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Prevalence and factors associated with undocumented children under-five in Haiti

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Abstract

Background Despite many efforts to provide children with legal existence over the last decades, 1 in 4 children under the age of 5 (166 million) do not officially exist, with limited possibility to enjoy their human rights. In Latin America and the Caribbean, Haiti has one of the highest rates of undocumented births. This study aimed to analyze the prevalence and the determinant factors of undocumented childhood in Haiti.

Methods For analysis of undocumented childhood and related socioeconomic determinants, data from the 2016/17 Haiti demographic and health survey were used. The prevalence and the associated factors were analyzed using descriptive statistics and the binary logistic regression model.

Results The prevalence of undocumented childhood in Haiti was 23% (95% CI: 21.9–24.0) among children under-five. Among the drivers of undocumented births, mothers with no formal education (aOR=3.88; 95% CI 2.21–6.81), children aged less than 1 year (aOR=20.47; 95% CI 16.83–24.89), children adopted or in foster care (aOR=2.66; 95% CI 1.67–4.24), children from the poorest regions like “Artibonite” (aOR=2.19; 95% CI 1.63–2.94) or “Centre” (aOR=1.51; 95% CI 1.09–2.10) or “Nord-Ouest” (aOR=1.61; 95% CI 1.11–2.34), children from poorest households (aOR=6.25; 95% CI 4.37–8.93), and children whose mothers were dead (aOR=2.45; 95% CI 1.33–4.49) had higher odds to be undocumented.

Conclusion According to our findings, there is an institutional necessity to bring birth documentation to underprivileged households, particularly those in the poorest regions where socioeconomic development programs are also needed. Interventions should focus on uneducated mothers who are reknown for giving birth outside of medical facilities. Therefore, an awareness campaign should be implemented to influence the children late-registering behavior.

Keywords Birth certificate, DHS, Undocumented, Children under-five, Institutional weakness, Haiti

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Introduction

Birth registration and birth certification are among the first international human rights [1, 2]. The right to a birth certificate is recognized in the International Covenant on Civil and Political Rights [3] and the Convention on the Rights of the Child [4]. It is also the case in many countries' Constitutions. The right to birth registration and the right to a birth certificate are strongly linked, as argued by Gerber et al. [1]. A birth certificate is defined as a document that proves identity, age, and family relationships, and confirms that a child's birth has been registered. Without those institutional artifacts [5–7], children are undocumented [8, 9], which prevents them from enjoying legal existence [10, 11].

Because legal identity systems have become increasingly recognized as catalytic for inclusive development [12, 13], the United Nations General Assembly adopted the Sustainable Development Goals (SDGs) in September 2015 to firmly placing birth registration and birth certification on the international development agenda. SDG specific target 16.9 clearly engaged the signatory countries to ensure legal identity for all, including through birth registration, by 2030 [14]. This SDG target is complemented by target 17.9, which calls for partnership to support statistical capacity building needed to establish robust civil registration systems, which are essential for achieving sustainable human and economic development [14]. Clearly, undocumented people including children who cannot prove any citizenship through legal identity can be left out of consideration entirely, both in their country and in relation with other countries, where they are susceptible to statelessness [15–18].

In many countries, children need a birth certificate to access public services including vaccination and other health care services, and education [19–22]. Equally, a birth certificate is often needed to obtain other legal documents such as the passport [1, 2, 23]. In addition to the legal identity, a birth certificate establishes a child's age [19] which is important to access appropriate social services. Without information on the exact age, children's health can be threatened by inappropriate medicine [24]. To ensure these rights and prevent undocumented childhood, Civil registration and vital statistics (CRVS) systems and legal identity systems have become increasingly recognized as catalytic both for inclusive development and for monitoring population dynamics [12].

