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Multidimensional Health of Women in WAEMU Countries: Key Determinants and Policy Insights

Santé Multidimensionnelle des Femmes dans les Pays de l'UEMOA : Déterminants Clés et Perspectives Politiques

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Abstract

Women's health is a key driver of sustainable growth in WAEMU countries due to its direct and indirect effects on child and household well-being. This paper analyzed women's multidimensional health deprivation in Benin, Burkina Faso, Côte d'Ivoire, Mali, and Senegal using Demographic and Health Survey (DHS) data. A composite health index is constructed based on the Alkire-Foster methodology and Multiple Correspondence Analysis, and estimated through a Probit model. Results reveal substantial heterogeneity across countries, with higher deprivation in Benin and Mali. Education, household wealth, age, contraceptive prevalence, and the regional health context emerge as key determinants. The findings call for context-specific health policies that reduce geographic inequalities, strengthen access to reproductive healthcare, and promote women's empowerment.

Keywords: Multidimensional women's health; WAEMU; Alkire-Foster; DHS; Probit

JEL Codes: I14, O15, C25, C81

Résumé

La santé des femmes constitue un levier essentiel pour la croissance durable dans les pays de l'UEMOA, en raison de ses effets directs et indirects sur le bien-être des enfants et des ménages. Cet article analyse la privation multidimensionnelle en santé des femmes au Bénin, Burkina Faso, Côte d'Ivoire, Mali et Sénégal, à partir des données des Enquêtes Démographiques et de Santé (EDS). Un indice composite fondé sur la méthode d'Alkire-Foster et l'Analyse des Correspondances Multiples est construit, puis estimé par un modèle Probit. Les résultats révèlent une forte hétérogénéité entre pays, avec une privation plus marquée au Bénin et au Mali. L'éducation, la richesse des ménages, l'âge, la prévalence contraceptive et le contexte sanitaire régional apparaissent comme des déterminants clés. Ces résultats plaident pour des politiques de santé différenciées, intégrant la réduction des inégalités géographiques et la promotion de l'autonomisation féminine.

Mots clés : Santé multidimensionnelle des femmes, UEMOA, Alkire-Foster, EDS, Probit.

Codes JEL: I14, O15, C25, C81

Introduction

Health, particularly women's health, plays a fundamental role in the economic and social development of any nation. According to human capital theory, investing in health and education enhances individual productivity and drives economic growth (Becker, 2009). Specifically, improvements in women's health positively impact not only their own well-being and productivity but also that of future generations due to their central roles as mothers and caregivers. The capability approach developed by Sen (1993) reinforces this idea, emphasizing that enhancing women's health expands their opportunities to lead the lives they value, thereby promoting broader economic and human development. Furthermore, the social benefits of improving women's health are substantial: reductions in poverty and progress towards gender equality (Pearce, 1978).

At the global level, women's health remains a top priority, especially since the adoption of the Sustainable Development Goal 3 (SDG 3) in 2015, which promotes good health and well-being. Specifically, SDG 3.1 aims to reduce maternal mortality to less than 70 deaths per 100,000 live births by 2030. Additionally, SDG 3.8 promotes universal health coverage, ensures access to essential services and protects against financial risks. As highlighted in previous studies (Aftab et al., 2021; Hug et al., 2021; Smith-Greenaway et al., 2021), maternal health has wide-ranging effects, not only on mothers, but also on child survival and household resilience. For example, maternal death can double the risk of death in children under five (Nwagbara et al., 2022; Van Raalte, 2021). Approximately 20% of the disease burden among children under five is linked to poor maternal health, nutrition, and inadequate neonatal care (Headey et al., 2020; Victora et al., 2021).

Despite growing global efforts, maternal mortality rates remain alarmingly high in sub-Saharan Africa, particularly within the WAEMU region. In 2018, WAEMU recorded 368 maternal deaths per 100,000 live births, far above the average in developing (239/100,000) and developed (12/100,000) countries. WAEMU countries have consistently high mortality rates: Benin (397), Burkina Faso (320), Côte d'Ivoire (645), Guinea-Bissau (667), Mali (368), Niger (520), Senegal (236), and Togo (400) (WAEMU Commission, 2020).

Multiple factors contribute to poor maternal outcomes, including tobacco use (Pineles et al., 2014; Valizadeh et al., 2024), maternal morbidity (Hogan et al., 2019), obesity (den Harink et al., 2022), and inadequate birth spacing (Cleland et al., 2012; Gebremedhin et al., 2021). WHO recommends 24–36 months between pregnancies to reduce maternal and child mortality (Conde-Agudelo & Belizán, 2000). Short birth intervals are linked to anemia, malnutrition,

preterm birth, and neonatal death (Islam et al., 2022; Elumalai & Govindarajan, 2021). Conversely, long intervals of > 70 months can also increase maternal risk (Ni et al., 2023). Optimal spacing (e.g., 18–23 months) improves outcomes for mothers and children.

