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ORIGINAL PAPER

Racial and ethnic disparities in the use of antipsychotic medication: a systematic review and meta-analysis

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Abstract
Objective To conduct a systematic review and meta-analysis of published evidence on ethnic or racial disparities in the outpatient use versus non-use of antipsychotics and in the outpatient use of newer versus older antipsychotics.
Method Electronic databases were searched for potentially relevant studies. Two independent reviewers conducted the review in three stages: title review, abstract review and full-text review. Included studies were those that: (a) report measures of disparity in the outpatient use of antipsychotic drugs in clearly defined racial or ethnic groups (b) have a primary focus on ethnic or racial disparities, and (c) have adjusted for factors known to influence medicine use. Odds ratios were pooled following the inverse-variance method of weighting effect sizes. I^2 statistics were calculated to quantify the amount of variation that is likely due to heterogeneity between studies. Funnel plots were produced and Egger's statistic was calculated to assess potential publication bias.
Results No significant differences were found in the odds of using any antipsychotics among African Americans (OR = 1.01, CI = 0.99–1.02) compared with non-African Americans and among Latinos (OR = 0.98, CI = 0.86–1.13) compared with non-Latinos. Small to moderate but statistically non-significant disparities were also noted in other ethnic groups: Asians (OR = 1.10, CI = 0.88–1.36), Maoris (OR = 0.78, CI = 0.53–1.13) and Pacific Islanders (OR = 0.97, CI = 0.84–1.11). Among those who received antipsychotic medication, African Americans (OR = 0.62, CI = 0.50–0.78) and Latinos (OR = 0.77, CI = 0.73–0.81) appeared to have lower odds of receiving newer antipsychotics compared with non-African Americans and non-Latinos.
Conclusion No significant ethnic disparities in the use versus non-use of any antipsychotics were observed, but, among those who received antipsychotic treatment, ethnic minorities were consistently less likely than non-ethnic minorities to be treated with newer antipsychotics.

Keywords Racial · Ethnic · Disparities · Antipsychotics · Schizophrenia

Introduction

The societal burden of schizophrenia is substantial despite its low prevalence [1, 2]. In addition to the suffering it causes on patients and their families, schizophrenia also results in huge economic losses [3]. Currently, there is no cure for this chronic condition, although the symptoms are usually treated and respond well to medications. Most existing clinical practice guidelines recommend the use of antipsychotic medication as first-line treatment for schizophrenia [4]. Specifically, the newer types of antipsychotics are indicated because of its arguably better clinical and risk profiles [5].

A variety of studies have been conducted to determine whether there are ethnic disparities in antipsychotic treatment, with some indicating significant differences in access and treatment type across ethnic groups [6–9]. To our knowledge, however, no study has synthesized the evidence

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that has accumulated. To address this gap, we systematically reviewed and meta-analyzed published studies that report ethnic and racial disparities in antipsychotic treatment and in the type of antipsychotic medication (newer versus older) used among those who were treated.

Examining the consistency of evidence in the disparities in antipsychotic medication use is important as the results can highlight areas in the mental health system that can be improved. In many instances, the presence of disparities can reveal a mismatch between need and appropriate care that could cause or further exacerbate existing inequalities in health outcomes [10].

Methods

Search strategy

The search strategy comprised electronic database searching, scanning reference lists of key articles, and checking the personal libraries and networks of the authors, for peer-reviewed articles. The electronic databases searched include CINAHL (Ebsco), EMBASE (OvidSP), International Pharmaceutical Abstracts (OvidSP), MEDLINE (OvidSP), PsycINFO (Ebsco), and Web of Science (Thompson Reuters). Search strategies aimed to capture the intersection of ethnicity-related keywords and subject headings, and subject headings and keywords for typical (older) and atypical (newer) antipsychotic medications (see "Appendix" for details of actual search parameters). A master's-trained information specialist performed the electronic database searches. To obtain further data or clarification, we contacted eight authors, three of whom replied.

Selection criteria

We sought peer-reviewed studies published in English between January 1, 1980 and December 30, 2010. To be included, studies must have focused on ethnic or racial disparities; assessed antipsychotic medication use in outpatient settings; and reported odds ratios adjusted for at least some of the other major factors that may influence medicine use (e.g., age, sex, health status, income, insurance, and related diagnosis) [11]. The full review protocol is available upon request from the corresponding author.

Study selection process

Study selection was completed by two independent reviewers in three stages: (1) a title review (2) an abstract review, and (3) a full-text review. At the title and abstract review stages, bibliographic entries deemed relevant by at least one reviewer were selected. At the final stage (full-text review), only those studies considered potentially relevant by both reviewers were selected and included for data extraction and analysis. Differences in inclusion assessment were discussed and resolved by consensus. We calculated kappa coefficients to determine reviewer agreement.

Data extraction

Using a standardized form, we extracted the following information from each included study: sample size, sampling frame, year(s) of data collection, source of drug utilization data, covariates used for adjustment, type of antipsychotic (old versus new), crude prevalence of use, adjusted prevalence and adjusted odds ratios. Two independent reviewers performed the data extraction and the results were merged into one dataset. Discrepancies between the reviewers' extractions were discussed and resolved by consensus.

Data analysis

For studies conducted in the US, we categorized "Blacks" as African Americans and "Hispanics" as Latinos. In the two non-US studies included in the review, we retained the racial/ethnic categories used by the study authors.