Despite the birth certificate being widely acknowledged to be an inclusion tool [25], thereby being given important efforts during the last decades, UNICEF report highlights that one in four children under the age of 5 (166 million), on average, were not registered in the world in 2019 [26]. Among the 508 million children under the age of 5 who were registered worldwide, about 70 million lacked proof of registration and, therefore did

not have a birth certificate, which allows for an inheritance claim [11], avoids the risk of statelessness, and helps seeking protection from violence and exploitation such as child labor, child marriages and underage recruitment into the armed forces [26]. Undocumented childhood remains more common in developing countries where many people are impoverished. In Latin America and the Caribbean, only 6% of children under the age of 5 were not registered in 2016 [27]. However within the region, Haiti is the country with the highest level of undocumented childhood, followed by Santa Lucia and Trinidad and Tobago [27, 28]. Despite this, very few studies have investigated on the micro-level factors of this persistent phenomenon. UNICEF highlights that the goal of 100% registered birth remains far from being achieved, although there is improvement in birth registration in Haiti [29]. Socio-historical reasons may contribute to this situation in addition to lack of public services. Haitian historians like Jean Casimir have noticed the social exclusion of the *moun an deyò* (the outside people) by the State [30]. Against such social divide, human rights activists and legalists have argued that *tout moun se moun* ("all people are people" or better translated by "all people are equal") [31, 32], and therefore should be counted in order to get out of the "legal anonymity". Additionally, because of sociopolitical instability, many Haitian households mistrust the public administration that often requires additional fees for its own malfunctions [33], and some households choose to not provide their personal information to the State they perceive as predatory. Finally, and for cultural beliefs (fear of witchcraft), some of them avoid to declare the name and the age of their newborns. As a result, despite the initiation of a public program attempting to digitalize the registration system, contributor of "Haiti Priorise" project reported that around 30% of the 0–4 children were undocumented as of 2012 [34], while a Haitian demographer found this problem a complex and multifactorial phenomenon [28]. This situation affects many Haitians in the diaspora, particularly those in the Dominican Republic where, in 2013, the Constitutional Court issued the Judgement TC/0168/13 which created denationalization of an important number of Haitians who were living in this neighboring country [35, 36].

In the literature, studies on such research topics are often based on a multilevel approach [37] in the framework of an ecological model. Under the ecological model, factors associated with undocumented childhood are observed at three different socioeconomic levels: the individual level, the household level, and the community or societal level [38, 39]. There is also an economic of public services perspective in the framework of which, barriers to birth certification and documentation are analyzed both on the demand-side (individual, household,

and community's characteristics and attitudes) and the supply-side (birth certification coverage) [40, 41]. This paper is grounded in the demand-side characteristics.

According to previous studies carried out in the different regions of the world; the factors significantly associated with birth registration and certification are (1) at individual level: mother's age, child's age, gender of the child, level of educational status, access to a mobile phone; (2) at the household level: family structures or relation to household head, household wealth, at the community or societal level: place of residence, region, ethnic or religious group, language barriers, registration fee, giving birth at home, high fertility and child mortality [11, 22, 37–39, 42–51]. At the community or societal level, socioeconomic aspects such as the mother's autonomy and bargaining power have also positive associations with birth registration and certification [52]. Furthermore, the mother's inability to move was found to be an important factor that affects a child's probability of having their births registered or certified [53, 54].

To find appropriate solutions to this vital issue in the Haitian context, - where children's rights remain a socio-economic issue [55], and even adults are exposed to undocumented life because of institutional weaknesses [56] -, it is important to study it. Indeed, this paper aimed to identify factors associated with undocumented under-five children in Haiti (i.e. not having a birth certificate).

Materials and methods

Study design and setting

The study used the household members' recoded data set (PR) from the latest Demographic and Health Survey (DHS) conducted in Haiti between November 2016 and April 2017. The DHS is a multi-round cross-country survey that evaluates population health with a focus on maternal and child health, as well as population health indicators of global importance. The data was gathered in collaboration with Haitian Institute for Children, Haitian Bureau of Statistics, Haitian Ministry of Public Health and Population, and the Inner City Fund (ICF) through the DHS Program of the United States Agency for International Development (USAID).

Haiti is a country located on the western part of Hispaniola Island, between the Caribbean Sea and the Atlantic Ocean. The total land area is estimated to be 27,750 km². Administratively, the country is divided into 10 departments or regions (Ouest, Sud, Sud-Est, Grande Anse, Nippes, Nord, Nord-Ouest, Nord-Est, Centre, and Artibonite), 42 districts, 140 municipalities and 570 communal Sect [57]. The overall population was estimated at 12 033 670 people in 2022 by the Haitian Ministry of Health and Population (HMHP) [58]. From this population, nearly 60% were estimated to live in urban areas.

