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REVIEW

Maternal Healthcare in Migrants: A Systematic Review

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Abstract Pregnancy is a period of increased vulnerability for migrant women, and access to healthcare, use and quality of care provided during this period are important aspects to characterize the support provided to this population. A systematic review of the scientific literature contained in the MEDLINE and SCOPUS databases was carried out, searching for population based studies published between 1990 and 2012 and reporting on maternal healthcare in immigrant populations. A total of 854 articles were retrieved and 30 publications met the inclusion criteria, being included in the final evaluation. The majority of studies point to a higher health risk profile in immigrants, with an increased incidence of co-morbidity in some populations, reduced access to health facilities particularly in illegal immigrants, poor communication between women and caregivers, a lower rate of obstetrical interventions, a higher incidence of stillbirth and early neonatal death, an increased risk of maternal death, and a higher incidence of postpartum depression. Incidences vary widely among different population groups. Some migrant populations are at a higher risk of serious complications during pregnancy, for reasons that include reduced access and use of healthcare facilities, as well as less optimal care, resulting in a higher incidence of adverse outcomes. Tackling these problems and achieving equality of care for all is a challenging aim for public healthcare services.

Keywords Migrants · Access, Utilization and quality of care · Maternal and child health

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Background

The most recent waves of immigration show the increasing feminization of this phenomenon. Migrant women frequently initiate the mobility process at a childbearing age, irrespective of individual motivations for leaving their countries. They are also frequently exposed to biological and psychosocial risks when confronted with new contexts, environments and lifestyles that tend to accentuate situations of social vulnerability [1]. In addition to the anxieties inherent to migration, there is scientific evidence suggesting increased vulnerability during pregnancy and the postpartum period [2, 3]. Stressors associated with the migration process may be particularly important after delivery, exacerbating psychopathological complications such as the postpartum blues, psychosis and depression [2, 4]. Several psychosocial risk factors have been

described, and include lack of social support, recent life stresses (including factors leading to migration and the migration process itself), personality variables and feelings about pregnancy or parenthood. Social and physical environmental adversity have been associated with maternal stress and pregnancy and infant health outcomes including prematurity, low-birth weight and infant mortality [5]. Migrants also exhibit a greater risk of suffering from mental illness, including depression, schizophrenia and post-traumatic stress, as a result of specific psychosocial determinants [2, 4].

The issue of vulnerability acquires more alarming contours when there are barriers that hinder the access of migrant populations to health systems, such as those related to economic difficulties, language problems, mobility issues, legal status, healthcare provider's attitudes, and cultural differences [6–9]. It is therefore important to assess the determinants of maternal healthcare in immigrant populations in order to establish policies that better attend these women's requirements.

The aim of this paper was to review the existing scientific evidence on the access, use and quality of healthcare in migrant populations during pregnancy and the postpartum period, with particular emphasis on how this interferes with health indicators and outcomes. To our knowledge, this is the first review to contemplate these three prime aspects of healthcare in the obstetric population.

Methods

One of our goals was to provide and reinforce evidence on the major role of perceived needs, cultural knowledge and individual expectations (e.g. health literacy). These aspects potentially influence the subjective perceptions of the migrant population about health and care adequacy, affecting their request and adherence to treatment as well as health behavior advice [10, 11]. These elements provide noteworthy indications to expand the research field knowledge and clinical focus.

The Medline and Scopus databases were searched for original articles (excluding comments, editorials, reviews and guidelines), published between January 1990 and February 2012, with abstracts written in English, Spanish, French or Portuguese, using the following search sentence: (pregnant OR pregnancy OR postpartum) AND (migrant OR migrants OR immigrant OR immigrants OR emigrants) AND ("maternal health" OR "maternal care" OR "prenatal care" OR "postpartum care" OR "prenatal health" OR "postpartum health" OR "health services" OR "maternal health services" OR "health care" OR "prenatal health services" OR "quality care" OR "health care quality" OR "health services utilization" OR "health access" OR "perinatal health" OR "perinatal care" OR "perinatal health services" OR "health outcomes" OR "health indicators" OR "health status" OR "reproductive health outcomes" OR "reproductive health indicators" OR "reproductive health status" OR "perinatal health outcomes" OR "perinatal health indicators" OR "perinatal health status").