Frequent pregnancies and caregiving burdens limit women's economic participation and reinforce poverty cycles. Expanding access to reproductive health services not only improves maternal outcomes, but also enhances women's economic and social roles. However, most research on maternal health has focused narrowly on access to services during pregnancy, overlooking other critical dimensions, such as social, cultural, and environmental determinants (Weitzman, 2017). A multidimensional approach is needed to capture the full complexity of women's health needs and better inform policy design.

This study contributes to the literature by proposing a multidimensional index of women's health constructed using multiple deprivation indicators and analyzing its determinants. These findings are expected to support the design of targeted and effective health policies across WAEMU countries, reinforcing the foundation of human capital essential for sustained economic growth. The remainder of this article is structured as follows. Section 1 provides a review of the relevant literature. Section 2 outlines the methodology and data sources used in this analysis. The empirical results and discussion of the findings are presented in Section 3. Finally, Section 4 concludes the study with a discussion of the policy implications.

1. Literature review

1.1. Theoretical importance of women's health

Women's health occupies a central place in economic development theory. According to the human capital theory (Becker, 2009), investing in health improves individual productivity, prolongs working life, and increases learning capacity. Women's health thus plays a key role not only in their own productivity, but also in that of future generations, due to their central role in reproduction, education, and care. Moreover, intra-family models, whether unitary or collective (Becker, 1975; Chiappori, 1992; Rosenzweig & Schultz, 1982), emphasize that women's health influences resource allocation decisions within the household. A healthy woman is better able to participate actively in these decisions and encourages investment in children's human capital. From a more normative perspective, the capability approach (Sen, 1993, 1999) considers health a fundamental component of well-being, as it is indispensable for individual freedom and full participation in social and economic life. Endogenous growth theories (Lucas, 1988; Romer, 1990) reinforce this vision by integrating health into long-term factors of production and innovation. Finally, contemporary approaches to sustainable human

development (Conceição, 2020) have confirmed that women's health is a structuring determinant of poverty reduction, social inclusion, and household resilience. Together, these theories show that promoting women's health is not just a matter of social or ethical considerations but also a strategic lever for sustainable economic development.

1.2. Determinants of women's health

Empirical research has shown that several factors influence women's health. Lleras-Muney (2005) identified economic inequality as an important factor in women's health. For him, higher incomes meant better access to healthcare, food, and a healthy environment. Gwatkin et al. (2000) and Asmamaw & Negash (2023) showed that wealth is a key determinant of access to maternal healthcare in low-income countries. Gertler et al. (2006) mentioned access to prenatal healthcare. The authors noted that access to prenatal care significantly reduces maternal mortality. Barro & Lee (2013) noted that improving accessibility to health services is essential for reducing maternal and infant mortality. Quality of care is another key dimension. Fuchs (1982) stressed the role of training health professionals, infrastructure availability, and medical equipment in ensuring adequate care.

In several regions of the WAEMU, the shortage of qualified personnel and inadequacy of infrastructure considerably limit the performance of healthcare systems. Behrman & Rosenzweig (2004) and Barro & Lee (2013) found that maternal education improved health behaviors and attendance at medical facilities. This shows the importance of education for women's health. This shows the importance of education for women's health. Another important factor is mental health, as Tunçalp et al. (2015) highlighted the effects of domestic violence, mental burden, and chronic stress on women's health, which are often overlooked in public policies. Conde-Agudelo & Belizán (2000) and Ni et al. (2023) showed that intervals that are too short or too long increase health risks for mothers and children.

These studies justify the adoption of a multidimensional approach that integrates the social, economic, mental, and biomedical dimensions of health. Thus, this research follows from previous work, bringing an innovative perspective: a multidimensional measurement of women's health, considering social, economic, mental, and biomedical factors. This approach is essential to accurately assess the impact of maternal health on the nutrition of children under five years of age in the UEMOA region. A better understanding of these interrelationships is essential to guide public health policies towards more holistic, equitable, and effective strategies.