Sampling technique and study population

A stratified two-stage cluster sampling technique was applied; with clusters being chosen first from 450 EAs (enumeration areas) and households being picked second. With clusters, enumeration areas sample households were chosen, and cluster selection was stratified by place of residence (rural/urban) and regions. A random sample of 13,451 households was drawn from the selected EAs of which 13,405 were successfully interviewed, yielding a response rate of 99.7%. Detailed information regarding the HDHS sampling and data collection have been published elsewhere [59]. Our study population consisted of under-five children. The total weighted sample size from data analyzed in this study was 6,729.

Inclusion and exclusion criteria

The category of children under 5 years old is targeted separately by DHS surveys. The information about the ownership of birth documentation is specifically collected for this category. All children under 5 years of age in the HDHS database were included in our sample study ($N=6,729$). In contrast, all individuals aged 5 and over in the survey were excluded from the study.

Study variables

Outcome variable

The outcome variable was documented children status, generated from the question that asked if under-five children on the household roster had a birth certificate. The different responses were: (i) neither certificate or registered, (ii) has certificate, (iii) registered, and (iv) don't know. Children who had a birth certificate were classified as documented (0), while other children were categorized as undocumented (1).

Covariates

The independent variables were identified from various literature and these covered factors related to child, maternal, household, and community characteristics that have an impact on access to a birth certificate [37, 40, 60–64]. The child characteristics included age ("Less than 1", "1–2", "3 and above") and gender ("female" and "male"). The household and maternal characteristics included age of household head ("Less than 25", "25–34", "35–44", "45–54", "55 and above"), sex of household head ("female" and "male"), relationship to household head ("son/daughter", "grandchild", "other relative", "adopted/foster child", and "not related"), wealth index ("poorest", "poorer", "middle", "richer", and "richest"), mother alive ("yes" and "no"), and mother's education level ("no formal education", "primary", "secondary", "higher", and "don't know"). Community variables included place of residence ("urban" and "rural") and region ("Aire Métropolitaine de Port-au-Prince", "Reste-Ouest", "Sud-Est", "Nord", "Nord-Est",

“Artibonite”, “Centre”, “Sud”, “Grand’Anse/Nippes”, and “Nord-Ouest”).

Statistical analysis

This study employed both descriptive and multivariate analysis. Univariate analysis illustrated frequencies and percentages to describe the population’s demographic characteristics. Furthermore, cross-tabulations of each independent variable and birth registration status were applied to estimate the prevalence of undocumented children in Haiti and for inferential analysis. A chi-squared test ascertained whether there was any association between population characteristics and the outcome variable using a p -value of <0.05 as a cut-off point. Variables with p -value >0.20 were excluded from the multivariate analysis. Binary logistic regression was performed to identify significant factors associated with undocumented children. Results were reported as crude odds ratios (cOR) and adjusted odds ratios (aOR) with their corresponding 95% confidence intervals (CI). Moreover, the variance inflation factor (VIF) was used to assess multi-collinearity. None of the variables displayed multi-collinearity problems (Min VIF=1.04, Max VIF=4.44, Mean VIF=1.84) [65]. The model predictive ability was assessed using the Area Under the Curve (AUC) and Receiver Operating Curve (ROC) [66]. These are plotted based on the probability of sensitivity and $1 - \text{specificity}$. Accordingly, the AUC of the final model was 83.3% and indicated that the model’s ability to predict undocumented children under-five in Haiti was good (Fig. 1).

All analyses were weighted to get unbiased estimates, and carried out in STATA 16.0 software (Stata Corp, Tex, USA) using “svy” command to adjust for the complex sampling structure of the data [67]. Statistical significance was declared at $p < 0.05$.

Ethics

As stated earlier, this study is based on a secondary analysis of publicly available data, under free registration and request (<https://dhsprogram.com/data/available-datasets.cfm>). The 2016–2017 dataset used was obtained from the DHS Program with official permission as of May 3, 2022. The HDHS survey protocol obtained ethical clearance from the National Ethics Committee of Haiti and the Institutional Review Board of ICF/USAID. During data collection, informed consent was obtained by participants and/or their legal guardians (for participants under 16 years of age). Since this is a study involving a secondary database, we were waived the need for additional informed consent. The participants’ anonymity and confidentiality were assured. All methods were carried out in accordance with relevant guidelines and regulations.