A total of 854 articles were obtained. The abstracts were evaluated by one of the authors (LA) to select studies that met all of the following inclusion criteria: (1) related to migrant women during pregnancy or in the year that followed, (2) evaluating access, use and/or quality of care, (3) providing and evaluation of health outcomes and/or presenting comparable health indicators.

The following exclusion criteria were also defined: (1) articles in which participants were in a situation of forced migration, were refugees or asylum seekers; (2) articles where evaluation of health outcomes was not based on assessment of access, use and/or quality of care; (3) articles where outcomes were not explicitly resultant from maternal healthcare; (4) studies that did not have a control group, or comparable health indicators from the indigenous population; (5) studies in which the participants had pre-existing health conditions, alcohol and drug abuse; (6) studies evaluating practitioners' views, experiences and perspectives.

After application of the inclusion and exclusion criteria, a total of 27 articles were retrieved for analysis. The full-text of these papers was read by one of the researchers (LA) to confirm that they were original studies. The reference list of all systematic reviews and/or meta-analysis related to the topic was checked manually in order to identify studies that may not have been retrieved using the defined search strategy. This yielded a further three papers, for a total of 30 included studies.

Data extraction was carried out independently by three researchers (LA, JC, DB) and discrepancies were resolved by consensus. When data from the same study was reported in different publications, only the more recent paper was selected. No quality scoring system was applied in this review.

Results

Table 1 provides a summary of the main characteristics and findings of the evaluated studies. Studies were mainly conducted in Europe, but some were carried out in the USA, Canada and Australia. Most countries where the studies were performed have specific legislation favoring universal access to healthcare during pregnancy [12–16].

The majority of studies point to a higher health risk profile in migrants [6, 8, 10, 11, 17], and this can be due to different contributing factors.

