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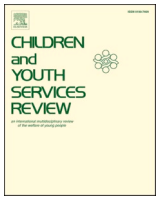

What affects the likelihood of children entering public care? The interaction of household low income, area-level deprivation and parental risk factors

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ABSTRACT

Background: Parental problems, low income and area-level deprivation are known predictors of children entering public care, but it is unclear how much this is due to relationships between these factors.
Objective: This study explores these interrelationships and asks how area-level deprivation and household-level low income interact with parental risk factors to influence the likelihood of care entry.
Methods: Administrative data from health services, education and children's social care were linked, creating a population-level dataset of households in Wales, UK, with children aged 3–17 (n = 221,312). Multilevel binary logistic regression models were used to identify the effects on the odds of care entry of adult risk factors (types of substance misuse, mental ill health, learning disability and neurodivegence), with and without adjustment for area-level deprivation and household low income. Further models examined interaction effects.
Results: Models suggest the effect on care entry of both area-level deprivation and low income is partly due to higher levels of the adult risk factors in deprived areas and in households with low income. There is no evidence of risk factors having a differential effect on the likelihood of care by area deprivation. Depression, anxiety and self-harm had a greater effect on the odds of care in households that did not have a low income.
Conclusions: These findings provide new evidence unpicking the association between families struggling financially and children entering care. Findings highlight the need for policies combating child poverty and to support families living in poverty to prevent entry of children into care.

1. Introduction

Previous studies have identified a relationship between public care and poverty, both at a family level (Bebbington and Miles, 1989; Barth et al., 2006; Franzén et al., 2008), and area level (Bywaters et al., 2020; Elliott, 2020; Bennett et al., 2022, Doebler et al., 2022; Doebler et al., 2023). For example, in the authors' context of the UK, Bebbington and Miles (1989) found that children from homes where the head of the household was in receipt of benefits paid to individuals on a low income were three times more likely to come into care. Bywaters et al. (2020) looked at area level deprivation in all four nations of the UK, using measures of deprivation in small geographical areas, (between 750 and 2000 people). They found that increasing deprivation was associated with an increased likelihood of public care. This relationship between socio economic status and the likelihood of a child welfare intervention has come to be described as a social gradient (Bywaters et al., 2020; Goldacre and Hood, 2022). This term refers to a roughly linear relationship affecting the whole population, with each step of increase in deprivation seeing a corresponding increase in child welfare intervention.

The reasons for these relationships are not clear. However, one of the major reasons for public care is child maltreatment (Perlman & Fantuzzo, 2013), and there is a large body of international evidence highlighting the relationship between poverty and different types of child maltreatment, including child neglect, physical abuse and sexual abuse. This evidence is summarised through a number of systematic reviews

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(Berger & Waldfogel, 2011; Bywaters et al., 2016; Hunter & Flores, 2021, Bywaters et al. 2022). This evidence shows that maltreatment is more likely to occur both in families facing socio-economic disadvantage (Sidebotham et al., 2002; Doidge et al., 2017) and also those living in geographical areas where there are high levels of deprivation (Coulton et al., 2007). It therefore seems likely that higher levels of child maltreatment may play an important role in the relationship between the likelihood of children entering public care and both family-level and area-level poverty.

There is, however, a lack of certainty about the mechanisms through which poverty affects the likelihood of child maltreatment, with Drake & Jonson-Reid (2013) suggesting that there may not be one single explanatory model. When considering the relationship between the deprivation level of small areas and public care, it would be useful to find out whether the association occurs because people living in areas of deprivation are more likely to have lower household incomes, or if there are other reasons for it. There are a number of US studies providing evidence of neighbourhood effects on child maltreatment rates, over and above the effects of household poverty (Freisthler, Merritt & LaScala, 2006; Maguire-Jack, Yoon & Hong, 2022; Bywaters et al., 2022), but a lack of similar evidence from the UK.

In terms of family-level poverty, various mechanisms have been put forward to explain a link with child maltreatment (Cancian et al., 2013). One of these is that poverty prevents parents from providing for a child's basic necessities, which can result in neglect. Neglect is a form of child maltreatment and, though the exact definitions vary in different jurisdictions, it includes unmet material needs (Esposito et al., 2022). It may include things such as providing inadequate shelter, food and clothing (Fong et al., 2017), and it is clear that a lack of financial resources can make it difficult for parents to meet these needs.

A second potential mechanism, developed from the family stress model (Conger et al., 1992), suggests that family stress caused by poverty impacts on parenting. It suggests that economic hardship can lead to pressures which result in parent psychological distress, and that this can lead directly to disrupted parenting. Additionally, it can result in interparental relationship problems, which can further disrupt parenting. There is a growing body of evidence to support this mechanism (Masarik and Conger, 2017).

Theories from criminology have also previously been used to explain the relationship between poverty and child maltreatment. For example Wolfe and Jaffe (1999) discuss routine activity, suggesting that the environment and daily activities of a family can create opportunities for abuse or neglect. Social disorganization theory has also been considered within the context of child maltreatment (for example Kubrin and Mioduszewsk, 2019). This theory suggests that communities that are more socially organized with higher levels of solidarity, cohesion and consensus on norms and values have lower crime rates, including levels of child abuse. This may be important for considering how area-level effects of deprivation could apply over and above family-level effects, however it is unclear how universally the tenets of the theory apply across different cultures.

In addition to poverty and area-level deprivation there are a number of other factors in parents and carers that have been identified as risk factors for entry into public care. These include mental health problems, substance misuse, domestic abuse, learning disabilities, learning difficulties and ADHD (Franzén et al., 2008; Simkiss et al., 2012; Melis et al., 2023). Some of these risk factors, particularly parental mental health problems, substance misuse and domestic violence, may be indicators of types of family stress, as suggested by Conger et al (1992). Many of these issues have also been associated with both individual-level measures of low income (Tello et al., 2005; Fone et al., 2007; Emerson, 2007; Russell et al., 2016; Marmot et al., 2020), and with area-level deprivation (Fone et al., 2007; Emerson, 2007; Remes et al., 2019; Marmot et al., 2020). Therefore, it could also be that children living in poverty are more likely to enter care simply because their parents are more likely to have these risk factors.

Another alternative hypothesis for the link between poverty and care entry is that indicators of poverty may increase the visibility and scrutiny of families living in poverty (Cancian et al., 2013). If families are more likely to access services, this may in turn make services more aware of problems in the family. Evidence for surveillance effects has been identified in programmes to support vulnerable families (e.g., Barlow et al., 2007). These effects could also contribute to the relationship between area-level deprivation and public care, if for example programmes are targeted at deprived areas (Scourfield et al., 2021). Alternatively, area-level differences could occur because of better services in less deprived areas. For example, in one US study, Shuey and Leventhal (2017) found neighbourhood affluence to be associated with neighbourhood resources, which was in turn associated with less physically aggressive parenting. This might mean that the relative impacts of area-level deprivation on public care may depend on policy relating to support services in an area.

Qualitative studies have also highlighted concerns from families living in poverty about feeling judged by social services for issues relating to their poverty (Gupta et al., 2016). These ranged from issues such as being judged for not having sufficient food or having been too stressed to clean up, to being judged for allowing a child to stay at home as they had been bullied for not having the right type of clothing. There is no evidence about whether these findings have any impact on outcomes or not, however, as Featherstone et al. (2019) state, whether these feelings are based on substance or not, they are serious concerns for families that may prevent them from building good relationships with social workers. We do not know how difficulties with these relationships may affect the likelihood of care entry.