Results

Background characteristics of children under-five in Haiti

Table 1 shows the sociodemographic characteristics of the study population. About 20% of the children were aged less than 1 year, and 50.2% were males. More than two-thirds of them were from rural areas and 16.3%

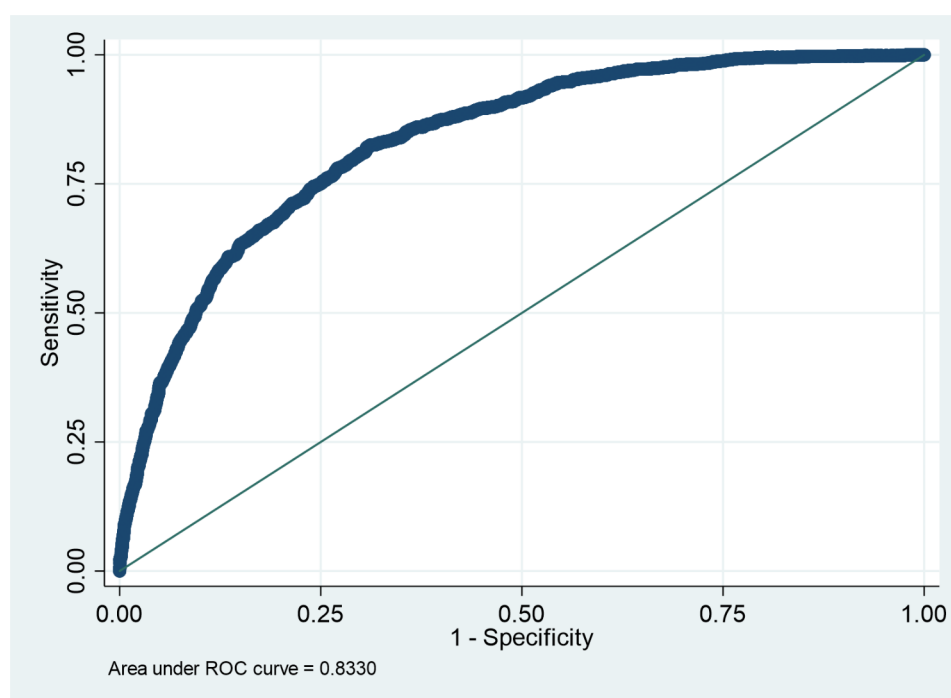


Fig. 1 The model predictive ability (area under the ROC curve)

Table 1 Sociodemographic characteristics of undocumented children under-five in Haiti

Sociodemographic characteristics	N	Percentage
Place of residence		
Urban	2224	33.0
Rural	4505	67.0
Region		
Aire Métropolitaine de Port-au-Prince	1095	16.3
Reste-Ouest	1197	17.8
Sud-Est	391	5.8
Nord	758	11.3
Nord-Est	256	3.8
Artibonite	1101	16.4
Centre	605	9.0
Sud	476	7.1
Grand'Anse/Nippes	493	7.3
Nord-Ouest	357	5.3
Sex of household head		
Male	3687	54.8
Female	3042	45.2
Age of household head		
Less than 25 years	292	4.3
25–34	1818	27.0
35–44	1804	26.8
45–54	1180	17.5
55 and above	1636	24.3
Mother's education level		
No formal education	1171	17.4
Primary	2177	32.4
Secondary	2147	31.9
Higher	226	3.4
Don't know	1007	15.0
Age of the children		
Less than 1 year	1286	19.1
1–2 years	2626	39.0
3 and above	2817	41.9
Gender of the children		
Male	3376	50.2
Female	3353	49.8
Mother alive		
No	69	1.0
Yes	6660	99.0
Relationship to household head		
Son/Daughter	3951	58.7
Grandchild	1889	28.1
Other relative	686	10.2
Adopted/Foster child	120	1.8
Not related	82	1.2
Wealth index		
Poorest	1721	25.6
Poorer	1447	21.5
Middle	1416	21.0
Richer	1204	17.9
Richest	942	14.0
Total	6729	100.0

were from the “Aire Métropolitaine de Port-au-Prince” region. 1% of the children's mothers were dead. Almost half (49.8%) had mothers with primary level or no formal education, and 47.1% were from poor households. Slightly more than 45% of them were in female-headed households, around a quarter were in households headed by people aged 55 and above, and 58.7% were the son/daughter of the household head.