We performed meta-analyses to measure ethnic/racial disparities in (a) the use versus non-use, and (b) use of newer vs older antipsychotics. We expressed all odds ratios using non-minorities (i.e., non-African Americans and non-Latinos) as the reference group. That is, in studies comparing whether ethnic minorities were more likely to receive or not receive any antipsychotic treatment, odds ratios lower than one indicate that ethnic minorities were less likely to receive antipsychotic treatment. Similarly, in studies investigating whether individuals were more likely to receive newer versus older antipsychotics, odds ratios of less than one indicate that minorities are less likely to receive newer antipsychotics.

We pooled the adjusted odds ratios following the inverse-variance method of weighting effect sizes [12]. This procedure required standard errors that were calculated from the reported 95 % confidence intervals. In studies where confidence intervals were not available, we used the reported point-estimates and p-values to estimate the standard errors.

I^2 statistics were calculated to measure the degree of potential heterogeneity between studies. Because of heterogeneity observed in some of the results, we pooled the odds ratios using a random effects model and stratified the analyses by ethnic/racial groups.

To assess potential publication bias, we produced a funnel plot and tested its asymmetry using the Egger statistic [13]. To supplement the results of Egger's test, which is biased toward indicating asymmetry when data points

consist of odds ratios and standard errors, we added contours of statistical significance in our funnel plots [14]. In these graphs, a noticeable clustering of odds ratios with large standard errors in statistically significant regions is suggestive of potential publication bias. This is because the clustering indicates that potentially missing studies are likely to be located in the statistically non-significant regions of the plot [14]. All statistical analyses were performed using version 10.1 of Stata for Windows [15].

Results

Our electronic database search produced a total of 1,825 unique citations. At the title review stage, we selected 532 potentially relevant titles. Abstracts for these titles were reviewed against the inclusion criteria and lead to the selection of 121 potentially relevant abstracts. In the last stage of the selection process (full-text review), we identified 12 studies that met inclusion criteria (Agreement: 96.7 %; Kappa: 0.92, 95 % CI = 0.83–0.99). A detailed description of the selection process can be found in Fig. 1.

Description of included studies

Table 1 summarizes the key features of each study. Of the 12 included studies, 10 were from the US [6–9, 16–21], one was from New Zealand [22] and one was from the United Kingdom (UK) [23]. Years of data collection ranged from 1992 to 2006. Prescription drug utilization data for these

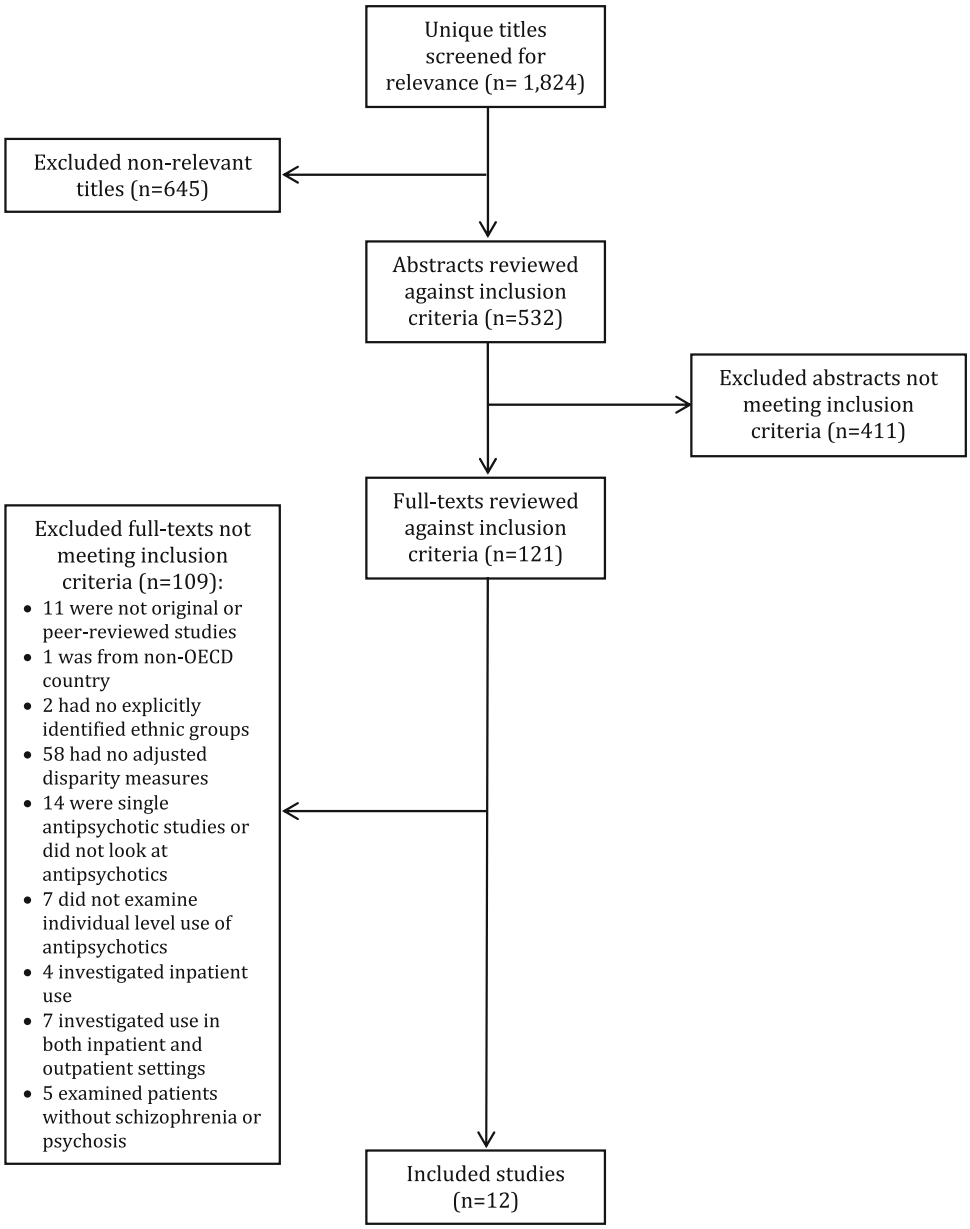

Fig. 1 Study selection and review process

Table 1 Design and sample/population characteristics of the studies included in the systematic review