Table 1 Main characteristics and findings of the studies included in the review

First author	Host country (region)	Country of origin (number)	Control group (number)	Type of study (sampling method)	Main findings in immigrant population (as compared to controls)
Bray et al. [17]	Scotland (Lothian)	Czeck, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia (n = 114)	Scottish (136)	Retrospective cross sectional (maternity case records)	No differences in total c-section or instrumental delivery rates. Lower elective c-section rate (6 vs. 10 %), higher epidural rate (65 vs. 50 %)
Chote et al. [14]	Netherlands (Rotterdam)	Morocco (208), Turkey (240), Cape Verde, Antilles (108), Creole Surinam (76), Hindustani Surinam (86)	Dutch (1242)	Prospective cohort	Higher rate of late entry into antenatal care in Cape Verdean (OR = 1.65; 0.96–2.82), Moroccan (OR = 1.74; 1.07–2.85), Dutch Antillean (OR = 1.80; 1.04–3.13), Surinam Creoles (OR = 2.04)
David et al. [18]	Germany (Berlin)	Turkey, Afghanistan, Pakistan, Arab countries of Northern Africa, Lebanon (n = 19,363).	German (121408)	Cross sectional study (hospital deliveries)	Higher rates of congenital malformations in neonates of primiparous women (2.5 vs. 1.8 %). Higher rates of less than 11 antenatal check-ups (55.2 vs. 45.3 %).
Eastwood et al. [5]	Australia (Sydney)	Other (n = 10,346)	Australian (n = 14,278)	Population –based cross-sectional study (nurse visit within 3 months of birth)	Higher rates of postpartum depression (OR = 1.7; 1.6–1.9 for EPDS > 9 and OR = 1.9; 1.7–2.1 for EPDS > 12,on univariate analysis)
Ekeus et al. [40]	Sweden (Stockholm)	Chile; Iran; Iraq; Poland; Finland; Somalia, Yugoslavia (n = 36,148)	Swedish (n = 383,188)	Population-based register	Lower rates of epidural analgesia during vaginal delivery for Yugoslavian (OR = 0.55; 0.53–0.58), Iraquian (OR = 0.71; 0.67–0.75), Turkish (OR = 0.87; 0.81–0.93), Chilean (OR = 1.63; 1.49–1.79), and Somali (OR = 0.53; 0.47–0.59)
El Reda et al. [35]	USA (Michigan)	Iraq; Lebanon; Yemen; Jordan; Syria; Israel; India; Jerusalem; Egypt; Palestine; Kuwait; Pakistan; S. Arabia, Bangladesh (n = 5,997)	US-born (n = 205,749)	Population-based register	Higher number of women with no prenatal care (1.1 vs. 0.7 %), lower rates of preterm birth (7.5 vs. 8.5 %).
Essen et al. [41]	Sweden	Sub-Saharan Africa (Somalia, Ethiopia, Eritrea) (n = 62)	Swedish (n = 113)	Population-based register (maternal deaths)	Higher number of intrapartum deaths considered avoidable (63 vs. 11 %), and neonatal deaths considered avoidable by adequate medical care (80 vs. 28 %). Antenatal death in relation to delivery and risk factors: OR (maternal disease) = 2.7 (1.1–7.4). Perinatal death from suboptimal factors: OR (antenatal) = 6.2 (1.9–20), OR(intrapartal) = 13 (1.1–166), OR(neonatal) = 18 (3.3–100).
Fedeli et al. [22]	Italy (Veneto region)	Eastern Europe, Africa, Asia, South America (n = 20,332)	Italians (n = 73,098)	Population-based registry (hospital discharge records)	Higher risk for complications of pregnancy (Ratio (antepartum hospitalizations) = 0.21 for regular migrants (RM), 0.24 for irregular migrants(IR) vs. 0.18 for Italians), miscarriages (Ration = 0.15 (RM), 0.35 (IR) vs. 0.16) and induced abortions (Ratio = 0.24 (RM), 0.81 (IM) vs. 0.13).
Ganann et al. [12]	Canada (Ontario)	UK, France, China, Spain, Portugal, Poland, Others (n = 519)	Canadian (n = 526)	Longitudinal cross-sectional	Higher rates of postpartum depression (11.2 vs. 6.7 % for EPDS ≥ 12).
Geltman and Meyers [23]	USA (Boston)	Haiti, Caribe, Central America, Cape Verde, Puerto Rico (n = 84)	US-born (n = 87)	Survey (Random, local population-based hospital admissions)	Less likelihood of initiating late prenatal care (16 vs. 30 %)