Prevalence of undocumented children under-five by sociodemographic characteristics

Table 2 includes information on undocumented children under-five by selected sociodemographic characteristics. In Haiti, 23% (95% CI: 21.9–24.0) of children under-five had no birth certificate. In addition, the results revealed that undocumented children were most prevalent in rural areas (26.7%), in the “Artibonite” region (36.3%), and in poorest households (34.8%). Similarly, undocumented children were most common among those aged less than 1 year (58.8%), males (23.4%), adopted or in foster care (31.7%), and whose mothers had no formal education (33.6%). About 23% of children whose mothers were alive had no birth certificate, compared with 31.9% of those whose mothers were dead. Our results also showed that undocumented phenomenon was most frequent among children in male-headed households (23.8%), and where the head was under 25 (30.7%).

Factors associated with undocumented children under-five in Haiti

Table 3 provides a summary of the results from the binary logistic regression model. The results indicated that children whose mothers had no formal education (aOR=3.88; 95% CI 2.21–6.81), primary (aOR=2.68; 95% CI 1.56–4.62), and secondary level (aOR=2.08; 95% CI 1.22–3.55) were more likely to be undocumented than those whose mothers had a higher education level. The odds of undocumented children among those aged less than 1 year (aOR=20.47; 95% CI 16.83–24.89), 1–2 years old (aOR=2.63; 95% CI 2.22–3.11) were high compared to those aged 3 and above. Likewise, the odds of undocumented children were 2.7 times higher among those adopted or in foster care (aOR=2.66; 95% CI 1.67–4.24) compared to sons or daughters of the household heads. Region was also found to be positively associated with birth certification status in Haiti. Children from “Artibonite” (aOR=2.19; 95% CI 1.63–2.94), “Centre” (aOR=1.51; 95% CI 1.09–2.10), and “Nord-Ouest” (aOR=1.61; 95% CI 1.11–2.34) were more likely to be undocumented than those from the “Aire Métropolitaine de Port-au-Prince”. Further, children from poorest (aOR=6.25; 95% CI 4.37–8.93), poorer (aOR=4.31; 95% CI 3.05–6.08), middle (aOR=2.92; 95% CI 2.13–4.01), and richer households (aOR=1.57; 95% CI 1.14–2.17)

Table 2 Prevalence of undocumented children under-five by selected sociodemographic characteristics

Sociodemographic characteristics	Undocumented children		P-Value
	Yes N (%)	No N (%)	
Place of residence			$p < 0.001$
Urban	343 (15.4)	1881 (84.6)	
Rural	1204 (26.7)	3301 (73.3)	
Region			$p < 0.001$
AMPAP	145 (13.2)	950 (86.8)	
Reste-Ouest	237 (19.8)	960 (80.2)	
Sud-Est	112 (28.6)	279 (71.4)	
Nord	116 (15.3)	642 (84.7)	
Nord-Est	53 (20.7)	203 (79.3)	
Artibonite	400 (36.3)	701 (63.7)	
Centre	186 (30.7)	419 (69.3)	
Sud	78 (16.0)	400 (84.0)	
Grand'Anse/Nippes	114 (23.1)	379 (76.9)	
Nord-Ouest	108 (30.3)	249 (69.7)	
Sex of household head			0.089
Male	877 (23.8)	2811 (76.2)	
Female	670 (22.0)	2372 (78.0)	
Age of household head			0.005
Less than 25 years	90 (30.7)	203 (69.3)	
25–34	380 (20.9)	1438 (79.1)	
35–44	416 (23.1)	1388 (76.9)	
45–54	275 (23.3)	904 (76.7)	
55 and above	386 (23.6)	1250 (76.4)	
Mother's education level			$p < 0.001$
No formal education	394 (33.6)	777 (66.4)	
Primary	596 (27.4)	1582 (72.6)	
Secondary	384 (17.9)	1764 (82.1)	
Higher	19 (8.4)	207 (91.6)	
Don't know	154 (15.3)	853 (84.7)	
Age of the children			$p < 0.001$
Less than 1 year	757 (58.8)	530 (41.2)	
1–2 years	519 (19.8)	2107 (80.2)	
3 and above	271 (9.6)	2546 (90.4)	
Gender of the children			0.361
Male	786 (23.4)	2566 (76.6)	
Female	760 (22.5)	2616 (77.5)	
Mother alive			0.067
Yes	1524 (22.9)	5136 (77.1)	
No	22 (31.9)	47 (68.1)	
Relationship to household head			0.033
Son/Daughter	900 (22.8)	3051 (77.2)	
Grandchild	454 (24.0)	1435 (76.0)	
Other relative	136 (19.8)	550 (80.2)	
Adopted/Foster child	38 (31.7)	82 (68.3)	
Not related	17 (20.7)	65 (79.3)	
Wealth index			$p < 0.001$
Poorest	599 (34.8)	1122 (65.2)	
Poorer	417 (28.8)	1030 (71.2)	
Middle	296 (20.9)	1120 (79.1)	
Richer	154 (12.8)	1050 (87.2)	
Richest	80 (8.5)	861 (91.5)	