Study [references]	Study design				Sample/population characteristics				Covariates
	Sampling frame	Sampling method	Data collection years	Rx data source	Diagnoses	*N*	Sex (%) M/W	Age	
Bagchi et al. [16]	Outpatient Medicaid recipients identified in the New Jersey HIV/AIDS registry, US	Population	1992–1998	Administrative	Schizophrenia and HIV	350	54/46	18+	Age at HIV diagnosis, sex, insurance (Medicare), health status (vital stat as of 1998) county of residence, mode of transmission; year of HIV diagnosis
Baillargeon and Contreras [6]	Prisoners in the Texas Department of Criminal Justice, US	Population	1998	Administrative	Schizophrenia and other psychotic disorder	4,316	93/7	18+	Age, sex, violent offense, presence of schizophrenia diagnoses or other psychotic disorders
Busch et al. [17]	Outpatient non-HMO medicaid recipients in Florida, US	Population	1996–2001	Administrative	Schizophrenia	28,153	47/53	18–64	Age, sex, comorbid substance abuse, fiscal year, region of residence, number of months of Medicaid enrolment
Copeland et al. [7]	Outpatient veterans affairs recipients, US	Population	1998–1999	Administrative	Schizophrenia	69,787	95/5	18+	Age, sex, substance use, bipolar, other psychoses
Covell et al. [9]	Outpatients of the connecticut public mental health system, US	Random	1996–1998	Chart review	Schizophrenia, schizoaffective, and psychotic disorders NOS	386	58/42	*Mean = 43.5	Age, sex, SES (education), marital status
Jano et al. [18]	Outpatient participants of the Medical Expenditure Panel Survey, US	Random	1996–2004	Administrative and survey	Schizophrenia, bipolar disorder, anxiety and dementia	551	30/70	60+	Age, sex, insurance (private vs. public), SES (income), health status (perceived gen health and perceived mental health), psychiatric diagnosis (anxiety, schizophrenia, bipolar, dementia), other (region, time, metro stat area)
Kreyenbuhl et al. [8]	Outpatient participants of the schizophrenia patient outcomes Research Team in Maryland, US	Purposive	1994–1996	Chart review	Schizophrenia or schizoaffective	344	36/64	18–64	Age, sex, SES (years of education), health status (medical comorbidity), psychiatric diagnoses (schizo vs. schizoaffective), marital status, state of residence, urban/rural, treatment facility type
Pinto et al. [23]	Outpatients from 29 out of 54 borough practices contributing data to Lambeth DataNet (primary care database) in London, UK	Population	2006	Administrative	Schizophrenia, bipolar disorders and any psychotic disorders not related to substance abuse	1,694	60/40	16–74	Age, sex, SES (area-based social deprivation measure)
Sleath et al. [24]	Outpatient medicaid recipients in North Carolina and Georgia, US	Population	2000–2001	Administrative	Schizophrenia	11,241	62/38	<18	Age, sex, state of residence
Sohler et al. [20]	Inpatient participants of the Suffolk County Mental Health Project, Massachusetts, US	Population	1989–1995	Chart review	Schizophrenia and other psychosis	501	57/43	15–60	Age, sex, marital status, educational status, occupational status, and insurance status

Table 1 continued

Study [references]	Study design				Sample/population characteristics				Covariates
	Sampling frame	Sampling method	Data collection years	Rx data source	Diagnoses	*N*	Sex (%) M/W	Age	
Wheeler et al. [22]	Outpatients of community health services in Auckland, New Zealand	Population	2000 and 2004	Chart review	Schizophrenia and schizoaffective disorder	4,821	65/35	*Mean = 38.2	Age and sex
Woods et al. [21]	Outpatients receiving antipsychotic treatment in a Connecticut community mental health center, US	Convenience	2000–2002	Survey	Schizophrenia, nonaffective psychoses, affective disorders, personality disorders, alcohol or substance abuse or dependence	501	54/46	Mean = 43.7[a]	Age, sex, years of education, psychiatric diagnoses, and alcohol or substance abuse

[a] Age range was not provided

studies were obtained from administrative databases ($n = 6$), medical chart reviews ($n = 4$), survey ($n = 1$) and a combination of survey and administrative data ($n = 1$). Many of the studies ($n = 8$) used the entire population of their sampling frame (e.g., insurance plan, outpatient list); the rest used purposive ($n = 1$), random ($n = 2$) and convenience ($n = 1$) samples. Study sample sizes ranged from 344 to 69,787.

Most of the studies ($n = 7$) reported results based on the adult population (individuals between the ages of 15 and older). One study examined children and youth exclusively and another focused on individuals 60 years and older. Mean age for three studies where age was not reported ranged from 38.2 to 43.7. We found wide variation in the number and type of covariates used for adjustment, though age, sex and psychiatric morbidity were the most frequently mentioned.

The minority ethnic/racial groups examined in the 11 US-based studies were African Americans and Latinos. Asians, Maoris and Pacific Islanders were the ethnic groups examined in the NZ study. The UK study compared "Black" and "Black British" with "White".