Table 1 continued

First author	Host country (region)	Country of origin (number)	Control group (number)	Type of study (sampling method)	Main findings in immigrant population (as compared to controls)
Gould et al. [34]	USA (California)	Mexico(433825), India (12899)	US-born white (n = 506,365), US-born black (n = 104,888)	Population-based registry (birth certificates)	Prenatal care initiation (3rd trimester/none/unknown) among Indian = 3.4 %, Mexican = 7.1 vs. US-White = 3.5 %, US-Black = 6.1 %. PTB is higher among US-born blacks (24.8 %), Indian (19.7 %) and Mexican (18.2 %) than in US-born whites (17.3 %). LBW is higher among US-Blacks = 12.5 %, Indian = 9.1 % and US-Whites = 5.7 % than Mexican = 5.2 %.
Janevic [28]	USA (New York)	Russia, Ukraine, Poland, Yugoslavia Republics (n = 23,790)	US-born (n = 232,797)	Population-based registry (hospital and birth database)	Higher rates of no prenatal care. (former Yugoslavia = 2.8 %, Russia and Ukraine = 1.2 %, USA = 0.7 %)
Jonkers et al. [27]	Netherlands (Leiden)	Group 1: Morocco, Turkey, Surinam, Dutch Caribe; Group 2: Eastern Europe, Middle East, Asia and Sub-Sahara African countries (n = 40)	Dutch (n = 10)	Qualitative study (intentional sampling conducted by obstetrician referral)	*Four obstetricians reviewed 20 of migrant cases:* 80 % sub-standard care; 31.25 % delayed care; Diagnosing delays: 50 % preeclampsia; 12.5 % uterine rupture; 6.25 % ketoacidotic diabetic coma.
Lansakara et al. [33]	Australia (Victoria)	Other (Non-English speaking background – NESB, n = 212)	Australians (n = 1,074)	Prospective cohort	*Higher depression rates in migrants for 2 weeks or longer* (27.6 %, OR = 1.92 (1.3–2.8) vs. 16.7 %). Higher rate of LBW in migrants: 3,297 g (SD ± 629 g) vs. 3,417 g (SD ± 569 g).
Malin and Gissler [30]	Finland (nationwide)	Nordic, Western, East.Europe, Baltic, N. African, S. Asian, Chinese, Somali, Vietnamese, African, Latin American (n = 6,532)	Finnish (n = 158,469)	Population-based registry (birth registry)	Migrants have more previous abortions (19.3 vs. 12.4 %), less c-section deliveries (18.2 vs. 19.7 %), higher rates of epidural analgesia (60 vs. 40 %), higher rates of LBW (3.8 vs. 3.4 %) and of being SGA (2.7 vs. 2.0 %) and register more perinatal mortality (5.7/1,000 vs. 5.1/1,000).
McDonald et al. [38]	USA	Hispanics (n = 5,105)	N-Hispanic white women (n = 22,608)	Cross-sectional	Higher rates of prenatal care after 1st trimester among migrants (29.3 %, RR = 1.3 (1.1–1.4) vs. 14.8 %) as well as self-reported morbidity during pregnancy: gestational diabetes = 10.3 %, RR = 1.2 (1.0–1.4) vs. 7.5 %; incompetent cervix: 6.5, RR = 3.1 (2.3–4.1) vs. 1.4 %.
Philibert et al. [31]	France	Sub-Saharan African, Asia, North and South America (n = 267)	French (n = 13,186)	Case–control study	Higher rates of postpartum maternal death (OR = 2.00; 1.42–2.80). For Sub-Saharan Africa (OR = 5.45, 3.29–9.00). Higher risk of dying from hypertensive disorder (OR = 4.58; 2.31–9.08) or infection (OR = 3.93; 1.17–13.15)
Puig Sola et al. [39]	Spain (Barcelona)	Central and South America, Magreb, Caribbean-Africa, Southeast Asia/Filipinas, India/Pakistan, Eastern Europe, China, Others (n = 989)	Spanish (n = 993)	Retrospective cross-sectional (one hospital)	Higher risk for hospital admissions caused by infections (73 vs. 62.6 %) among migrants. Lower risk of LBW (3.8 %, OR = 0.17 (0.03–0.90) vs. 10 %) and PTB (11.1 %, OR = 1.98 (0.71–5.53) vs. 18.3 %) among migrants. Higher rates of pregnancy with poor or no prenatal care in migrant women: 14.7 %, OR = 2.58 (1.76–3.77) vs. 6.3 %.