Table 2 (continued)

Sociodemographic characteristics	Undocumented children		P-Value
	Yes N (%)	No N (%)	
Total	1547 (23.0)	5183 (77.0)	

were more likely to be undocumented than their counterparts from richest households. Finally, children whose mothers were dead (aOR=2.45; 95% CI 1.33–4.49) were more likely to have no birth certificate than those whose mothers were alive.

Discussion

This study examined the prevalence and factors associated with undocumented children in Haiti using the most recent Haitian Demographic and Health Survey. The data of 6,729 children under the age of 5 were included in the study, and 23% (95% CI: 21.9–24.0) of them did not have their birth certificate. This rate is quite high despite a gain over the last ten years (in 2005–2006, it was 30%) according to DHS statistics. Such increase in the rate of birth documentation can be explained by recent efforts made by the Haitian government, after repeated advocacy from different categories of actors including human rights organizations, civil society organizations, and the Haitian diaspora. This level of undocumented children is similar to other countries like Indonesia [40], lower than many Sub-Saharan African countries like Nigeria [37], Uganda [68] and Niger [69], or the Dominican Republic that shares the island with Haiti. As argued in the first section of this paper, undocumented childhood remains a complex phenomenon in the particular context of Haiti with persistent political instability, chronic rural poverty and limited access to public services for households living in remotes areas [70], limited access to public records which do not often function properly, weak institutions [71], and a lack of will in the general public to be registered or seen by a state perceived as predatory, etc. All those reasons create room for the invisible childhood analyzed here. Further, the results revealed that the undocumented childhood phenomenon was significantly associated with social, demographic, and economic factors.

The mother's educational level was found to be positively associated with birth certification status. Children whose mothers had a higher education level were more likely to be certified. Analogous findings have been reported in Ghana [72] and Indonesia [73]. Educational attainment may contribute to greater awareness about the importance of birth certificates for children's future mobility (university education, participation in the formal job market and legal migration abroad) [11, 39, 51, 69]. Moreover, this might be justified by the fact that educated women may be more exposed to the mass media in Haiti [59], which would increase their knowledge of the birth certification process. Additionally, educated

mothers generally have a higher income, enabling them to overcome the financial obstacles associated with birth certification [37].

Being from poor communities is associated with an increased likelihood of being undocumented. This result is in line with studies conducted elsewhere [37, 48, 64]. Parents from rich communities have a better education level, coupled with the economic privilege of access to social and health services and information, than those in poor communities.

Children from “Artibonite”, “Centre”, and “Nord-Ouest” regions were more likely to be without a birth certificate than those from “Aire Métropolitaine de Port-au-Prince”. This finding is consistent with results from other studies [61, 64, 74] that reported a significant association between region and birth registration. Regional disparities in social services may explain this association. Civil registration services are concentrated in the “Aire Métropolitaine de Port-au-Prince”, while in the “Artibonite”, “Centre”, and “Nord-Ouest” regions, individuals have limited access to civil registration services [33]. Further, in the “Aire Métropolitaine de Port-au-Prince” (an urban region), women generally give birth in a health facility, whereas in “Artibonite”, “Centre”, and “Nord-Ouest” (predominantly rural regions), many children are born at home [59]. Having an institutional birth delivery could provide parents with information on the benefits of birth registration, and possibly link them to civil registration services [28]. Besides, the distance to the registration center, the cost of transport as well as the cost of the birth certificate can also be a barrier to birth certification in the “Artibonite”, “Centre”, and “Nord-Ouest” regions where roads are difficult to access and families/households are very financially vulnerable [75].

