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Racial minority groups on dialysis in Europe: a literature review

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ABSTRACT

Aims To provide an overview of the existing data on non-Caucasian dialysis patients within Europe, and to explore whether these data confirm differences between non-Caucasian and Caucasian dialysis patients that were found in other parts of the world.

Methods A query consisting of the combination “dialysis”, “ethnicity”, and “Europe” was applied in PubMed, EMBASE, Web of Science, CINAHL, and the Cochrane Library.

Results Ten papers were included in this study. Studies from the United Kingdom (UK) and the Netherlands confirm the higher incidence of end-stage renal disease (ESRD) in non-Caucasians. In other European countries these findings were not confirmed. In studies from the UK, the Netherlands, and Spain a younger age at initiation of dialysis treatment for non-Caucasians compared to Caucasians was reported, this is also found in non-European studies. Regarding comorbid conditions at the start of renal replacement therapy (RRT), vascular disease was less common, while diabetes was more common among non-Caucasians compared to Caucasians. Large non-European studies also demonstrated less vascular disease among non-Caucasians initiating RRT than among Caucasians. The survival advantage for non-Caucasian compared to Caucasian RRT patients is confirmed in one large study from the UK and in a Dutch study. Reasons for the better survival of non-Caucasians are not understood completely.

Conclusion Only a few studies are available on non-Caucasian dialysis patients in Europe. The available data confirm findings of other studies throughout the world on racial differences on dialysis. More research is needed to understand the higher incidence and better survival in non-Caucasian patients, and also in countries where there are currently no relevant data.

INTRODUCTION

Studies across the world suggest that non-Caucasians are more prone to develop end-stage renal disease (ESRD) than Caucasians.^{1,2} In 2006 the incidence of ESRD for African-Americans was 1,010 per million population (pmp), for native Americans 489 pmp, for Asians 388 pmp, and for whites 279 pmp.¹ However, once dialysis is initiated non-Caucasians seem to have a survival advantage compared to Caucasians.³ In 2001 the unadjusted 5-year survival probability for African American incident dialysis patients was 43%, while white American incident dialysis patients had a 5-year survival probability of 27%. For other races the 5-year survival probability was 47%.¹ European data on non-Caucasian dialysis patients are available from the United Kingdom Renal Registry (UKRR)⁴, but no clear picture is available for other countries in Europe. The aim of this study is to provide an overview of the existing data on non-Caucasian dialysis patients within Europe, with special emphasis on the proportion of non-Caucasians among patients on dialysis compared to the general population, on patient characteristics, and on outcomes. We aim to explore whether these data confirm differences between non-Caucasian and Caucasian dialysis patients that were found in other parts of the world.

METHODS

In July 2009, a query consisting of the combination of the subjects “dialysis”, “ethnicity”, and “Europe” was applied in the following databases: PubMed, EMBASE (OVID version), Web of Science, CINAHL (EBSCO-Host version), and Cochrane Library. Our search was restricted to studies published in the English language. Various synonyms and related terms for all three subjects were used. The databases were searched taking into account the terminological differences between these databases. We used the “Related Article” link in PubMed to find additional studies. References in relevant papers were checked. Finally, relevant studies presented at the poster session of the Satellite Conference “Kidney Disease in Disadvantaged Populations” of the World Nephrology Congress 2009 were included. Per country only the largest studies relating to the incidence, prevalence and/or survival of non-Caucasian dialysis patients were included, or when these studies were lacking we included the largest study in which the number of non-Caucasian dialysis patients was assessed. Only original research papers were included, providing data on ethnicity of adult patients on dialysis in Europe. Papers describing highly selected populations, for instance randomized controlled drug trials, were excluded.

To compare the proportion of non-Caucasians among patients on dialysis to the general population, we used data from the Organization for Economic Cooperation and Development (OECD) on foreign populations in 2005. Foreign population was defined as persons born abroad who retained the nationality of their country of origin, or as second and third generation immigrants born in the host country. We used tables on the foreign population by nationality, in which only the main nationalities were specified, to estimate the number of non-Caucasians among the foreign population. To approximate the number of non-Caucasians we excluded North American, Australian and European nationalities, except for the Turkish nationality. Nationalities that belonged to the category “other countries” were all classified as non-Caucasians.⁵

RESULTS

The bibliographic databases yielded 682 references (Pubmed: 545; EMBASE: 173 (85 unique); Web of Science: 87 (20 unique); CINAHL: 24 (15 unique); Cochrane Library: 26 (17 unique)). One author reviewed the abstracts and assessed their relevance. 175 articles were excluded as they were review articles, case reports, or non-English articles. 130 articles were excluded because only non-European data were presented. Another 329 articles were excluded because patients were not representative of the general dialysis population, or data on ethnicity were not provided.