All this highlights the need to understand the complex inter-relationship between family-level poverty, area-level deprivation and parental risk factors. The growing availability of linked administrative datasets provides scope for understanding the interrelationship between some of these issues. These data can enable studies looking at children who enter care, as well as adults who are significant in the child's life including parental figures. This study focuses on the households the children were living in before they entered care, and the adults who resided with them. This paper reports on a study using linked data to ask questions about this complex inter-relationship. It asks:

- What is the impact of area-level deprivation on entry to public care when a measure of household level low income is taken into account?
- To what extent is the relationship between deprivation, household low income and likelihood of care entry due to higher levels of adult risk factors?
- Is there any evidence that adult risk factors have a different effect on the likelihood of care entry in more deprived areas or in low income households?

These questions are important for unpicking how poverty and area-level deprivation are related to the likelihood of care. Understanding these issues is crucial in developing support to prevent the need for children living in poverty to enter public care and, ultimately for furthering social justice.

2. Material and methods

2.1. Study design

This was a retrospective, national-scale, observational e-cohort study. It considered children entering care in Wales during the period from 1 April 2016 to 31 March 2020. Anonymised individual-level, linked administrative datasets, covering social care, education and health were accessed through the Adolescent Mental Health Data Platform at the Secure Anonymised Information Linkage (SAIL) Databank (https://saildatabank.com). This is a privacy-protecting Trusted

Research Environment that holds anonymised population-scale data for Wales (Ford et al 2009). A Trusted Research Environment is a controlled computing space where researchers can access sensitive data privately and securely.

The data are exclusively from Wales, a small nation within the UK. Its devolved Government has responsibility for law and policy in relation to public care, and there has been some divergence in recent years, however, there is a lot more in common between its legal framework and those in the rest of the UK than separates them, so we believe the study will have relevance there too. The international transferability of research on child welfare is more limited, due to differences between nations in the purpose and provision of services. However, the results will still be of some interest to other affluent countries outside the UK.

2.2. Data sources and linkage

This study used data relating to households in Wales with a child aged three to 17 between the beginning of April 2016 and the end of March 2020. This age group was chosen so that they could be linked to education data. These households were identified from the Welsh Demographic Service dataset (WDSD) using Residential Anonymous Linking Fields (RALFs). These use primary health care registrations so that individuals registered with a primary care doctor (General Practitioner − GP) at the same address can be linked (Rodgers et al., 2009). This was linked to additional datasets to produce a dataset of households in Wales, with information about the risk factors present in the adults in those households and details of whether or not a child in that household had entered care. A complete list of datasets are available in Table 1 and further information about datasets is available on the Health Data Research Innovation Gateway (2023).

Table 1
Datasets used.

Dataset	Description	Used to identify
Looked After Children Wales (LACW)	Information collected by local authorities and submitted annually to Welsh Government about looked after children. Provides information about demographics and episodes in care	Children who entered care, local authorities from which they entered
Welsh Demographic Service Dataset (WDSD)	Register of all individuals who are registered with a Welsh GP, includes individuals anonymised address and practice history	Household members living with children prior to care entry and local authorities in which they were based
Welsh Longitudinal General Practice Dataset (WLGP)	Attendance and clinical information for all interactions with general practices registered to share their data with the SAIL Databank.	Risk factors in the adults in households
Patient Episode Database for Wales (PEDW)	All inpatient and day case activity undertaken in NHS Wales plus data on Welsh residents treated in English Trusts.	Risk factors in the adults in households
Emergency Department Dataset (EDDS)	Clinical and attendance information about all attendances at Accident and Emergency (A & E)	Risk factors in the adults in households
Substance Misuse Dataset (SMDS)	Data on individuals presenting for substance misuse treatment in Wales	Risk factors in the adults in households
Education Wales	Schools and Pupil data for Wales which covers state funded learning centres.	Free School Meal Status

2.3. Study population and outcome

To identify households containing a child who had entered care, the household dataset was linked to the Looked After Children Wales (LACW) dataset. The LACW data identified n = 4,958 children who had entered care between 1st April 2016 to 31st March 2020. This excluded unaccompanied asylum seekers as their pre-care households were not located in Wales. It also excluded children defined as on a "short break" for respite reasons. Under Welsh law (Part 6 section 76 of the Social Services and Well-being (Wales) Act 2014) these children are legally counted as looked after by a local authority although they are only there in a short planned period in order to provide respite for their families (Welsh Government, 2021).

Because we did not have access to data on the children's fathers, it was decided to use the adults that the children co-resided with before they entered care as a proxy for parents. This has been done in previous studies carried out in the UK (Lut et al., 2022). Further details about the differing effects of the risk factors in different adults within the study are available in our earlier paper (Warner et al, 2024). In order to identify the households the children were living in before they entered care, they were linked to the WDSD. This was done using Anonymous Linking Fields (ALFs) (Ford et al., 2009). ALFs are the SAIL databank's method for linking data relating to particular individuals from different datasets together. Before data are added to the SAIL databank, commonly identifying data, such as names, postcodes and dates of birth, are removed and used by a third party to derive the ALFs so that records about a particular individual can be linked within the SAIL databank (Lyons et al., 2009). The process of deriving ALFs for datasets depends on the quality of the identifying data in those datasets and when this is poor, there may be a number of cases without ALFs. This was the case for the LACW dataset, so the proportion of records that were able to be linked (the match rate) was relatively low. The match rate for ALFs was improved via linkage to additional social care and education datasets as has been done in previous studies using the LACW data (Melis et al., 2023; Warner et al., 2024) (See Supplementary Table 1 for more information). Of the children who entered care, 4,387 (88.5%) had an ALF enabling them to be matched to other datasets. Individuals were matched to the WDSD to identify the households they were living in on the day before they entered care. Not all children could be matched to RALFs, as a successful match depended on them being registered with a GP that provides data to SAIL. Of these 4,091 (93.3%) could be matched to the WDSD and had a RALF for addresses in Wales on the date before they entered care. The 4,091 children who entered care matched to 2,885 unique RALFs indicating that some households had more than one child enter care.

All the households that did not have a child enter care during the study period became comparison households. Each household had a care entry index date. This was needed as certain parental risk factors had to be measured in the period before a child entered care. For the households from which a child entered care the care entry index dates were taken from the LACW dataset. Where a child entered care more than once during the period the first date of care entry within the four-year period was used, and where households had more than one child entering care on different dates in the period the date of the first child to enter care was used for the household. The comparison households were randomly assigned 'pseudo' care entry index dates. To ensure the 'pseudo' care entry index dates of the comparison households accurately mirrored the households from which a child entered care, the numbers of children who entered care each month over the four-year period for the care entry group were explored. Fig. 1 shows the distribution of children who entered care each month.