Table 1 continued

First author	Host country (region)	Country of origin (number)	Control group (number)	Type of study (sampling method)	Main findings in immigrant population (as compared to controls)
Ravelli et al. [29]	Netherlands (nationwide)	African, South Asian, non-Western, Turkish/Moroccan (n = 93,691)	Dutch (n = 460,543)	Population-based registry	Higher rates of perinatal mortality among migrants: Turkish/Moroccan: 9.8, African: 13.9, S-Asian: 12.5, E-Asian: 6.6, Other n-West.: 11.4 vs. Dutch: 7.6). Important ethnic differences in LBW: Turkish/Moroccan: 6.1 %, African: 10.0 %, S-Asian: 14.3 %, E-Asian: 6.2 %, Other n-West.: 7.6 vs. 6.6 %. Important ethnic differences in PTB: Turkish/Moroccan: 5.6 %, African: 8.9 %, S-Asian: 9.5 %, E-Asian: 6.1 %, Other n-West.: 7.2 vs. 7.8 %.
Reed et al. [24]	USA (Colorado)	Other (n = 5,961 undocumented immigrants)	US-born (n = 112,943)	Retrospective (Medicaid database, birth records)	*Higher rates of late or no prenatal care in migrants: no PNC* = 1.7 % (vs. 1.0 %); 1st trimester: 52.0 % (vs. 83.3 %). More medical risk factors among migrants: Anemia: 7.7 (vs. 2.2 %), Gestational Diabetes: 2.7 (vs. 1.7 %). Lower rates of LBW (5.3 vs. 6.5 %) or PTB (12.9 vs. 14.5 %), and higher rates of labor complications: excessive bleeding (2.3 vs. 0.8 %) and fetal distress (8.7 vs. 3.6 %).
Reeske et al. [21]	Germany (nationwide)	Middle and Northern Europe/North America, Middle East/North Africa, Asia, Eastern Europe (n = 504,043)	Germans (n = 2,166,005)	Population-based registry	Higher rates of pre-eclampsia among German mothers (2.5 %) compared to Middle East and North African mothers (1.3 %) and Asian mothers (1.2 %). Higher stillbirth rate in Middle East and North African women (RR = 1.34 (1.22–1.55)), Asian (RR = 1.34 (1.02–1.65)) and Mediterranean women (RR = 1.14 (0.93–1.28)).
Reichman et al. [36]	USA	Mexico	US-born (NH, non-Hispanic) N = 2,412	Longitudinal cohort	Late onset of prenatal care among Mexicans (1st trimester: 42.8 vs. 55.3 % in NH-Whites, 44.8 % in NH-Blacks). Higher rates of gestational hypertension among migrants (OR = 2.87 (2.05–4.02)) and lower rates of gestational diabetes (OR = 0.62 (0.29–1.31)) and LBW (5.8 vs. NH-Whites: 12.4 %, NH-Blacks: 13.5 %).
Schutte et al. [20]	Netherlands (nationwide)	Western, Non-western, Surinam/Dutch Antilles, Turkey, Morocco, Other (Sub-Saharan Africa, Asia)	Dutch N = 289	Population-based registry (maternal deaths)	Higher rates of maternal mortality ration in N-Western women (20.7 %, OR = 2.1 (1.6–2.7)), Surinam-D.Antillean (26.2 %, OR = 2.7 (1.7–4.3)) and Others (34.1 %, OR = 3.3 (2.3–4.8)) vs. 10 %. Lower rates of pre-eclampsia as cause of death in migrant women (87 vs. 94 %).
Sosta et al. [15]	Italy (Brescia)	Eastern Europe, Asia, South America, Africa (n = 105)	Italians (n = 366)	Prospective study (one hospital)	Late onset of prenatal care among migrants: $\geq$ 12 gestational week: 35.24 (vs. 4.92 %). Higher rates of PTB among migrants: 13.6 %, OR = 1.37 vs. 6.2 %.