Furthermore, births of children aged less than 1 year, 1–2 years were more likely to not be issued with a birth certificate compared to older ones, which reflects findings from previous studies [61, 73, 76]. This is in agreement with a study that was conducted in Nigeria [22]. This might be due to the fact that most children in Haiti start kindergarten at the age of 3. To successfully enroll them in early childhood education, parents must get their birth certificates [28]. If the child does not start preschool, some parents may not find it necessary to start the process of obtaining a birth certificate.

One of the interesting findings of our study is that adopted children and those in foster care were more likely to be undocumented compared to sons or daughters of the household heads, which corroborates previous findings [68]. This could be explained by the fact that many children are illegally adopted (without legal authorization) or kept in foster care in Haiti [77]. Most of them come from poor families in rural areas and do not have birth certificates [55]. To escape poverty, their

parents send them to live with families in urban areas with better economic conditions [78]. These host families generally promise to take care of the children and send them to school in exchange for helping with housework. However, studies have shown that these children are physically exploited [79, 80]. Child domestic servants who perform unpaid labor are commonly referred to as “restavèk” [55, 81]. Restavèks are often stigmatized and prohibited from attending school [80], which would increase their likelihood of not having a birth certificate. In fact, most of restavèks are likely to live their whole life as undocumented persons [8]. The social conditions of the restavèks that can be considered as the worst form of invisible childhood was largely studied by sociologists; the latest approached it through the range of lens from solidarity to child abuse or slavery [55, 81, 82]. According to our analysis, restavèks who were in rural areas or in poor households were even more likely to be undocumented.

The fact that the child’s mother is dead also increases the likelihood of not having a birth certificate. This finding is in line with past studies [43, 83]. Arguably, for children whose mothers are dead, the procedure to obtain a birth certificate often takes longer. Therefore, this may prevent them from being certified by caregivers [28]. In addition, these children could be adopted or in foster care. For the reasons mentioned earlier, they are very likely not to be certified. This result raises concerns in terms of shared parental responsibilities between fathers and mothers of newborns in Haiti. Parent decision was pointed out by researchers who analyzed the attitudes toward birth registration in Kenya [41].

Strengths and limitations

This study brings evidence to an essential phenomenon in Haiti. It used DHS data which provide the best estimates for the completeness of birth registration and birth certification in Haiti. This is the first analysis of its kind in Haiti and the findings are nationally representative. Although this study reached its aims and important policy implications can be drawn from the results, it has some limitations. First, the study used exclusively a quantitative research design. Future studies using qualitative methods will provide a more nuanced understanding of the factors associated with undocumented children under-five in Haiti. Second, due to the cross-sectional study design, we could not infer causality in the relationships between the exposure variables and the outcome. Third, due to the self-reported nature of the DHS surveys, the data may be subject to recall bias. Finally, failure to control for known and unknown potential confounding factors due to data limitations could have resulted in an over- or under-estimation of the associations between