The comparison households were then randomly assigned 'pseudo' care entry index dates using the same distribution. The original sample of WDSD data contained any household (RALF) that had had a child living at it at any point during the four year study period. However some of these addresses did not have children aged between three and 17

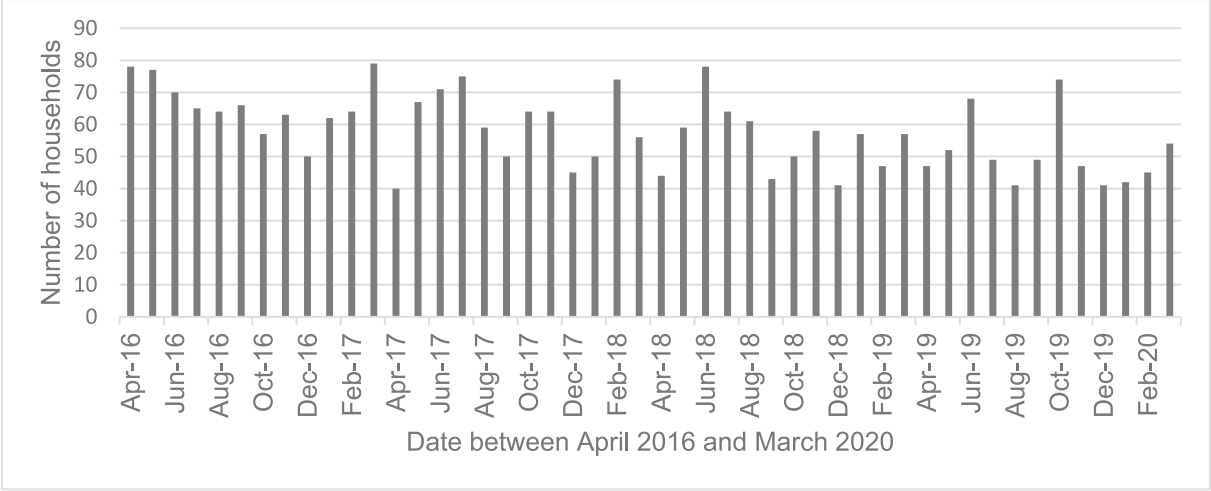

Fig. 1. Numbers of households with at least one child entering care each month.

years on the specific 'pseudo' care entry index date allocated to them, so they were then removed. Households were also removed if they contained no adult aged over 18, or more than 10 individuals, as in previous studies exploring households with adverse childhood experiences (Evans et al., 2020).

The data set of households was linked to the Education Wales dataset to identify children who were eligible for free school meals (FSM). This was used as a measure of low household income (see risk factor section below). In order to allocate FSM status at a household level, a reference child was used. In cases where at least one child entered care this was the first child to enter care during the period. For comparison households this was a random child. EDUW data is collected in January each year, and the EDUW data for FSM eligibility in the January before the care entry index date was used. Sometimes the index child for a household could not be matched to EDUW data for that year, for example if they were not in mainstream education or if data was missing. Where this happened households were also excluded. Additional households were removed if data identifying the local authority was missing. These data were required in order to control for local authority effects in models (see analysis below).

2.4. Risk factors

Risk factors were derived by linking the household dataset to a range of additional datasets. **Area-level deprivation:** Deprivation was measured using the Welsh Index of Multiple Deprivation (WIMD) 2019 available in the Welsh Demographic Service Dataset (WDSD). The WIMD 2019 is the Welsh Government's official measure of relative deprivation for small areas (Welsh Government, 2019). It is based on small areas known as Lower Super Output Areas (LSOAs) each with a population of around 1600 people. The WIMD ranks these LSOAs from most deprived to least deprived on a measure that takes into account a range of factors including income and employment, health, education, access to services, housing, community safety and the physical environment. The WIMD was divided into 10 deciles, with one being the most deprived and 10 the least. Information about which LSOA each household was in was provided by a third party based on postcodes. We are aware of recent methodological advances in measuring area-level effects using individually defined and scalable neighbourhoods (for example Petrović et al., 2022), However WIMD was used to measure area-level deprivation because it was the only measure of area-deprivation available in the SAIL databank. An advantage of using it is that it has also been used in other studies exploring area-level deprivation and care entry in Wales (Bywaters et al., 2020; Elliott, 2020; Doebler et al., 2022). The results of our study provide some explanation for the findings of those earlier studies and so it is appropriate to use the same measure of area deprivation.

Household Income: An indication of household-level low income was gained through the Free School Meal (FSM) status of the reference child in the family. During the study period, children at schools in Wales were entitled to claim FSMs if their parents were receiving a range of support payments associated with low household incomes (Welsh Government, 2023). Just over 17% of the pupils in mainstream schools in Wales were entitled to FSMs during the study period (Stats Wales, 2025). FSM status was identified from the Education dataset in the January before the child entered care.

Household adult risk factors: All the adults in the households were linked to health datasets in order to identify adult risk factors. These were drug misuse, alcohol misuse, assault at home, schizophrenia, anxiety, depression, self-harm, learning disabilities, learning difficulties and ADHD. The presence of these factors in adults in the household had already been identified as risk factors for children entering care (Warner et al., 2024). Learning difficulties was used to refer to people with an IQ of below 70 who had a significantly reduced ability to understand new or complex information and new skills and a reduced ability to cope independently. Learning difficulty described those with scholastic difficulties.

Risk factors were identified from a combination of datasets, WLGP, EDDS, PEDW and SMDS. Published and validated code lists were used to identify the risk factors from WLGP, EDDS, PEDW. Risk factors were identified from WLGP data using published and validated Read code lists, and ICD10 codes were used to identify risk factors in PEDW and EDDS. These code lists were available through the SAIL Databank's Concept Library (https://conceptlibrary.saildatabank.com/). For example, schizophrenia was identified using a code list published by (John et al., 2018). Supplementary Table 2 provides details of all code lists together with relevant links to references.

The substance misuse dataset was used to identify those receiving NHS substance misuse services for either alcohol or drug problems. Indications of risk factors from each of these different sources were combined to indicate if the individual had a risk from any of these sources. EDDS was also used to identify individuals who presented at A & E departments because they were the victim of an assault that had occurred within their own homes, to form the assault at home variable. Drugs, alcohol, assault at home, anxiety, depression and self-harm were only counted as risk factors if they occurred in the two-year period before the care entry index date or the pseudo- care entry index date for the comparison population. For schizophrenia, learning disabilities, learning difficulties and ADHD then any diagnosis of the disorder at any time was taken as a risk factor. This approach was taken because of the

permanent nature of these conditions. Risk factors were counted as being present if they occurred in any adult in the household. While we are aware than many of the risk factors sometimes co-occur, the effects of this on outcomes are explored elsewhere in this study (Warner et al., 2024). The particular piece of analysis in the current article was devised to look at how much the risk factors could explain the relationship between area-level deprivation, individual low income and care entry, and so only individual risk factors were used.