Racial or ethnic disparities in the use versus non-use of antipsychotic drugs

Disparities in the use versus non-use of any antipsychotics were investigated in six studies. In most of the studies, comparisons were made across three or more ethnic groups; hence, we were able to extract a total of 12 adjusted odds ratios from all six included studies. The odds ratios range from 0.64 to 1.19.

Figure 2 presents the contour-enhanced funnel plot of the log odds ratios for the included studies. There appeared to be more log odds ratios with lower precision on the left side of the plot and odds ratios with relatively higher precision on the right-hand side, but overall, the data points were scattered in regions of low statistical significance. Similarly, Egger's test statistic failed to detect significant funnel asymmetry (bias coefficient = 0.85; se = 1.51; $p = 0.59$). Together, these assessments do not indicate a bias toward publishing statistically significant findings.

Pooled odds ratios (Fig. 3) stratified by ethnicity showed neither large nor statistically significant disparities in the use versus non-use of antipsychotics. In US studies, the odds of receiving any antipsychotic medication among African Americans (OR = 1.01, CI = 0.99–1.02) and Latinos (OR = 0.98, CI = 0.86–1.13) were not significantly different from those of non-African Americans and non-Latinos.

Small to moderate but statistically non-significant disparities were also noted when odds ratios for other ethnic

minorities were pooled: Asians (OR = 1.10, CI = 0.88–1.36), Maoris (OR = 0.78, CI = 0.53–1.13) and Pacific Islanders (OR = 0.97, CI = 0.84–1.11). Odds ratios for these minority groups were derived from the single NZ study and the pairs of odds ratios that were pooled represent measurements taken from two separate time points (2000 and 2004). Of all the ethnic groups examined in the NZ study, only the pooled results for the Maori group exhibited significant heterogeneity (98.4 %, $p = 0.00$).

Finally, the single study from the UK comparing "Black" and "Black British" against "Whites" reported slightly higher but statistically non-significant odds of antipsychotic use among "Black" and "Black British" (OR = 1.16, 95 % CI = 0.88–1.53).

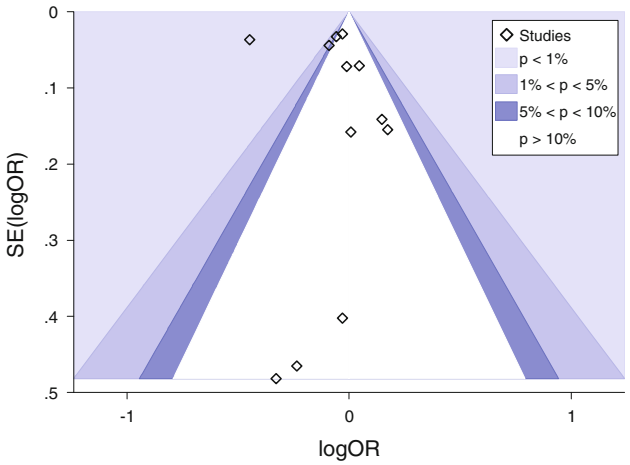

Fig. 2 Funnel plot of receiving versus not receiving any antipsychotics

Racial or ethnic disparities in the use of newer versus older antipsychotics

Seven studies, all conducted in the US, examined the odds of being treated with newer versus older types of antipsychotics. A total of 14 odds ratios were extracted and they were all less than one, ranging from 0.24 to 0.97, suggesting lower use of newer antipsychotics among ethnic minorities.

Figure 4 presents the contour-enhanced funnel plot of the log odds ratios for these results. There is a noticeable clustering of data points on the left side of the funnel plot. However, the odds ratios appeared to be evenly dispersed across regions of low and high statistical significance, suggesting that if there are missing data points on the right side of the plot, they should be evenly dispersed as well in regions of low and high statistical significance. Egger's test