2. Methodology and data

2.1. Construction of the Women's Multidimensional Health Index

In this study, multidimensional health is conceptualized as a state of overall well-being that goes beyond the absence of disease and includes several essential dimensions of women's physical, mental, and reproductive health. Alkire & Foster's (2011) counting method is adopted to analyze women's multidimensional health. Unlike traditional approaches, which focus solely on health status or access to care, this method assesses simultaneous deprivation across multiple essential dimensions of women's health-related lives. The resulting composite index enables comparisons across countries and social groups, monitors trends over time, and evaluates the effectiveness of health policies that target women.

This methodology involves two key stages: identification and aggregation. In the identification phase, specific health-related dimensions (e.g., access to health services and antenatal and postnatal care) were selected, and indicators with deprivation thresholds were defined. These thresholds determine whether a woman is deprived of the given indicator. Each dimension is assigned a weight that reflects its social relevance. In this study, weights were derived using Multiple Correspondence Analysis (MCA).

During the aggregation phase, the method computes both the incidence and intensity of deprivation to construct a Multidimensional Health Index (MHI). A global deprivation cutoff was applied to classify women as multidimensionally deprived of health, offering a comprehensive tool for policy design and targeting.

2.1.1. Deprivation Identification Method

Let n be the number of individuals, and d be the number of dimensions. We can construct the achievement matrix $Y = [y_{ij}]$ of dimension $n \times d$, where $d \geq 2$, and $y_{ij} \geq 0$ represents the achievement of individual i in dimension j. The row vector $y_{i.}$ gives the achievements of individual i across the d dimensions, while the column vector $y_{.j}$ represents the achievements in dimension j for all n individuals.

Let z be a row vector, where each element $z_j > 0$ represents the deprivation threshold in dimension j, below which an individual is considered deprived. Let w be the weighting vector whose elements w_j are the weights assigned to each dimension j, such that $\sum_{j=1}^{d} w_j = d$.

From the achievement matrix Y, we can construct a deprivation matrix $g^0 = [g_{ij}^0]$ with the same dimension $n \times d$. A typical element of this matrix is defined as:

$$g_{ij}^0 = \begin{cases} 1 \; if \; y_{ij} < z_j \\ 0 \; if \; y_{ij} > z_j \end{cases} \quad (1)$$

This means that in matrix g^0, for each dimension j, the ij^{th} element takes the value 1 if individual i is deprived of dimension j, and 0 otherwise. This is the identification of deprived individuals for each dimension.

Based on this, it is possible to construct a column vector c, called the deprivation count vector, where each element c_i represents the number of deprivations experienced by individual i, such that $0 \leq c_i \leq d$. To identify multidimensionally deprived individuals, the deprivation count vector c is compared to a deprivation cutoff k such that $0 < k \leq d$. The identification method is defined by the function $\rho_k(y_i; z)$ such that

$$\rho_k(y_i; z) = \begin{cases} 1 \; if \; c_i \geq k \; (individual \; i \; is \; deprived) \\ 0 \; if \; c_i < k \; (individual \; i \; is \; not \; deprived) \end{cases} \quad (2)$$

From this identification, a censored deprivation matrix can be constructed $g^0(k)$, such that:

$$g^0(k) = \begin{cases} g_{ij}^0(k) = 1 \; if \; c_i \geq k \\ g_{ij}^0(k) = 0 \; if \; c_i < k \end{cases} \quad (3)$$

We also derive a censored deprivation count vector c_k such that:

$$c_k = \begin{cases} c_i(k) = c_i \; if \; c_i \geq k \\ c_i(k) = 0 \; if \; c_i < k \end{cases} \quad (4)$$

This identifies the individuals who are considered to be multidimensionally deprived.

2.1.2. Multidimensional Health Measurement

Headcount Ratio (Incidence of Deprivation)

Let q be the number of individuals identified as deprived, and n be the total number of individuals in the sample. The headcount ratio H is the proportion of deprived individuals and is defined as

$$H = \frac{q}{n} \quad (5)$$

This measure does not account for the intensity of deprivation and does not satisfy the monotonicity condition, that is, when a woman becomes deprived of an additional dimension, H does not change (Alkire & Foster, 2011; Aminou & Zahonogo, 2019).

Deprivation Intensity

The intensity of deprivation, A is the average number of deprivations experienced by individuals identified as deprived. It is given by:

$$A = \frac{\sum_i^q c_i(k)}{qd} \quad (6)$$

where $c_i(k)$ is the censored deprivation count for individual i, d is the total number of dimensions, q is the number of multi-dimensionally deprived individuals.