2.5. Analysis

Univariable analysis was carried out to look at the likelihood of a household having one or more child enter care if the risk factors were present in the household. Attributable fractions (Mansournia and Altman, 2018) for adult risk factors, FSM and the most deprived four WIMD deciles have been calculated. Bar charts showing the distribution of households with and without free school meals in each decile of deprivation are presented, both for the whole population and for those who enter care only. A series of multilevel (households nested in local authorities) binary logistic regression models were used to explore the impacts of the risk factors in different situations. Parameter estimates are shown as an odds ratio (OR) and accompanied by 95% confidence interval (CI) and p-value. These are used to show how much of an impact each risk factor had on the likelihood of a household having a child enter care. Where odds ratios are greater than one it shows that the presence of a risk factor increases the odds of care, and the greater the odds ratio the more of an effect it has on the likelihood of care. The first set of models explored the individual risk factors in isolation using univariable regression models. Multivariable models were then used with the risk factors entered in three stages. In the first model all parent-level risk factors were added. In the second stage WIMD was added and in Model 3 FSM was added. Additional models were used to look at interaction effects. The first of these looked at the interactions between each of the parental risk factors and WIMD decile, while a second model looked at the interactions between risk factors and FSM. Interaction effects for WIMD were explored using a binary variable indicating whether households were more or less deprived than the median LSOA. A binary WIMD indicator was used facilitate comparison between the models looking at FSM interactions and WIMD interactions. All models were multilevel models to control for children in Wales entering care through 22 local authorities, and controlled for the number of adults in the household. Because some children, who were identified as entering care in the LACW dataset, could not be matched to other datasets, a weighting system was used so that care entry rates remained representative of care entry rates in the Welsh population.

3. Results

Fig. 2 shows the flow of data to derive the study population including those that had to be excluded from the Household dataset at various stages. The resulting dataset contained 221,312 households, of which 1,752 had had a child enter care, and 219,560 were comparison households. Table 2 shows descriptive statistics for both the households where a child entered care and where a child did not. The most prevalent risk factor is depression, present in 854 (48.7%) of households from which a child entered care and 51,622 (23.5%) of the comparison households. Assault at home and drug misuse were the most strongly associated with the likelihood of children entering care. Around 0.8% of all the households in the sample had a child enter care, however this rose to around 5.8% of the households where either assault at home or drug misuse were present. The attributable fractions show the proportion of those that enter care with each risk factor that would not have been expected to enter care if the risk had not been present. For both drug misuse and assault at home it is 0.863, suggesting 86.3% of the

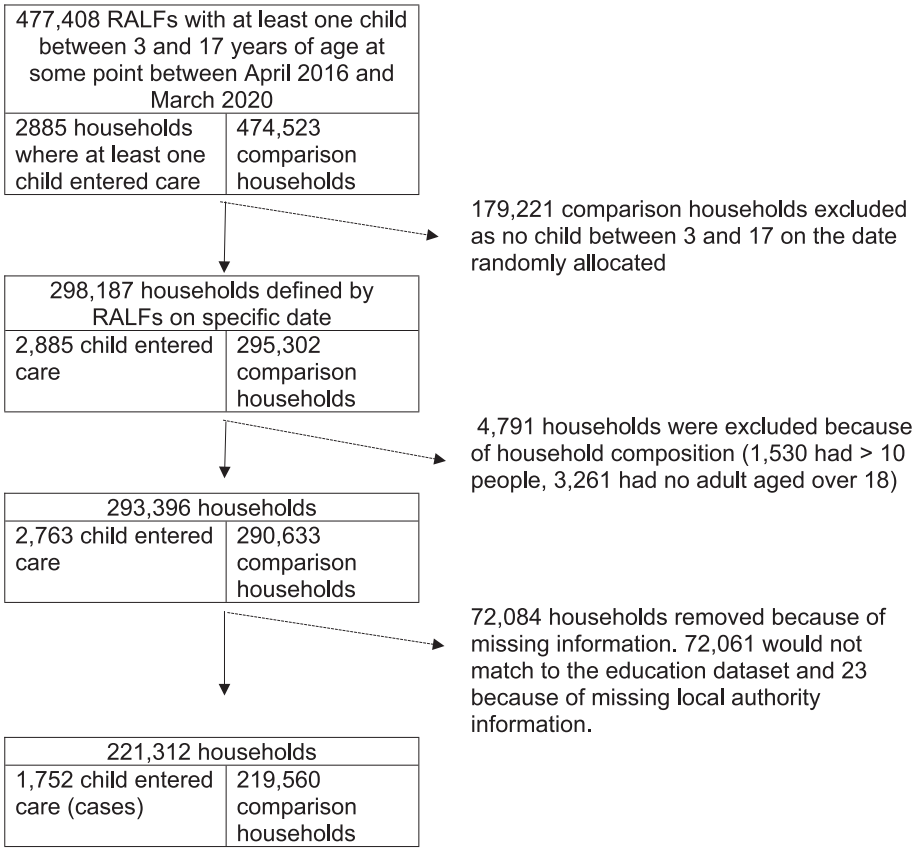

Fig. 2. Flow chart of the study population for analysis.

Table 2
Frequencies of risk factors in households of children that did and did not enter care.

	Child entered care n (%)	Child did not enter care n (%)	% of households from which child enters care	Attributable Fraction
All households	1752 (100)	219,560 (100)	0.8	
At least one adult in the household recorded with:				
Drug misuse	264 (15.1)	4257 (1.9)	5.8	0.863
Alcohol misuse	208 (11.9)	5066 (2.3)	3.9	0.798
Assault at home	30 (1.7)	486 (0.2)	5.8	0.863
Schizophrenia	85 (4.9)	2033 (0.9)	4	0.801
Anxiety	456 (26)	28,922 (13.2)	1.6	0.486
Depression	854 (48.7)	51,622 (23.5)	1.6	0.510
Self-Harm	119 (6.8)	3191 (1.5)	3.6	0.778
Learning Disability	56 (3.2)	1912 (0.9)	2.8	0.720
Learning Difficulty	63 (3.6)	2229 (1)	2.7	0.710
ADHD	70 (4)	3071 (1.4)	2.2	0.642
FSM	1028 (58.7)	30,707 (14)	3.2	0.754
WIMD decile				
1 – most deprived	448 (25.6)	25,556 (11.6)	1.7	0.537
2	340 (19.4)	23,694 (10.8)	1.4	0.436
3	220 (12.6)	22,636 (10.3)	1	0.171
4	190 (10.8)	22,879 (10.4)	0.8	0.031
5	140 (8)	19,967 (9.1)	0.7	
6	121 (6.9)	20,570 (9.4)	0.6	
7	106 (6.1)	20,904 (9.5)	0.5	
8	86 (4.9)	19,737 (9)	0.4	
9	58 (3.3)	20,957 (9.5)	0.3	
10 – least deprived	43 (2.5)	22,660 (10.3)	0.2	
Control Variables				
Number of adults in household				
1	711 (40.6)	44,995 (20.5)	1.6	
2	663 (37.8)	115,450 (52.6)	0.6	
3	254 (14.5)	39,232 (17.9)	0.6	
4 plus	124 (7.1)	19,883 (9.1)	0.6	

households where those risk factors were present, from which a child entered care, would not have had a child enter care if the risk factors were not present.

Bivariate associations between FSM and WIMD decile in all the households in the dataset and only the households that entered care are shown in Table 3 and Fig. 3. When all the households in the dataset are looked at, the most deprived decile is the most populated overall, with 116,070 households (52.4%) in the bottom five deciles compared to 105,242 households (47.6%) in the top five deciles. If all the households in Wales were being used, then the population would be spread evenly

Table 3
Number of households in each deprivation decile by Free School Meal Status.