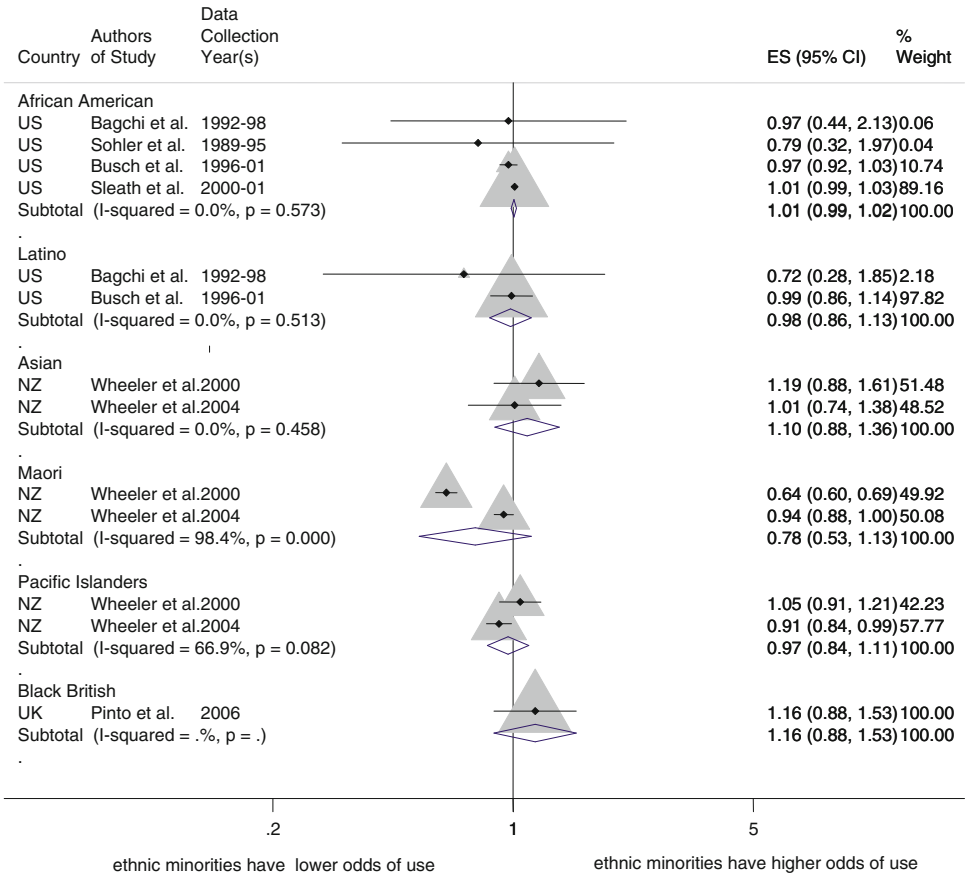

Fig. 3 Odds of receiving versus not receiving any type of antipsychotic treatment

did not indicate statistically significant funnel asymmetry (bias coefficient = −0.89; se = 0.45; $p = 0.07$). Based on these assessments, we did not conclude that the reported results were influenced by potential publication bias.

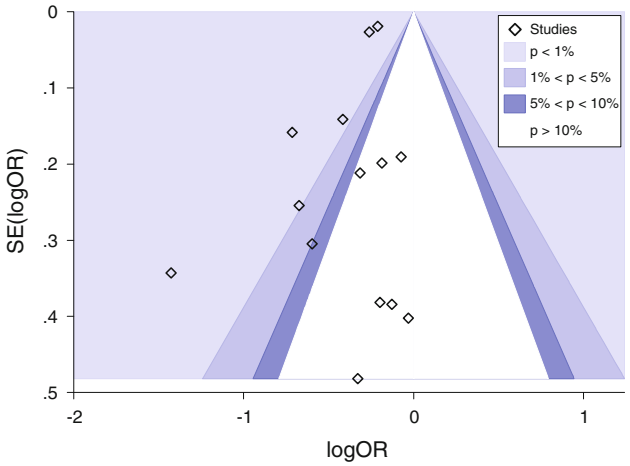

Fig. 4 Funnel plot of receiving newer versus older antipsychotics

The results of pooling the odds ratios (Fig. 5) suggest that ethnic minorities who were treated with antipsychotics, compared with non-minorities who were also treated with antipsychotics, were less likely to receive the newer type of antipsychotics and therefore more likely to receive older antipsychotics. African Americans, compared with non-African Americans, appeared to have 38 % lower odds of receiving newer antipsychotics (OR = 0.62, 95 % CI = 0.50–0.78). Similarly Latinos, compared with non-Latinos, have a 23 % lower odds of receiving newer antipsychotics (OR = 0.77, 95 % CI = 0.73–0.81). No substantial heterogeneity was observed ($I^2 = 0$ %, $p = 0.58$) among the studies that examined Latinos, but in those that studied African Americans, a high degree of heterogeneity was noted ($I^2 = 73.2$ %, $p = 0.00$).

Discussion

This study sought to systematically review and synthesize findings from published studies that examined racial and