Adjusted Headcount Ratio

Because the headcount ratio H is not sensitive to the intensity of deprivation, Alkire & Foster (2011) proposed the adjusted headcount ratio M_0, defined as the product of the headcount ratio H and deprivation intensity A:

$$M_0 = H \times A \quad (7)$$

This index satisfies the monotonicity condition, meaning that when an individual experiences deprivation in an additional dimension, M_0 increases. Moreover, M_0 is decomposable across population subgroups and can be broken down by dimension to analyze the contribution of each deprivation domain.

2.2. Dimensions and indicators of women's multidimensional health

Maternal health indicators are essential tools used to assess women's health during pregnancy, childbirth, and the postpartum period (generally defined as the first six weeks after delivery, although its effects may extend over several months). The construction of the multidimensional health index in this study was based on three key dimensions: access to healthcare, antenatal care, delivery, and postpartum care. These dimensions serve as a framework for selecting indicators that reflect the deprivation experienced by women in the study.

- ✓ **Access to Healthcare**

Health service decision-making: In this study, we treat women's decision-making autonomy in matters related to their own health care as a direct indicator of health status. This choice is grounded in the capability approach introduced in the theoretical framework. According to this approach, health is not only a biological condition but also the *real freedom* to seek, receive, and use appropriate health services. Limited autonomy restricts a woman's ability to decide whether to visit a health facility, choose a treatment, or access preventive services, regardless of their physical availability.

Health insurance coverage increases the likelihood of receiving preventive and screening services, thus improving overall reproductive health outcomes (Lindberg et al., 2020).

Getting medical help for oneself: Indicates access barriers such as financial, geographic, or gender-based discrimination (Peters et al., 2008).

Birth interval: Short (<24 months) or very long (>60 months) intervals are associated with increased maternal and neonatal risks; an optimal interval of 18–36 months is recommended, with the WHO suggesting 36–59 months (Conde-Agudelo & Belizán, 2000; Ni et al., 2023).

Access to family planning is critical for preventing pregnancy complications, reducing maternal and child mortality, and promoting women's autonomy (Singh et al., 2009).

✓ **Antenatal Care**

Access to antenatal care: Crucial to reducing maternal mortality and improving outcomes for mothers and infants (Campbell & Graham, 2006; Koblinsky et al., 2016).

Prevalence of anemia: A significant risk factor for maternal complications, used to assess the quality of prenatal care (Black et al., 2013).

Preeclampsia and eclampsia: These conditions are major contributors to maternal and fetal complications, and reflect the quality of antenatal services (Say et al., 2014).

✓ **Delivery and Postpartum Care**

Skilled birth attendance is a key factor in reducing maternal deaths and improving neonatal survival (Campbell & Graham, 2006).

Postpartum care: Critical for preventing complications after childbirth and supporting maternal recovery (Awiti, 2013; Tunçalp et al., 2015).

Interrupted pregnancy: Whether voluntary or spontaneous, it has significant physical and mental health implications for women.

Eleven indicators were selected to represent deprivation across the three dimensions of maternal health: access to healthcare (five indicators), antenatal care (three indicators), and delivery and postpartum (three indicators). These indicators provide a comprehensive basis for constructing a multidimensional index of maternal health, enabling an in-depth analysis of women's health deprivation across countries and subpopulations. Table 1 lists the dimensions, indicators, and deprivation thresholds.

Table N°1 : Dimensions, indicators and deprivation thresholds

Dimensions	Indicators	Deprivation Threshold
Access to health services	Women's health care	The person who usually decides on the woman's health care is the husband/ partner alone, someone else or other
	Health insurance coverage	Women are not covered by health insurance
	Getting medical help for self	Distance from the healthcare facility is a big problem
	Birth interval	The previous birth interval is outside 36 – 59 months
	Family planning	The woman does not use contraceptive methods or does not intend to use later
Prenatal care	Access to antenatal care	The woman received fewer than four antenatal visits during pregnancy
	Prevalence of anemia	The rate of anemia in pregnant women is moderate or severe
	Preeclampsia and Eclampsia	The pregnant woman has a systolic blood pressure greater than 150 mmHg (SBP>150 mmHg) or blood pressure has not been controlled during pregnancy.

Childbirth and postpartum	Assistance from qualified personnel	The woman did not have the assistance of a midwife, nurse or doctor before delivery
	Postpartum care	The woman did not receive postpartum medical care within six weeks of birth
	Pregnancy terminated	The woman has had her pregnancy terminated

Source : Authors' construction

Consequently, a woman experiences multidimensional deprivation when the weighted total of her deprivations is greater than or equal to the overall deprivation threshold k. The primary deprivation cutoff was set at k=30%, meaning that a woman is considered multidimensionally deprived if she is deprived in at least 30% of the weighted indicators. This threshold is widely used in applications of the Alkire–Foster method, as it balances sensitivity and robustness in the identification of multidimensional deprivation (Alkire & Foster, 2011; Alkire et al., 2015). Moreover, k=30% is commonly adopted in empirical studies on multidimensional poverty and health deprivation in Sub-Saharan Africa, which facilitates comparability with existing work (Kabubo-Mariara et al., 2013). Nonetheless, to ensure robustness, a sensitivity analysis was conducted using alternative thresholds, confirming that the main conclusions remain stable across different values of k.