	All households			Households from which a child enters care only		
WIMD Decile	FSM, n (%)	No FSM, n (%)	Total, n (%)	FSM, n (%)	No FSM, n (%)	Total, n (%)
1 *	8425 (26.5)	17,579 (9.3)	26,004 (11.7)	298 (29.0)	150 (20.7)	448 (25.6)
2	5738 (18.1)	18,296 (9.7)	24,034 (10.9)	222 (21.6)	118 (16.3)	340 (19.4)
3	4447 (14.0)	18,409 (9.7)	22,856 (10.3)	135 (13.1)	85 (11.7)	220 (12.6)
4	3586 (11.3)	19,483 (10.3)	23,069 (10.4)	119 (11.6)	71 (9.8)	190 (10.8)
5	2540 (8.0)	17,567 (9.3)	20,107 (9.1)	80 (7.8)	60 (8.3)	140 (8.0)
6	2174 (6.9)	18,517 (9.8)	20,691 (9.3)	54 (5.3)	67 (9.3)	121 (6.9)
7	1730 (5.5)	19,280 (10.2)	21,010 (9.5)	47 (4.6)	59 (8.1)	106 (6.1)
8	1327 (4.2)	18,496 (9.8)	19,823 (9.0)	36 (3.5)	50 (6.9)	86 (4.9)
9	1100 (3.5)	19,915 (10.5)	21,015 (9.5)	28 (2.7)	30 (4.1)	58 (3.3)
10 *	668 (2.1)	22,035 (11.6)	22,703 (10.3)	9 (0.9)	34 (4.7)	43 (2.5)
Total	31,735	189,577	221,312	1028	724	1752

*1 = most deprived, 10 = least deprived.

across the 10 deciles. The fact that they are not highlights that households with children (aged 3 to 17) whether or not they have children entering care, are more likely to be living in areas of deprivation than the rest of the population. The figures concerning children who entered care show a strong social care gradient. This social care gradient is present in both the households where the reference children are entitled to FSMs and in those where they are not. However, it is steeper in the households where the child is entitled to FSMs.

Table 4 shows the bivariate relationships between each of the risk factors and both the WIMD decile and FSM status. Each of the risk factors is more common in areas of higher deprivation (WIMD score = 1) than lower deprivation (WIMD score = 10). The risk factors are also more common in households where there are FSMs, with the highest proportions of households where a child has FSMs being found in the households where the adults have either schizophrenia, a drug misuse problem, a learning disability or are victims of assault at home.

Results from regression models are shown in Table 5 and Fig. 4. These show: 1. Crude odds ratios from univariable regression models; 2. Multivariable model with the risk factors only; 3. Multivariable model with WIMD; and 4. Multivariable model with FSM added. As can be seen, when regression model 2 is run, the odds ratios for the risk factors attenuate. Both the crude odds ratios and multivariable models show the biggest effect for drug misuse followed by assault at home. These effects have been discussed in our earlier paper (Authors Own, 2024). Odds ratios for all risk factors attenuate further when WIMD is added, and again when FSM is added. Once all variables have been added the effects of all variables remain significant, except for ADHD and self-harm. FSM has the greatest effect on the odds of a child entering care in this model.

Tables 6 shows the regression model when interactions with a binary version of the WIMD variable are explored. None of the interaction effects are significant, suggesting that the risk factors have the same impact on the odds of a child entering care in areas of high and low deprivation.

Table 7 shows the results of the regression models including the interaction effects of the risk factors with the FSM variable. In this case three interactions have a significant effect on the model. These are the interactions between FSM and depression, anxiety and self-harm. In all three cases the odds ratios are lower than one, showing that where FSM is present then depression, anxiety and self-harm have less effect on the

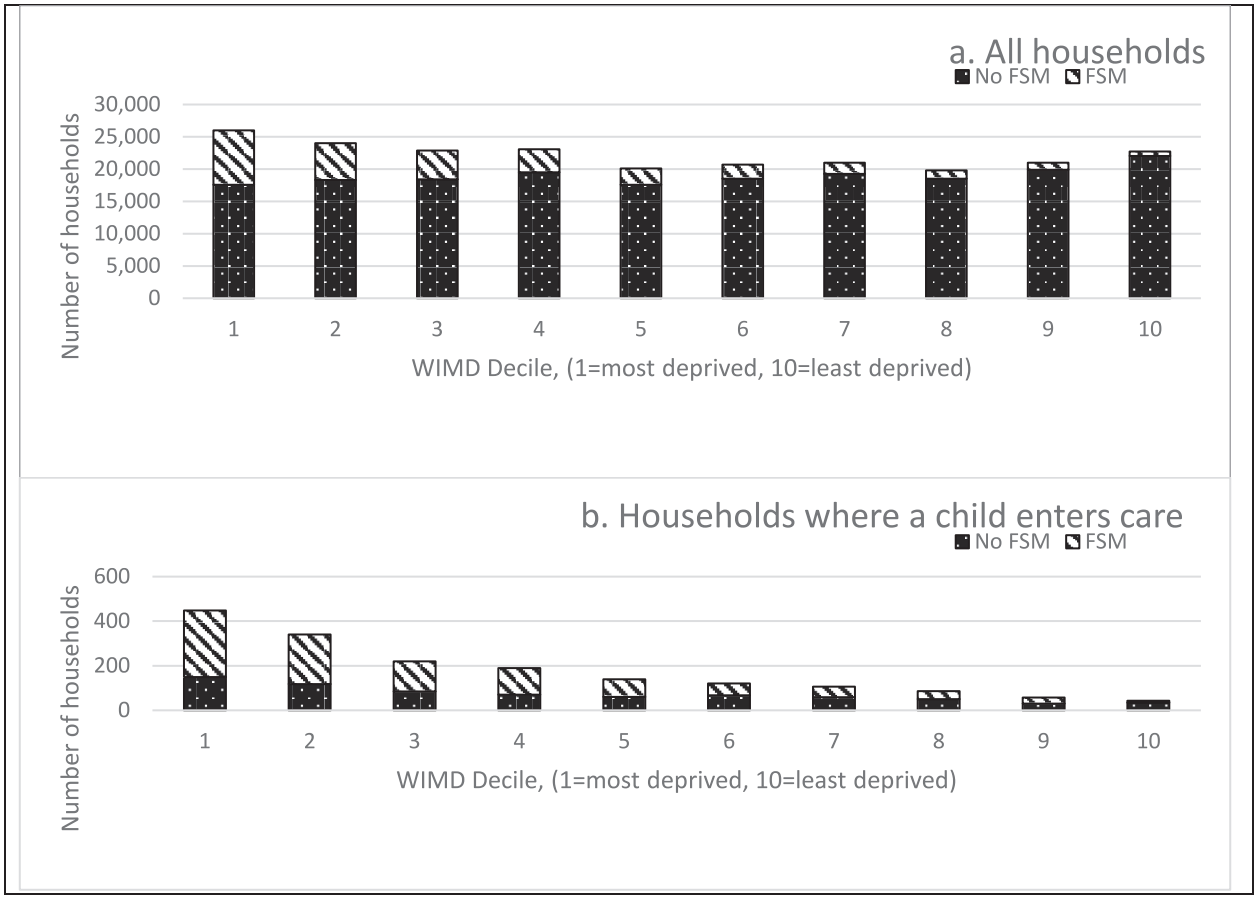

Fig. 3. Free school meal status by welsh index of multiple deprivation decile.

Table 4
Bivariate relationships between household risk factors and area-level deprivation.