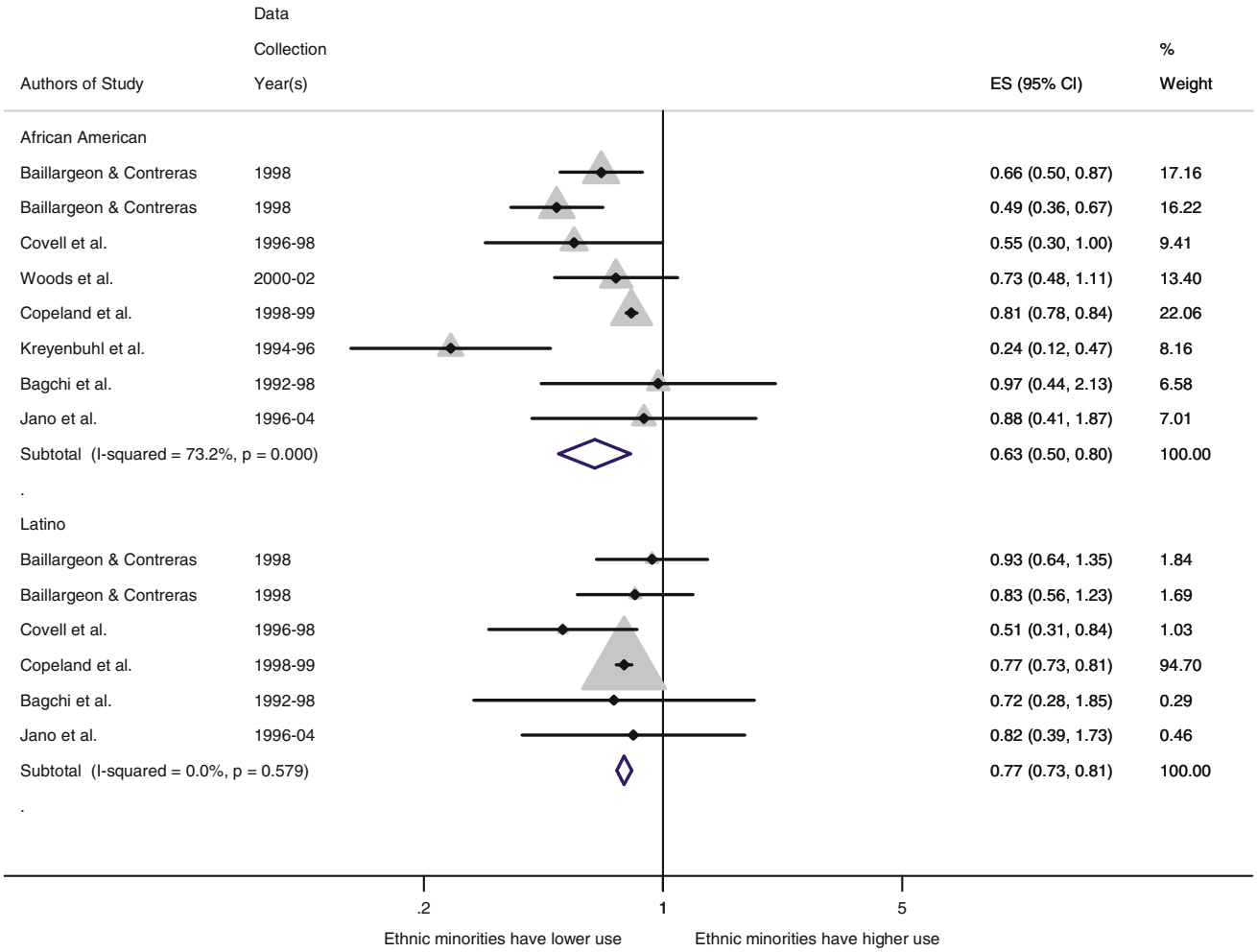

Fig. 5 Odds of receiving newer versus older type of antipsychotics among individuals who received antipsychotic treatment

ethnic disparities in the receipt and type of antipsychotic medication used in outpatient settings. Our results are that published evidence does not establish significant ethnic disparities in likelihood of receiving any antipsychotic medication. However, among those treated with antipsychotics, results of published studies suggest that African Americans and Latinos were less likely than non-minorities to be treated with the newer type of antipsychotics.

The evidence for lack of ethnic disparities in the receipt of any antipsychotic treatment seems reliable. In the two largest US studies that are likely to have adequate power to detect existing disparities [17, 24], the reported odds ratios were close to one. In the other two US studies [16, 20] where some degree of disparities were observed, the results were based on smaller sample sizes that produced less reliable estimates as reflected in the wide confidence intervals reported. In the NZ study, no disparities were noted with respect to Asians; Maoris, however, were found in a previous time period to have significantly lower odds of use. This difference disappeared in subsequent assessment (by the same authors in the same study), and our pooling of the odds ratios for both time periods yielded an effect size that although < 1, was not statistically significant. Likewise, in the NZ study, Pacific Islanders were found to have significantly lower odds of use but the effect size was small and the pooled odds ratio was not statistically significant. Lastly, the reported odds ratio from the UK study was small and not statistically significant.

The lower odds of newer antipsychotic use among ethnic minorities appeared robust across the seven US studies included in this review. Though not all effect estimates were statistically significant, all were < 1. No significant heterogeneity was observed in the odds ratios for Latinos, but in the studies that reported odds ratios for African Americans, a high degree of heterogeneity was noted. We re-analyzed the data for these studies without including the study [8] that appeared to contribute highly to the observed heterogeneity. This sensitivity analysis substantially decreased but did not completely eliminate the observed heterogeneity ($I^2 = 56.7$ %, $p = 0.031$) and did not considerably changed the pooled effect estimate (OR = 0.69, 95 % CI = 0.57–0.84). As a result, we used the original results produced using a random effects model, which accounts for the heterogeneity present between studies.

Our finding of persistent ethnic differences in the receipt of newer versus older antipsychotics is consistent with findings of ethnic differences in the use of health services for other mental disorders [25–27]. With respect to the use of newer antipsychotics, the disparity could mean that members of ethnic minorities, compared with non-minorities, received poorer care quality since practice guidelines have recommended the use of newer antipsychotics as first-line treatment for psychotic disorders such as schizophrenia [28, 29]. Newer antipsychotics have generally been regarded as better at improving cognitive functions (i.e., verbal fluency, attention, memory for facts and events) and are also considered less likely to cause irreversible movement disorders (i.e., extrapyramidal syndromes and tardive dyskinesia) [5].

We note that data for all the included studies were collected at a time when newer antipsychotics were still considerably more expensive than older antipsychotics. During that period, low income and inadequate insurance coverage, which were reported to be associated with race/ethnicity in the United States [30], may have limited ethnic minorities' access to newer antipsychotic treatment. It is possible that ethnic minorities who are uninsured or are perceived to be unable to afford the co-payment for the newer medication, have requested or were given the older antipsychotics to ensure that some form of pharmaceutical treatment is available.

Alternatively, it is also possible that the lower odds of use of newer antipsychotics among ethnic minorities may have been driven by concerns about the specific adverse effects of the newer type of antipsychotics. Previous research has linked the prolonged use of newer antipsychotics with increased risks of cardiovascular events and metabolic syndrome [5]. Since epidemiological studies have determined that hypertension and diabetes are more prevalent among African Americans and Latinos [31–33], it could be that the lower odds of use of newer antipsychotics among ethnic minorities were prompted by efforts to minimize those risks.

There is already substantial evidence about disparities in antipsychotic medication use pertaining to African Americans and Latinos in the US. The number of studies included in this review would have been greater, if we counted those that did not adjust for factors that influenced medicine use and those that examined antipsychotic use in inpatient settings. While there is still value in monitoring whether disparities persist over time, future studies could benefit from the examination of potential determinants and outcomes of observed treatment disparities. In addition, future research could also focus on measuring antipsychotic treatment disparities in understudied ethnic minorities in other countries (e.g., Canada and Australia) with rapidly changing ethnocultural make-up due to immigration.