Table 1 continued

First author	Host country (region)	Country of origin (number)	Control group (number)	Type of study (sampling method)	Main findings in immigrant population (as compared to controls)
Johnelle Sparks [37]	USA	Non-Hispanic Blacks, US-born Hispanics, foreign-born Mexican, other Hispanics, Native American, Asian	US-born N = 7,800	Longitudinal Study-Birth Cohort	Higher rates of no care (Mexicans = 7.94 %, Asians = 4.55 % vs. NH-whites = 2.24 %) or inadequate prenatal care (Mexicans: 17.44 %, Asians: 8.28 % vs. NH-Whites: 6.28 %) and LBW (Mexicans: 3.07 %, Asians: 3.26 % vs. NH-Whites: 3.02 %) among migrants.
Stewart et al. [32]	Canada (Montreal, Toronto and Vancouver)	Others (n = 94 immigrants)	Canadian (n = 73)	Observational prospective study (hospitalization for giving birth)	Higher rates of postpartum depression (35.1 % vs 8.1 % for EDPS ≥ 10; OR = 4.58; __–__)
Sword et al. [16]	Canada (Ontario)	Chinese, South Asians, Portuguese, Polish, Jewish, Italian, Other (n = 393)	Canadian (n = 857)	Cross-sectional survey (vaginal birth to single live infant)	Higher rates of postpartum depression in migrants: EPDS ≥ 12: 15.1 %, OR = 2.27 (1.44–3.59) vs. 7.3 %.
Thurman et al. [25] Thurman and Janecek [26]	USA (Texas)	Hispanics, Others (undocumented migrants) (n = 332)	US-born N = 429	Cohort (record review of women delivering live born singleton at local University hospital)	Undocumented US residents who had vaginal delivery were less likely to receive a postpartum sterilization request (PPTL) than documented residents with the same delivery route (OR = 0.36 (0.21–0.61)). Higher rates of denied PPTL in migrants, documented and undocumented: Hispanics: 78.9 %, OR = 0.88 (0.54–1.44), Undocumented: 63.2 %, OR = 0.64 (0.42–0.98) vs. NH-Whites: 14.3 %, OR = 1.40 (0.8–2.45), NH-Blacks: 6.8 %, OR = 0.63 (0.27–1.49). (One-Year Follow-up) Within 1 year of delivery, 46.7 % of women that requested and didn't receive PPTL became pregnant. Those women were more likely to became pregnant than women in the control group (22.3 %), who did not request permanent sterilization. Among undocumented residents, 63.2 % didn't receive requested PPTL (OR = 1.51 (1.04–2.18)).
van Roosmalen et al. [19]	Netherlands (nationwide)	Africans, Surinam, Netherland s Antilles/ West Caribbean, Turkey, Morocco, Somalia, other Sub.Saharan countries, Indonesia, Vietnam	N = 102 maternal deaths	Population-based registry study (maternal deaths)	Higher rates of substandard care resulting in maternal deaths, resulting from delay in recognizing symptoms (RR = 4.2; 1.3–3.9), delay in referral (RR = 5.1; 1.4–19.2), or inadequate antenatal care by midwife (RR = 7.8; 0.6–106.2).

Some migrant populations appear to have a higher incidence of disease that can affect pregnancy and the postpartum period, particularly of anemia [18–20]. It is also noticeable that the rate of congenital malformations is significantly higher in some migrant collectives [18].

A recent study from Germany reported that access to healthcare services was similar for the majority of migrant women during pregnancy, therefore suggesting that observed differences were related to the quality and content of antenatal care [20, 21]. On the other hand, health outcomes and indicators tend to assume a worse expression when legal documentation has not been obtained. A study conducted in Sweden identified problems of access to care especially in illegal immigrants [13]. An Italian study corroborated this finding, showing illegal immigrants to be at a higher risk of teenage delivery, complications of pregnancy, miscarriages and induced abortions [22]. Other studies show that higher rates of anemia, excessive bleeding and fetal distress occur among the undocumented populations [23, 24]. Undocumented US residents were also less likely to receive requested postpartum sterilization after vaginal delivery (OR = 0.36 (0.21–0.61)), mainly due to the lack of funding, and more likely to be discharged from the hospital without birth control [25, 26].

Migrants may receive less optimal care due to inappropriate pregnancy strategies, inadequate medical treatment and miscommunication. Poor communication between women and caregivers can result in inadequate care because of undiagnosed symptoms or poor compliance with treatments. Migrant women often reported delays in receiving information on diagnosis and treatment [27, 28].

A lower rate of obstetrical interventions, can also be found in the immigrant population, such as planned caesarean sections, and epidural analgesia during labour [18]. German women had a significantly higher frequency of planned caesarean sections and migrants were significantly less likely to receive an epidural anesthesia during delivery [20].

Regarding the incidence of stillbirth and early neonatal death, one study from the Netherlands revealed a higher incidence among African, South Asian and other non-western women, but a lower incidence in other western or East Asian women. In women without risk factors, the ethnic risk differences in mortality were even more pronounced [29]. Other studies report excessive perinatal mortalities among African (29.6/1,000) and Somali women (12.2/1,000) [30].