WIMD Decile	Drugs n (%)	Alcohol n (%)	Assault at home n (%)	Schizophrenia n (%)	Anxiety n (%)	Depression n (%)	Self-Harm n (%)	Learning Disability n (%)	Learning Difficulty n (%)	ADHD n (%)
1	1062 (23.5)	919 (17.4)	132 (25.6)	460 (21.7)	4385 (14.9)	8540 (16.3)	657 (19.8)	456 (23.2)	423 (18.5)	594 (18.9)
2	725 (16.0)	700 (13.3)	83 (16.1)	303 (14.3)	3754 (12.8)	6986 (13.3)	470 (14.2)	291 (14.8)	270 (11.8)	457 (14.5)
3	628 (13.9)	647 (12.3)	70 (13.6)	280 (13.2)	3321 (11.3)	6158 (11.7)	438 (13.2)	270 (13.7)	278 (12.1)	418 (13.3)
4	493 (10.9)	603 (11.4)	68 (13.2)	230 (10.9)	3333 (11.3)	5984 (11.4)	395 (11.9)	216 (11.0)	263 (11.5)	340 (10.8)
5	352 (7.8)	459 (8.7)	50 (9.7)	179 (8.5)	2656 (9.0)	4483 (8.5)	302 (9.1)	169 (8.6)	188 (8.2)	266 (8.5)
6	345 (7.6)	461 (8.7)	32 (6.2)	168 (7.9)	2437 (8.3)	4160 (7.9)	246 (7.4)	153 (7.8)	207 (9.0)	253 (8.1)
7	304 (6.7)	449 (8.5)	23 (4.5)	146 (6.9)	2332 (7.9)	4105 (7.8)	247 (7.5)	126 (6.4)	191 (8.3)	230 (7.3)
8	225 (5.0)	382 (7.2)	27 (5.2)	123 (5.8)	2276 (7.7)	3844 (7.3)	205 (6.2)	100 (5.1)	153 (6.7)	208 (6.6)
9	203 (4.5)	358 (6.8)	18 (3.5)	120 (5.7)	2390 (8.1)	4126 (7.9)	202 (6.1)	119 (6.0)	174 (7.6)	212 (6.7)
10	184 (4.1)	296 (5.6)	13 (2.5)	109 (5.1)	2494 (8.5)	4090 (7.8)	148 (4.5)	68 (3.5)	145 (6.3)	163 (5.2)
FSM	1975 (43.7)	1615 (30.6)	213 (41.3)	920 (43.4)	6862 (23.4)	13,498 (25.7)	1155 (34.9)	817 (41.5)	759 (33.1)	1118 (35.6)
Total	4521	5274	516	2118	29,378	52,476	3310	1968	2292	3141

% refers to percentage of those with risk factor who have economic indicator; WIMD score 1 = most deprived; WIMD score 10 = least deprived.

odds of care than they would in a household where the child was not in receipt of FSM.

4. Discussion

This paper has used population level data on households with school-aged children in Wales to explore the effects and interrelationships of adult risk factors, area-level deprivation and an indication of low household income (FSM) on the likelihood of children going into care. A range of adult risk factors were investigated: drug misuse, alcohol misuse, assault at home, schizophrenia, anxiety, depression, self-harm, learning disabilities, learning difficulties and ADHD. Unadjusted odds ratios confirmed being a recipient of FSMs, living in an area of deprivation and all the adult risk factors were positively related to the likelihood of children entering care. Bivariate analysis also showed that the risk factors were all also related to both area-level deprivation and being

Table 5
Associations between risk factors and children in care, n = 221,312.

	Model 1. Univariable model				Model 2. Multivariable model, risk factors only				Model 3. Model 2 + WIMD				Model 4. Model 3 + FSM			
	OR	95% CI		P-value	OR	95% CI		P-value	OR	95% CI		P-value	OR	95% CI		P-value
Drug misuse	8.93	7.91	10.09	0.000	4.16	3.49	4.95	0.000	3.61	3.07	4.24	0.000	2.82	2.40	3.31	0.000
Alcohol misuse	5.77	4.95	6.72	0.000	2.34	1.97	2.80	0.000	2.34	1.97	2.78	0.000	2.18	1.84	2.58	0.000
Assault at home	7.71	5.93	10.01	0.000	3.69	2.72	5.01	0.000	3.36	2.54	4.45	0.000	2.88	2.20	3.78	0.000
Schizophrenia	5.51	4.66	6.52	0.000	2.74	2.25	3.35	0.000	2.56	2.11	3.11	0.000	1.98	1.63	2.42	0.000
Anxiety	2.33	2.05	2.63	0.000	1.37	1.21	1.54	0.000	1.33	1.19	1.50	0.000	1.23	1.10	1.37	0.000
Depression	3.10	2.79	3.44	0.000	2.29	2.04	2.57	0.000	2.09	1.86	2.35	0.000	1.65	1.47	1.84	0.000
Self-Harm	4.98	4.05	6.12	0.000	1.27	0.98	1.64	0.074	1.26	0.98	1.61	0.068	1.24	0.98	1.58	0.069
Learning Disability	3.70	2.63	5.19	0.000	2.29	1.51	3.47	0.000	1.99	1.31	3.04	0.001	1.53	1.01	2.31	0.043
Learning Difficulty	3.67	2.80	4.82	0.000	2.71	1.96	3.75	0.000	2.59	1.88	3.57	0.000	2.12	1.54	2.91	0.000
ADHD	3.04	2.50	3.71	0.000	1.52	1.21	1.89	0.000	1.41	1.13	1.75	0.002	1.21	0.97	1.52	0.096
Number of adults in household	0.69	0.65	0.74	0.000	0.60	0.57	0.64	0.000	0.63	0.60	0.67	0.000	0.73	0.69	0.77	0.000
WIMD decile	0.80	0.78	0.81	0.000					0.84	0.82	0.85	0.000	0.90	0.88	0.91	0.000
FSM status	8.76	8.23	9.33	0.000									4.80	4.42	5.21	0.000
Constant					0.01	0.01	0.02	0.000	0.03	0.02	0.04	0.000	0.01	0.01	0.02	0.000
LA variance					0.09	0.05	0.15		0.1	0.05	0.21		0.11	0.05	0.21	

OR = odds ratio; CI = confidence interval; ADHD = Attention deficit hyperactivity disorder; WIMD = Welsh index of multiple deprivation. WIMD score 1 = most deprived; WIMD score 10 = least deprived; FSM = Free school meal.