Table 3 Factors associated with undocumented children under-five in Haiti

Socio-demographic characteristics	Unadjusted Odds Ratio cOR (95% CI)	Adjusted Odds Ratio aOR (95% CI)
Sex of household head		
Male	1.10 (0.99–1.24)	0.96 (0.83–1.11)
Ref=Female		
Age of household head		
Less than 25 years	1.43 (1.09–1.88)*	0.96 (0.66–1.41)
25–34	0.86 (0.73–1.01)	0.80 (0.61–1.04)
35–44	0.97 (0.83–1.14)	0.84 (0.66–1.09)
45–54	0.99 (0.83–1.18)	0.90 (0.72–1.12)
Ref=55 and above		
Mother's education level		
No formal education	5.56 (3.42–9.04)***	3.88 (2.21–6.81)***
Primary	4.14 (2.56–6.70)***	2.68 (1.56–4.62)***
Secondary	2.39 (1.47–3.88)***	2.08 (1.22–3.55)**
Don't know	1.98 (1.20–3.27)**	2.58 (1.45–4.59)**
Ref=Higher		
Age of the children		
Less than 1 year	13.42 (11.35–15.86)***	20.47 (16.83–24.89)***
1–2 years	2.31 (1.98–2.71)***	2.63 (2.22–3.11)***
Ref=3 and above		
Relationship to household head		
Grandchild	1.07 (0.94–1.22)	0.89 (0.70–1.14)
Other relative	0.84 (0.69–1.03)	0.96 (0.73–1.25)
Adopted/Foster child	1.58 (1.07–2.33)*	2.66 (1.67–4.24)***
Not related	0.89 (0.52–1.53)	0.59 (0.30–1.13)
Ref=Son/Daughter		
Place of residence		
Rural	2.00 (1.75–2.29)***	0.81 (0.64–1.02)
Ref=Urban		
Mother alive		
No	1.61 (0.97–2.68)	2.45 (1.33–4.49)**
Ref=Yes		
Region		
Reste-Ouest	1.61 (1.29–2.02)***	0.85 (0.62–1.17)
Sud-Est	2.62 (1.98–3.47)***	1.35 (0.93–1.96)
Nord	1.18 (0.91–1.54)	0.63 (0.45–0.88)**
Nord-Est	1.73 (1.22–2.45)**	0.81 (0.53–1.24)
Artibonite	3.74 (3.02–4.63)***	2.19 (1.63–2.94)***
Centre	2.90 (2.27–3.71)***	1.51 (1.09–2.10)*
Sud	1.25 (0.92–1.69)	0.57 (0.38–0.83)**
Grand'Anse/Nippes	1.96 (1.49–2.58)***	0.88 (0.61–1.26)
Nord-Ouest	2.83 (2.13–3.76)***	1.61 (1.11–2.34)*
Ref=Aire Métropolitaine de Port-au-Prince		
Wealth index		
Poorest	5.72 (4.46–7.34)***	6.25 (4.37–8.93)***
Poorer	4.33 (3.36–5.59)***	4.31 (3.05–6.08)***
Middle	2.83 (2.18–3.68)***	2.92 (2.13–4.01)***
Richer	1.58 (1.19–2.09)**	1.57 (1.14–2.17)**
Ref=Richest		

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

the socioeconomic and demographic variables assessed with non-certification of births.

Conclusion

Legal existence is framed both by birth and death registrations which are two institutional acts. The certificates issued during these acts are important tools to enjoy individual life in an organized society. However, many children in the developing world are still undocumented. In this paper, we aimed to analyze this institutional lack in the case of Haiti.

The study results showed that the factors significantly associated with undocumented childhood in Haiti were: mother's education level, whether or not the mother was alive, age of the children, children's relationship to household head, regions and wealth index. Based on these findings, a specific policy should be designed to bring birth registration and birth certification for free in each communal section and each medical service point, through a connected system that ensures data quality. A governmental program of birth registration/certification awareness is needed, because it is difficult to plan economic development for a growing but uncensored population. Such an awareness campaign should mobilize mass media, community-based organizations and traditional childbirth practitioners. The awareness campaign should try to influence the children late-registering behavior. Overall, poverty reduction is the more powerful policy to reduce such a poor-country phenomenon that leaves people out of an institutional and legal existence.

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Author contributions

Conception and design: BP, DJS and CP. Literature review: BP, and MM. Data management and analysis: BP, DJS and CVKT. Interpretation of the results: BP, DJS and CP. Drafting of the article: BP and DJS. Review, editing and supervision: BP and DJS. All authors read and approved the final version.

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Data availability

The dataset used in this study is publicly available, under free registration and upon reasonable request, on the following repository: https://dhsprogram.com/data/dataset/Haiti_Standard-DHS_2016.cfm?flag=0.

Declarations

Ethics approval and consent to participate

The 2016–2017 dataset used in this study was obtained from the DHS Program with official permission. The HDHS survey protocol obtained ethical clearance from the National Ethics Committee of Haiti and the Institutional Review Board of ICF/USAID. During data collection, informed consent was obtained by study participants and/or their legal guardians (if under 16 years

of age). Since this is a study involving secondary database, we were waived the need for additional informed consent. The participants' anonymity and confidentiality were assured. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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