A study conducted in France indicated that the risk of postpartum maternal death was twice as high for foreign women (sub-Saharan Africa, Asia, North and South America). The risk of dying from hypertensive disorder or infection was four times higher for immigrant women. Quality of care received by women who died was less often optimal in immigrants (9.1 %) compared with French women (28.8 %) and therefore some of these deaths may have been preventable (25.5 vs. 12.7 %) [31]. Another study evaluating maternal mortality in the Netherlands, reported that substandard care was found to be more frequent in immigrant women. These findings were also detected in hospitals, especially in women who died from pre-eclampsia, that were less often operated on in an unstable situation and received insufficient treatment of complications more frequently than native women [20]. Maternal mortality related to pre-eclampsia was mostly caused by insufficient diagnostic testing when indicated, inadequate management, insufficient stabilization before transport to tertiary care centers, and failure to consider timely delivery [19].

Several studies conducted in the UK, Canada and Australia found that immigrant mothers were more likely to experience postpartum depression. In a study conducted in Canada, immigrants (35.1 %) were significantly more likely than Canadian-women (8.1 %) to score $\geq$10 on EDPS, and those that required it had lower social support scores than Canadian-born women [32]. One of the studies showed that immigrant women experienced significantly poorer psychological health compared to Australian born women and were at higher risk of depressive symptoms [5]. Although immigrant mothers had an equivalent level of contact with primary care practitioners in the first 3 months postpartum, they were less likely to be asked about their emotional well-being or about social or familial support [5, 16, 33].

Some studies paradoxically report better perinatal outcomes in the immigrant population. This has been described as the *healthy migrant effect* [23, 34–39]. Possible explanations for this finding are the positive influence of informal family networks [13, 18, 40] and healthier behaviors during pregnancy [37]. These results are mostly limited to Hispanics and Eastern European women that are compared with US-born residents [31].

Discussion

This systematic review is, to our knowledge, the first to investigate the core aspects of healthcare received during pregnancy by migrant populations: access, use and quality of care, evaluating their impact on healthcare procedures and indicators. Migrants pose specific challenges for obstetric management (e.g. late booking for antenatal care, fewer visits [10, 12, 17], increased rates of operative deliveries, suboptimal postpartum care, often due to a series of barriers to accessing health care services: clinic waiting times (considering substandard and frequently irregular work conditions), transportation (lack of financial

support) or absence of qualified interpreters [11], and poor engagement with antenatal care services). There is substantial evidence that language barriers adversely affect access to healthcare, quality of care, patient satisfaction and health outcomes [13, 14, 16, 40].

Generalizing conclusions from a systematic review such as the present one has inherent limitations. The methodological quality of the evaluated studies differs considerably, as do the migrant and local populations evaluated. Main study samples lack representativeness, as this population is frequently found in adverse social conditions and in an illegal status, and it is therefore difficult to reach and to establish contact. Fear of being reported to authorities is a common problem [12, 15]. These characteristics necessarily hinder the quality of the investigations.

Seeking health care by migrant populations is probably affected by personal concepts of health and illness, health literacy, knowledge of how the health system works, financial aspects, and past experiences of care. Access can be affected by a number of barriers related to the lack of necessary professionals and facilities, need for long distance travel, communication between the care giver and the patient [30]. Poverty also plays an important role in shaping racial disparities in health outcomes in the general population. There is a pressing need for additional research to provide a deeper understanding of immigrant women's perceptions of individual, community and health system barriers to care in order to better meet their needs. Difficulties in communication are potentially dangerous, increasing the risk of delayed care or the risk of missing obstetrical interventions [30]. Professional interpreters should be available when language barriers occur.

Immigrants bring with them diverse epidemiological profiles, but most of all their cultural beliefs and practices, including those involving health and illness [33]. Special attention should also be given to knowledge and conceptions of the immigrant population, in order to improve healthcare use, particularly among women of African origin who consistently show poorer outcomes. Information on the danger signs associated with serious pregnancy complications probably needs to be better conveyed to these groups. Culturally sensitive strategies are necessary to increase awareness of relevant health and social support services in their communities. Public health education policies may need to target both women and the community in order to increase health literacy and the likelihood of seeking maternal care [12].

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