The following limitations of our study need to be considered when interpreting the results. First, our search was limited to literature published in academic journals. Any findings of disparity or the lack thereof that were reported in the non-peer-reviewed literature or other types of reports and publications would therefore have been excluded. Second, the review was limited to journal articles that specifically reported on ethnic or racial disparities in

antipsychotic use. We may therefore have missed some studies that included but did not discuss ethnicity or race as a control variable when examining more general determinants of antipsychotic use. Last, we were not able to calculate Peter's statistic because our data points consisted of adjusted odds ratios and standard errors derived from confidence intervals. Previous research has demonstrated that Peter's [34] statistic produce lower rates of false positives with respect to publication bias.

Conclusions

Our review found neither strong nor consistent ethnic disparities in the use versus non-use of any antipsychotics. However, among those who received antipsychotic treatment, ethnic minorities such as African Americans and Latinos were found to be consistently less likely than members of non-minorities to be treated with newer antipsychotics and were therefore more likely to have used older antipsychotics.

Conflict of interest The authors report no competing interests.

Appendix

Systematic review search strategy

Source: CINAHL (EbscoHost CINAHL with full text)

Searched on: 29 November, 2010.
Saved as: n/a.
Results: 96.
Search:
(MH "Ethnic Groups + ") OR (MH "Race Factors") OR (MH "Minority Groups").
AND.
(MH "Antipsychotic Agents + ") OR (Acepromazine or Acetophenazine or Amisulpride or Aripiprazole or Benperidol or Bromperidol or Butaperazine or Chlorproethazine or Chlorpromazine or Chlorprothixene or Clopenthixol or Clotiapine or Clozapine or Cyamemazine or Dixyrazine or DOGMATIL or Droperidol or Fluanisone or Flupentixol or Fluphenazine or Fluspirilene or Haloperidol or Levomepromazine or Levosulpiride or Loxapine or Melperone or Mesoridazine or Molindone or Moperone or Mosapramine or Olanzapine or Oxypertine or Paliperidone or Penfluridol or Perazine or Periciazine or Perphenazine or Pimozide or Pipamperone or Pipotiazine or Prochlorperazine or Promazine or Prothipendyl or Quetiapine or Remoxipride or Risperidone or Sertindole or Sulpiride or Sultopride or Thiopropazate or Thioproperazine or Thioridazine or Tiapride or Tiotixene or Trifluoperazine or Trifluperidol or Triflupromazine or Ziprasidon or Zotepine or Zuclopenthixol or Methotrimeprazine).
Limit to: Scholarly (Peer Reviewed) Journals.

Source: EMBASE (OvidSP; 1980 to 2010 Week 47)

Searched on: 1 December, 2010.
Saved as: ethnicity antipsychotics Joseph SR EMBASE.
Results: 1310.
Search:

1. exp neuroleptic agent/bd, ct, ad, cm, do, it, dt, ih, ia, ce, cv, dl, ig, im, na, ip, tl, iv, po, pa, pr, pe, pd, rc, sc, sb, li, tp, td
2. (Acepromazine or Acetophenazine or Amisulpride or Aripiprazole or Benperidol or Bromperidol or Butaperazine or Chlorproethazine or Chlorpromazine or Chlorprothixene or Clopenthixol or Clotiapine or Clozapine or Cyamemazine or Dixyrazine or DOGMATIL or Droperidol or Fluanisone or Flupentixol or Fluphenazine or Fluspirilene or Haloperidol or Levomepromazine or Levosulpiride or Loxapine or Melperone or Mesoridazine or Molindone or Moperone or Mosapramine or Olanzapine or Oxypertine or Paliperidone or Penfluridol or Perazine or Periciazine or Perphenazine or Pimozide or Pipamperone or Pipotiazine or Prochlorperazine or Promazine or Prothipendyl or Quetiapine or Remoxipride or Risperidone or Sertindole or Sulpiride or Sultopride or Thiopropazate or Thioproperazine or Thioridazine or Tiapride or Tiotixene or Trifluoperazine or Trifluperidol or Triflupromazine or Ziprasidon or Zotepine or Zuclopenthixol or Methotrimeprazine).mp.
3. 1 or 2
4. exp ethnic difference/or exp ethnic group/or exp "ethnic or racial aspects"/or exp race/or exp "ethnic, racial and religious groups"/or exp ethnicity/
5. 3 and 4
6. limit 5 to (human and english language and year = "1980 -Current")
7. limit 6 to (article or journal or letter or report or "review")

Source: International Pharmaceutical Abstracts (OvidSP; 1970 to November 2010)

Searched on: 29 November, 2010.
Saved as: ethnicity antipsychotics Joseph SR IPA.
Results: 84.
Search:

1. ethnic.mp. [mp = title, subject heading word, registry word, abstract, trade name/generic name]