Of 48 appropriate studies the “Related Articles” in PubMed and the references were reviewed. Four new articles were found. One study that was presented at the poster session of the Satellite Conference “Kidney Disease in Disadvantaged Populations” of the World Nephrology Congress 2009, but not published at the time of our literature search, was also included.⁶ Of 53 articles that were considered to be relevant, 38 presented United Kingdom (UK) data, 6 Dutch data, 4 data of the European part of the Dialysis Outcomes and Practice Patterns Study (DOPPS), two Italian data, one data of the European Renal Association – European Dialysis and Transplant Association (ERA-EDTA) Registry, one Spanish data, and one German data. Per country only the largest studies relating to the incidence, prevalence and/or survival of non-Caucasian dialysis patients were included, or when these studies were lacking we included the largest study in which the number of non-Caucasian dialysis patients was assessed. Finally, ten articles were included in this study (Table1).^{4;6-14}

Table 1. Large studies on racial minority groups on dialysis in European countries.

Country	Registry and/or region ^{reference}	Number of renal units	Modality of renal replacement therapy	Prevalent/ Incident patients	Period	Number of patients	Non - Caucasians (% of all dialysis patients)	Main categories racial minorities (% of all dialysis patients)	Foreign population in the general population (%) ¶	
									All	Non - Caucasians
United Kingdom	England ¹²	53	HD, PD, transplant	Incident	1991 – 1992	5,901	13.7	4.7 Blacks 7.7 Asians		6.2 #
	UKRR ⁶	52	HD, PD, transplant	Incident	1997 – 2006	31,244	14.0	3.9 Blacks 8.0 South Asians	5.2	3.4
	UKRR ⁴	72	HD, PD, transplant	Prevalent	2007	45,484	18.6 II	6.0 Blacks 9.5 Asians 0.7 Chinese II		
Spain	DOPPS I ¹¹	20	HD	Prevalent	1998 – 2000	1,064	5.6	0.1 Indian	9.5	7.0
	Madrid region ⁹	31	HD	Prevalent	2003	2,035	4.3	2.2 Latin-American 1.7 African 0.6 non-EU Europeans 0.4 Asians		
Greece	ERA-EDTA *	96	HD, PD	Incident	2003	1,290 †	0.2	?	5.2	0.7
Italy	DOPPS I ¹¹	20	HD	Prevalent	1998 – 2000	1,296	0.3	0.1 Blacks 0.1 Asians	4.6	3.1
Germany	DOPPS I ¹¹	21	HD	Prevalent	1998 – 2000	1,279	0.7	0.3 Blacks 0.1 Asians 0.1 Indian	8.2	4.7
	Aranesp	167	HD, PD	Prevalent	?	1,502 †	1.7	0.6 Blacks		

Country	study group ⁷	n	HD	Prevalent	Year	n	Prevalent	Year	n	Ethnicity	Prevalent	Year	n	Ethnicity
France	DOPPS ¹¹	20	HD	Prevalent	1998 – 2000	1,244	6.4	1998 – 2000	1,244	0.5 Asians 2.4 Blacks 1.0 Asians 0.2 Indian	5.6	1998 – 2000	1,244	3.8
The Netherlands	NECOSAD ¹⁰	38	HD, PD	Incident	1997 – 2002	1,677	7.5	1997 – 2002	1,677	2.0 Blacks 6.0 Asians	4.2	1997 – 2002	1,677	2.8
	The Hague ⁸	3	HD, PD	Incident	1990 – 1997	56 §	51.8	1990 – 1997	56 §	51.8 Indo-Asian		1990 – 1997	56 §	
	Amsterdam ¹⁴	1	HD, PD	Incident	1996 – 2005	303	38.6	1996 – 2005	303	11.9 Blacks 8.3 Moroccan 7.3 Suriname Hindustani 5.9 East Asians		1996 – 2005	303	

* Data obtained by personal communication with Dr. Vianda Stel, ERA-EDTA Registry, Amsterdam, The Netherlands.

† Only included when data on serum creatinine were available.

‡ Only included when clinically stable, and mean Hb 10-13 g/dl.

§ Only Caucasians or Indo-Asians included who had diabetes mellitus as cause of renal failure.

|| Percentages calculated after excluding missing data on ethnicity (missing in 19.8% of all patients).

