	4.7	14	5.1
Other	16	5.8	14	5.1
Health status				
Disabled/Long term health condition	188	72.3	200	73.5
Not disabled/no health condition	72	27.7	72	26.5

† Numbers do not add to totals due to missing data, not all contacts were recorded on the IT platform.

Fig. DS1 Type of improvement reported among welfare advice group participants reporting any improvement at follow-up.



Impact of co-located welfare advice in healthcare settings: prospective quasi-experimental controlled study

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