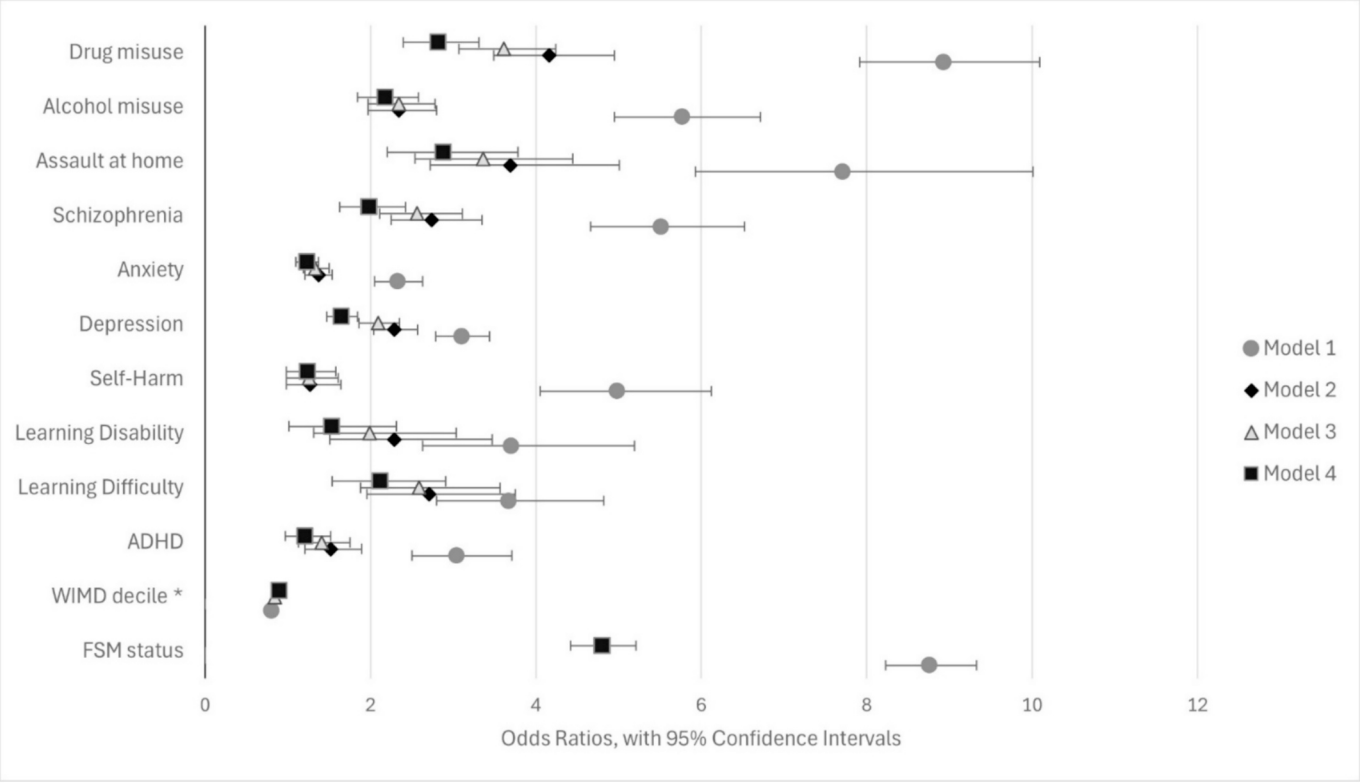

Fig. 4. Associations between risk factors and children in care. Model 1 = Univariable model, Model = Multivariable model, risk factors only, Model 3 = Model 2 + WIMD, Model 4 = Model 3 + FSM. All point estimates are odds ratios alongside 95% confidence intervals, with the exception of WIMD decile where the point estimate is depicted by the difference in mean WIMD score in children in care or not. * WIMD is a scaled risk factor, 1 to 10, WIMD score 1 = most deprived; WIMD score 10 = least deprived.

in receipt of FSM. Multilevel binary regression models showed that some of the effects of both area-level deprivation and FSM were due to the greater presence of these risk factors. However, all the risk factors, except for self-harm and ADHD, had an effect once FSM and area-level deprivation were controlled for and both area-level deprivation and FSM continued to have an effect over their combined effects. FSM had the largest effect. Interaction effects between both area-level deprivation and adult risk factors were not significant, while three interaction effects between risk factors and FSM were significant: depression, anxiety and self-harm all had a greater effect when present in adults in households where the children were not receiving FSM.

This study builds on previous work on the socio-economic predictors of public care, such as that by Franzén et al. (2008), which identified an association with family levels of low income and Bywaters et al. (2020) that identified a social gradient. This study has found a similar effect and also makes a valuable contribution to studies in this area by exploring

Table 6
Regression model, WIMD interaction effects.

	OR	95% CI		P-value
Drug misuse	2.98	1.76	5.03	0.000
Alcohol misuse	2.29	1.49	3.51	0.000
Assault at home	4.05	1.22	13.44	0.022
Schizophrenia	1.91	1.19	3.06	0.007
Anxiety	1.49	1.20	1.84	0.000
Depression	1.76	1.40	2.20	0.000
Self Harm	1.69	1.12	2.57	0.013
Learning Disability	1.70	0.94	3.08	0.082
Learning Difficulty	3.40	1.81	6.39	0.000
ADHD	1.03	0.51	2.06	0.939
Adult Number	0.72	0.69	0.76	0.000
WIMD binary	1.98	1.62	2.41	0.000
FSM	5.02	4.61	5.48	0.000
WIMD binary * drug	0.96	0.55	1.69	0.900
WIMD binary * alcohol	0.93	0.57	1.52	0.776
WIMD binary * assault	0.70	0.20	2.45	0.575
WIMD binary * Schizophrenia	1.05	0.54	2.04	0.897
WIMD binary * anxiety	0.78	0.58	1.04	0.088
WIMD binary * Depression	0.93	0.70	1.22	0.589
WIMD binary * Self Harm	0.68	0.44	1.03	0.067
WIMD binary * Learning Disability	0.91	0.51	1.62	0.753
WIMD binary *Learning Difficulties	0.53	0.26	1.11	0.092
WIMD binary * ADHD	1.22	0.62	2.42	0.562
Constant	0.00	0.00	0.01	0.000
LA variance	0.11	0.06	0.20	

WIMD binary 0 = lower deprivation, 1 = higher deprivation.

Table 7
Regression model, FSM interaction effects.

	OR	95% CI		P-value
Drug misuse	2.71	2.12	3.48	0.000
Alcohol misuse	2.24	1.72	2.93	0.000
Assault at home	4.98	3.00	8.26	0.000
Schizophrenia	2.35	1.63	3.38	0.000
Anxiety	1.47	1.23	1.74	0.000
Depression	2.20	1.91	2.54	0.000
Self Harm	1.84	1.30	2.60	0.001
Learning Disability	1.34	0.65	2.75	0.429
Learning Difficulty	2.83	1.60	5.01	0.000
ADHD	1.35	0.66	2.76	0.404
Adult Number	0.73	0.69	0.77	0.000
WIMD decile	0.90	0.88	0.92	0.000
FSM	6.92	6.20	7.73	0.000
FSM*Drug misuse	1.06	0.77	1.44	0.730
FSM*Alcohol misuse	0.94	0.67	1.33	0.738
FSM*Assault at home	0.45	0.18	1.09	0.075
FSM*Schizophrenia	0.80	0.51	1.25	0.327
FSM*Anxiety	0.75	0.60	0.96	0.019
FSM*Depression	0.60	0.49	0.73	0.000
FSM*Self Harm	0.56	0.38	0.83	0.004
FSM*Learning Disability	1.20	0.56	2.57	0.637
FSM*Learning Difficulty	0.66	0.33	1.32	0.241
FSM*ADHD	0.86	0.35	2.10	0.737
Constant	0.01	0.01	0.01	0.000
LA variance	0.11	0.06	0.21	

WIMD score 10 = least deprived, 1 = most deprived.

some of the reasons for it.

Firstly, we were able to compare the relationship between area-level deprivation and care entry among those households where the reference child was in receipt of FSM with those where they were not. The area-level social care gradient was apparent for both, however it was steeper for households in receipt of FSM. This shows that part of the reason for the association between areas of high deprivation and care entry is that more people in those areas are on a very low income. It is important to note that households in Wales with children aged between 3 and 17 across the whole population were slightly more likely to be living in areas of high deprivation, rather than areas of low deprivation. This effect was also found by Bywaters et al. (2020) and will be another contributory factor accounting for a small amount of the association between children living in areas of high deprivation and entering care.