¶ If not otherwise indicated data derived from the OECD.⁵

Percentage non-Caucasians in the general population of England, derived from 1991 census breakdown.¹²

Ethnicity

Two large international studies have collected data on the ethnicity of European dialysis patients. The first one is the DOPPS, a prospective observational study in prevalent and incident hemodialysis patients across different countries in the world. Five European countries were included in the first phase of this study (1998 – 2000): France, Germany, Italy, Spain, and the UK. The percentages of non-Caucasian dialysis patients varied widely among the countries, from 0.3% in Italy to 16.6% in the UK.¹¹ In the general population of these countries the percentages of non-Caucasian foreigners were more equally distributed (Table 1).⁵

The second data set comprised the data of a special study on residual renal function of the ERA-EDTA Registry.¹³ Data on race were available for renal registries in two Italian regions (Basilicata, Piedmont), Greece, and the UK (England, Wales) (data obtained by personal communication Dr. Vianda Stel, ERA-EDTA Registry, Amsterdam, The Netherlands). In Italy none of the patients was non-Caucasian, and in Greece 0.2% were non-Caucasian, while in the general population of Italy and Greece respectively 3.1% and 0.7% belonged to the non-Caucasian foreign population.⁵ Data on the UK population are also included in a more comprehensive national study.⁶

National data on the proportion of non-Caucasians among patients on dialysis in Europe originate mainly from the UK, the Netherlands, and Spain. Data from the UK are derived mainly from the UKRR. The UKRR is an important data source since it is one of the few European registries collecting data on ethnicity.⁴ Of all patients accepted for renal replacement therapy (RRT) in renal units in England in 1991 and 1992, 7.7% were Asian and 4.7% were black. The crude relative acceptance rates for Asians and blacks were respectively 3.5 and 3.2 compared to Caucasians.¹² Of all new patients accepted for RRT in England and Wales between 1997 and 2006, 14% had a non-Caucasian ethnicity.⁶ For comparison, in the general population of England about 12% belonged to a (mixed) ethnic group other than Caucasian.¹⁵ OECD data, on the other hand, revealed about 3.4% non-Caucasian foreigners.⁵

A Spanish study in the region of Madrid found that 4.9% of prevalent hemodialysis patients in 2003 had a non-EU nationality, while in the general population 9.9% were non-EU members. The prevalence of hemodialysis therapy in non-EU immigrants was lower compared to the general population (454 pmp in the general population, 438 pmp in Africans, 135 pmp in Latin Americans, and 298 pmp in Asians). The prevalence in non-EU

resident immigrants might be even lower as selective migration of ESRD patients to Spain may play a role (62% of the immigrants included in the study were directly incorporated to the hemodialysis program after arriving in Spain).⁹ However, based upon international data, a higher prevalence of RRT in non-Caucasians would be expected.² The reasons for this discrepancy are unclear. The Madrid non-EU population could include younger persons compared to the EU-patients. Theoretically it is also possible that they would have a limited access to dialysis therapy.

In the Netherlands a prospective cohort study among incident adult dialysis patients in 73% of the dialysis centers showed 7.5% non-Caucasians.¹⁰ For comparison, in OECD data 2.8% of the population in the Netherlands are of a non-Caucasian foreign population.⁵

Overall, data from large studies in the UK and studies in the Netherlands confirm the higher incidence of ESRD in non-Caucasians, as the proportion of non-Caucasians among patients on dialysis is higher compared to the general population (Table 1). In other European countries these findings were not confirmed.

Clinical characteristics and outcomes

Age

Studies in the UK, the Netherlands, and Spain have examined the age of non-Caucasian dialysis patients in Europe. Non-Caucasian dialysis patients in Europe are consistently younger when they start dialysis treatment compared to Caucasians. In the UK the mean age for Blacks, South Asians, and Caucasians at the start of dialysis treatment was respectively 53.7, 58.9, and 65.4 years⁶, and immigrant dialysis patients in the Netherlands were 13.1 years younger compared to native Dutch patients at the initiation of dialysis treatment.¹⁴ Studies across the world also found a lower age for non-Caucasians starting dialysis treatment compared to Caucasians.^{1;16;17} This difference in age may be a reflection of age structure of the general population. In the general population of England, for instance, the mean age for non-Caucasians is 30.4 years and for Caucasians 40.9 years.¹⁵ Another reason may be that non-Caucasians arrive earlier at the final stage of renal disease.

Comorbidity

In the UK and the Netherlands the percentage of patients with a vascular disease at the initiation of RRT was decreased in non-Caucasian compared to Caucasian patients. In the UK, 22%, 36%, and 38% of respectively Black, South Asian, and Caucasian dialysis patients had a

vascular disease at the initiation of RRT. In the Netherlands this was 22% and 37% for immigrants and natives, respectively. However, in the UK the age-adjusted prevalence of vascular comorbidity at the start of RRT was higher in South Asians compared to Caucasians.^{6;14} Non-European studies also found less vascular disease at the start of dialysis treatment in non-Caucasians compared to Caucasians.^{3;16;17}