2. (ethnic or ethnicity).hw.
3. race.hw.
4. 1 or 2 or 3
5. Antipsychotic agents.hw.
6. (Acepromazine or Acetophenazine or Amisulpride or Aripiprazole or Benperidol or Bromperidol or Butaperazine or Chlorproethazine or Chlorpromazine or Chlorprothixene or Clopenthixol or Clotiapine or Clozapine or Cyamemazine or Dixyrazine or DOG-MATIL or Droperidol or Fluanisone or Flupentixol or Fluphenazine or Fluspirilene or Haloperidol or Levomepromazine or Levosulpiride or Loxapine or Melperone or Mesoridazine or Molindone or Moperone or Mosapramine or Olanzapine or Oxypertine or Paliperidone or Penfluridol or Perazine or Periciazine or Perphenazine or Pimozide or Pipamperone or Pipotiazine or Prochlorperazine or Promazine or Prothipendyl or Quetiapine or Remoxipride or Risperidone or Sertindole or Sulpiride or Sultopride or Thiopropazate or Thioproperazine or Thioridazine or Tiapride or Tiotixene or Trifluoperazine or Trifluperidol or Triflupromazine or Ziprasidon or Zotepine or Zuclopenthixol or Methotrimeprazine).ti,ab,hw,tn,rw.
7. 5 or 6
8. 4 and 7
9. limit 8 to (english language and human and year = "1980-Current")

Source: MEDLINE (1950 to Present with Daily Update) (OvidSP)

Searched on: 29 November 2010.
Saved as: ethnicity antipsychotics Joseph SR.
Results: 597.
Search:

1. ethnicity.mp.
2. exp ethnic groups/or exp african americans/or exp arabs/ or exp asian americans/or exp gypsies/or exp hispanic americans/or exp mexican americans/or exp jews/
3. exp continental population groups/or exp african continental ancestry group/or exp african americans/ or exp indians, central american/or exp indians, south american/or exp asian continental ancestry group/or exp asian americans/or exp european continental ancestry group/or exp oceanic ancestry group/
4. cross-cultural comparison/or exp cultural characteristics/or exp cultural diversity/or exp ethnology/
5. 1 or 2 or 3 or 4
6. Antipsychotic agents/
7. Psychotic disorders/dt [drug therapy]
8. (Acepromazine or Acetophenazine or Amisulpride or Aripiprazole or Benperidol or Bromperidol or Butaperazine or Chlorproethazine or Chlorpromazine or Chlorprothixene or Clopenthixol or Clotiapine or Clozapine or Cyamemazine or Dixyrazine or DOG-MATIL or Droperidol or Fluanisone or Flupentixol or Fluphenazine or Fluspirilene or Haloperidol or Levomepromazine or Levosulpiride or Loxapine or Melperone or Mesoridazine or Molindone or Moperone or Mosapramine or Olanzapine or Oxypertine or Paliperidone or Penfluridol or Perazine or Periciazine or Perphenazine or Pimozide or Pipamperone or Pipotiazine or Prochlorperazine or Promazine or Prothipendyl or Quetiapine or Remoxipride or Risperidone or Sertindole or Sulpiride or Sultopride or Thiopropazate or Thioproperazine or Thioridazine or Tiapride or Tiotixene or Trifluoperazine or Trifluperidol or Triflupromazine or Ziprasidon or Zotepine or Zuclopenthixol or Methotrimeprazine).mp. [mp = title, original title, abstract, name of substance word, subject heading word, unique identifier]
9. 6 or 7 or 8
10. 5 and 9
11. limit 10 to (english language and year = "1980-Current")
12. limit 11 to (classical article or clinical trial, all or comparative study or controlled clinical trial or evaluation studies or journal article or letter or meta analysis or multicenter study or randomized controlled trial or "review" or technical report or validation studies)

Source: PsycINFO (Ebsco)

Searched on: 29 November, 2010.
Saved as: n/a.
Results: 76.
Search:

S1. DE "Racial and Ethnic Groups" OR DE "African Cultural Groups" OR DE "Arabs" OR DE "Asians" OR DE "Blacks" OR DE "Indigenous Populations" OR DE "Latinos/Latinas" OR DE "Romanies" OR DE "Whites" OR DE "Cross-Cultural Differences" OR DE "Racial and Ethnic Differences"
S2. DE "Neuroleptic Drugs" OR DE "Aripiprazole" OR DE "Clozapine" OR DE "Molindone" OR DE "Nialamide" OR DE "Olanzapine" OR DE "Quetiapine" OR DE "Reserpine" OR DE "Risperidone" OR DE "Spiroperidol" OR DE "Sulpiride" OR DE "Tetrabenazine"
S3. (Acepromazine or Acetophenazine or Amisulpride or Aripiprazole or Benperidol or Bromperidol or Butaperazine or Chlorproethazine or Chlorpromazine or Chlorprothixene or Clopenthixol or Clotiapine or

Clozapine or Cyamemazine or Dixyrazine or DOGMATIL or Droperidol or Fluanisone or Flupentixol or Fluphenazine or Fluspirilene or Haloperidol or Levomepromazine or Levosulpiride or Loxapine or Melperone or Mesoridazine or Molindone or Moperone or Mosapramine or Olanzapine or Oxypertine or Paliperidone or Penfluridol or Perazine or Periciazine or Perphenazine or Pimozide or Pipamperone or Pipotiazine or Prochlorperazine or Promazine or Prothipendyl or Quetiapine or Remoxipride or Risperidone or Sertindole or Sulpiride or Sultopride or Thiopropazate or Thioproperazine or Thioridazine or Tiapride or Tiotixene or Trifluoperazine or Trifluperidol or Triflupromazine or Ziprasidon or Zotepine or Zuclopenthixol or Methotrimeprazine)

S4. S2 OR S3

S5. S1 AND S4

Limiters—Scholarly (Peer Reviewed) Journals, 1980-Current.

Source: Web of Science (Thompson Reuters ISI Web of Knowledge)

Searched on: 29 November, 2010.

Saved as: n/a.

Results: 307.

Search:

- Topic = (antipsychotic*)
- Topic = (ethnic* OR racial OR race)
- #2 AND #1

Refined by: document type = (article or letter or review) and languages = (english).

Timespan = all years. Databases = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH.

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