Secondly, we looked at a number of adult risk factors that had also previously been associated with entry of children into care (see for example Franzén et al., 2008; Simkiss et al., 2012; Melis et al., 2023). A previous paper from the same study, explored the relationship between these risk factors and care entry in more detail (Warner et al., 2024). Our analysis showed that risk factors are also all more prevalent in areas of high deprivation and in households where a child is in receipt of FSM. We also showed that the effect of both FSM and area-level deprivation reduced further when these risk factors were controlled for. This suggests that there is a combined effect, and that at least part of the reason that children in poverty, and in areas of deprivation are more likely to enter care is that the adults they are living with before they enter care are more likely to have these risk factors. This could be in keeping with the Family Stress Model (Conger et al., 2007). However, while both FSM and area-level deprivation had less of an effect when the risk factors were controlled for, they still had a significant effect. With the data we had, there was still a social gradient, albeit a much less steep one, once these risk factors were taken into account.

This may suggest alternative mechanisms are also contributing to the relationship between poverty and care entry. This could be for a variety of reasons, for example in the introduction we discuss surveillance effects and how the greater involvement of services in areas of high deprivation might lead to more awareness of problems in families. Alternatively it could potentially give weight to theories, such as Social Disorganization Theory (Kubrin and Mioduszewsk, 2019) that have previously been used to understand the association between area-level poverty independently of individual-level poverty. However, before making such a conclusion we must bear in mind the limitations of our variables. We outline the full study limitations in a separate section below, but they also form an important part of this discussion.

We know our variables will not have fully identified the risk factors in the adults in our households. There may be families who are struggling financially that do not meet the threshold for FSMs, and adult risk factors are limited to only those who have been in contact with health services about these issues. This means that while our analysis implies we can confidently say that these issues, at least partly, explain the association between both area-level deprivation and FSM status and entry into care, we are unable to say how much they would explain this association if our data were able to fully measure the extent of these issues in the population. So, while we can feel confident that our findings show that, at least some of the relationship between poverty and child care entry is due to adult risk factors, we cannot fully conclude that some of it is caused by other mechanisms. Likewise, FSM is a limited measure of household financial stress. It indicated that the families were in receipt of certain benefits, so we are confident that those who were in receipt of FSM were on low incomes. However, there would also have been many households who were struggling financially and would not have been in receipt of FSM. For example, calculations from the Child Poverty Action group (2020) suggested that in 2020 over half the children living below the poverty line in Wales were not eligible for FSMs. There may also have been cases where children were eligible for them, but they had not been claimed. Because of this we cannot say with certainty how much of the relationship between area-level deprivation and child entry into care would have remained had fuller measures of household financial stress been available.

Our analysis of interaction effects has provided some important findings. We found no evidence of the risk factors having a significantly different effect on the odds of care in areas of higher compared to lower deprivation. Although, in interpreting this it is important to remember that the odds of care are higher in areas of higher deprivation. Our findings suggest that, for example, a drug misuse problem will increase the odds of care by nearly three times irrespective of deprivation. However, the odds of care are much higher in an area of high deprivation to start with. Therefore, the odds of a child in a household with a

drug misuse problem entering care from an area of high deprivation are higher than the odds of a child in a household with a drug misuse problem in a less deprived area, and we still don't know what the reasons for that are.

In our study there was evidence of interaction effects among those in receipt of FSMs. Three risk factors, depression, anxiety and self-harm had a bigger effect on the odds of care when present in households that were not in receipt of FSM. We do not know why this is, and there could be several plausible explanations for such a finding. For example it could be related to differences in help-seeking behaviours, stigma or service thresholds. There could be differences in practice, perhaps due to social workers being more surprised by parental problems in less socio-economically typical families and responding to them differently, or different levels of support available to families not living in poverty. However, it is again important to remember that although the risk factors have less of an effect on the odds of a child going into care when they occur in households where there are FSM, children from FSM households are still much more likely to go into care. At the moment we do not know the reasons for these findings, and so further studies, including qualitative studies, would be needed to identify an explanation for this effect.

4.1. Implications for policy and practice

Although there is much more research that needs to be carried out to fully understand the relationships between parental risk factors and both area-level and individual level poverty, this study strongly backs up, and builds on previous studies that have shown a link between families struggling financially and children entering care. Once adult risks and area-level deprivation are taken into account, it is the measure of low income that has the biggest effect on the likelihood of care. The study does not provide any evidence that this is due to social work practice. This highlights how crucial it is to ensure that government policy works to combat child and family poverty. Whilst waiting for a major shift in government policy that make not come in the short term, there is still potential for practitioners and services to respond differently. Social workers are central to this issue due to their role in decision-making and supporting families to prevent care entry. Our study supports the need for more poverty-aware social work (Krumer-Nevo, 2020), an approach that not currently evident in UK statutory practice (Morris et al., 2018). Another development that might help prevent or ameliorate family problems would be for social work, mental health and substance misuse services to work together better for the benefit of parents who are struggling.

4.2. Strengths and limitations

Like all studies carried out with administrative data, there will be small errors in data collection, which will mean that some variables may have been incorrectly coded for some individuals. There was also a challenge created by missing data across all variables, that may have had an effect on our findings, as well as impacts of children who could not be included in the data because of poor match rates. However, this is off set by the very large size of the dataset, which has enabled us to look at issues at a whole population level.

The variables we used to identify risk factors would not have been fully able to identify all individuals with those risk factors in the population. We were reliant on their issues having been discussed with health services and those problems being recorded within health data. So, the extent of some of these issues in the population is likely to be higher than we were able to identify. Additionally, some issues that are risk factors for entry into care, particularly domestic abuse, are very hard to determine from this data. We were not able to identify the fathers of the children who entered care, and so used risks identified in adults in the household. We were therefore not sure how different our findings would have been if we were only able to look at the impacts of risks in parents. However, the presence of risk factors in any adult household member may be an important predictor of care entry. This study did not consider co-occurrence of risks, however we know that risks often occur together, nor did it reflect the severity of these issues. These would be useful to factor into future research in this area. Likewise, FSM is a limited measure of household financial stress. Many households may be living in financial stress and not entitled to it, and where families are entitled to it they need to have applied for it. If data on additional economic indicators becomes available in the future it would be useful to repeat this analysis to include these. Our measure of area deprivation was limited to WIMD, which provided useful comparisons with previous studies in this area. However, there are now new methodological innovations in measuring individually defined and scalable neighborhoods (Petrović et al., 2022), and it would be useful to apply these approaches to future studies of this issue.

5. Conclusion

This study is original in exploring the interrelationship between family-level low income, area-level deprivation, adult risk factors and public care entry. It provides evidence that adult risk factors and family-level low income explain some of the relationship between area-level deprivation and care entry, but with the data we had we were not able to fully explain it. Although the odds of care are higher in areas of high deprivation, the effect that adult risk factors had on the odds of care was similar in areas of higher or lower deprivation. Three risk factors: depression, anxiety and self-harm had a greater effect on the odds of care among families who were not in receipt of Free School Meals.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.childyouth.2026.108851.

Data availability

The authors do not have permission to share data.

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