In the UK the percentage of patients with diabetes as comorbid condition at the start of RRT was significantly higher in non-Caucasian than in Caucasian dialysis patients (36%, 50%, and 25% for Blacks, South Asians, and Caucasians, respectively).⁶ This was also found in Dutch dialysis patients, albeit not statistically significant.¹⁴ In Spain diabetes was not determined as a comorbidity.⁹ Most non-European studies on non-Caucasian dialysis patients only determined the percentage of patients with diabetes as cause of renal failure, instead of diabetes as a comorbid condition.^{3;16;17}

A population-based case-control study in the city of The Hague in the Netherlands has shown a 22-fold higher risk of ESRD due to diabetes mellitus Type 2 in Surinamese Indo-Asian immigrants compared to native Dutch individuals. After adjusting for age this risk of ESRD was 38 times higher, as Indo-Asians were 14 years younger at onset of diabetes Type 2. This higher risk is explained by both an 8 times higher prevalence of diabetes in the Indo-Asian general population in The Hague, and by a higher incidence rate of diabetic nephropathy for the Indo-Asian diabetic population.⁸

Survival

Survival data of non-Caucasians dialysis patients in Europe are only available from the UK and the Netherlands.^{6;14} They confirm United States (US) data that found a better survival on dialysis in racial minority groups compared to Caucasian patients.^{1;3} In the UK the crude hazard ratios (HR) for mortality after 90 days on hemodialysis were 0.40 (95% CI 0.33-0.47) for Blacks and 0.62 (95% CI 0.55-0.70) for South Asians compared to Caucasians. In the Netherlands a decreased relative mortality risk of 0.37 (95% CI 0.26-0.53) was found for immigrant compared to native Dutch dialysis patients. These survival advantages persist after adjustment for age, comorbidity, and primary renal disease. Explanations for the difference in survival remain unclear.

In the UK Caucasians had higher renal transplant rates than Blacks and South Asians, while in the Netherlands significantly more immigrants received a renal transplantation compared to

natives. As censoring at the time of renal transplantation could cause a selection bias, in the UK survival analyses were performed without censoring at renal transplantation. In the Netherlands, however, survival analyses were performed with censoring patients at renal transplantation. However, not censoring at transplantation did not materially influence the survival data.^{6,14}

DISCUSSION

This review provides an overview of the existing data on non-Caucasian dialysis patients within Europe. Special emphasis is put on the proportion of non-Caucasians among dialysis patients compared to the proportion of non-Caucasians in the general population, on patient characteristics, and on outcomes.

Comparing percentages of non-Caucasian dialysis patients to non-Caucasian foreigners in Table 1 is subject to some limitations, particularly as only sporadic data are available for analysis. First, most studies in dialysis patients were not aimed at assessing the proportion of non-Caucasian patients in particular, which could cause less accuracy in counting non-Caucasian individuals. Second, the number of non-Caucasian foreigners is a rough estimation of the real number. We consider all people in the category “other countries” as non-Caucasians, while some of them originate from European countries. Third, the number of non-Caucasian foreigners in the general population is not equal to all non-Caucasians living in a country. For example, illegal immigrants are not included, as well as non-Caucasians who only have the nationality of the country of residence (such as people originating from overseas colonies). For drawing further conclusions on the incidence and prevalence of non-Caucasian dialysis patients in Europe, a more accurate assessment of the number of non-Caucasians in the general population of Europe is needed.

Racial differences in comorbidity at the start of RRT have been described in Europe. These differences do not explain the better survival for non-Caucasian compared to Caucasian dialysis patients, as adjustment for comorbidity did not significantly influence the hazard ratios for mortality in the multivariate analyses. Reasons for the better survival of racial minorities on dialysis in Europe are not known.^{6,14} In the US the underlying mechanisms of survival differences between racial groups on dialysis are also not fully understood. A recent study in the US has shown a higher mortality in black patients with early-stage chronic

kidney disease than in white patients.¹⁸ Thus survivor bias may explain the lower mortality seen among black ESRD patients. Another study suggests that the more extensive use of activated vitamin D in black patients compared to whites, as a consequence of higher parathyroid hormone levels, is a possible explanation for the difference in survival.¹⁷ Furthermore, different psychosocial factors or intensities of depressive symptoms among different racial groups on dialysis may cause survival disparities.^{19;20}

CONCLUSION

Few definite conclusions on non-Caucasian dialysis patients in Europe could be drawn, as the available data are both sparse and sporadic in nature, and have probably not been all that carefully collected, reducing the value of any analysis accordingly. Most European studies on non-Caucasian dialysis patients originate from the UK, and some originate from the Netherlands. Data from other countries are scarce. The available data confirm findings of other studies in the world on racial differences on dialysis. However, more detailed research is needed to understand the higher incidence and apparent better survival in non-Caucasian patients, and basic data need to be acquired in those European countries where none have thus far been collected.

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