2.3. Determinants of women's multidimensional health

To identify the factors that explain the level of deprivation in women's health, we specified a probabilistic model of multidimensional health. A binary variable H_i is defined, which takes the value 1 if woman i is considered multidimensionally deprived in health and 0 otherwise:

$$H_i = \begin{cases} 1 \text{ i}f \text{ the woman is multidimensionally deprived in health,} \\ 0 \text{ otherwise.} \end{cases} \quad (8)$$

The observed variable H_i is assumed to reflect an unobserved continuous latent variable H_i^*, which captures the underlying level of health deprivation. The relationship between H_i and H_i^* is defined as follows.

$$H_i = \begin{cases} 1 \; if \; H_i^* > 0, \\ 0 \; otherwise \end{cases} \quad (9)$$

The latent health status H_i^* is modeled as a linear function of a vector of explanatory variables Y, which includes individual, socioeconomic, and contextual characteristics, and a stochastic error term ε_i:

$$H_i^* = \alpha_1 + \alpha_2 Y + \varepsilon_i \quad (10)$$

Assuming that the error term ε_i follows a standard normal distribution, the model can be estimated by using a probit specification. Thus, the probability that a woman is multidimensionally deprived of health is given by

$$Pr(H_i = 1) = \Phi(\alpha_1 + \alpha_2 Y) \quad (11)$$

where $\Phi(\cdot)$ denotes the cumulative distribution function of the standard normal distribution.

2.4. Data and sources

The data used comes from the latest Demographic and Health Surveys (DHS) conducted in WAEMU countries with technical support from the ICF. These surveys provide reliable information on fertility, family planning, child nutrition, infant mortality, anemia, noncommunicable diseases, and domestic violence. Due to data availability, the analysis covers five countries: Benin (DHS 2018), Burkina Faso (DHS 2021), Côte d'Ivoire (DHS 2021), Mali (DHS 2018), and Senegal (DHS 2023).

The choice of variables is based on theoretical and empirical literature on women's health and household well-being. Individual characteristics (age, gender, education, marital status) reflect the biological, behavioral, and social determinants of health (Bloom et al., 2001; Bhalotra & Rawlings, 2013). The wealth index reflects living standards and access to health resources (Filmer & Pritchett, 2001), while household characteristics (size, number of children, gender of head) illustrate burdens and decision-making dynamics (Becker & Lewis, 1973; Quisumbing & Maluccio, 2003). Spatial variables (type of residence, region) reflect disparities in access to infrastructure (Günther & Harttgen, 2012), and contextual indicators (average health index, contraceptive prevalence) capture norms and the health environment (Cleland et al., 2012). This multidimensional framework thus allows for a comparative analysis of the determinants of women's health in the WAEMU region. Table 2 below illustrates the definition of the variables used in this study.

Table N°2 : Definition of variables used in the study

Variable	Definition
Women's Health	Binary variable: 1 if the woman is multidimensionally deprived in health; 0 otherwise.
Age_enft	Child's age in months.
Sexe_enft	Child's sex (Male or Female).
Twins	Binary variable: 1 if the child is from a multiple birth (twin or more); 0 otherwise.
Age_fem	Woman's age in years.
Marital status	Marital status of the woman (single, married, divorced, widowed, etc.).
Educ_fem	Highest level of education attained by the woman (none, primary, secondary, higher).
Residence	Type of household residence (urban or rural).
Department	Administrative department of household residence.
Household size (Tail_mge)	Total number of people living in the household.
Nbr_enft	Number of children under five years of age in the household.

Household head's sex	Sex of the household head (male or female).
Wealth index	Household wealth index ranked in ascending order from 0 (poorest) to 5 (richest).
Average health index	Average of the multidimensional health index for women, calculated at the departmental level.
Contraceptive prevalence	Percentage of women who reported using a contraceptive method, calculated at the departmental level.

Source: Authors' construction based on Demographic and Health Survey (DHS) data.

3. Results and Discussion

3.1. Descriptive Statistics

Table 3 summarizes the socioeconomic characteristics of women from the five WAEMU countries selected for this study: Benin, Burkina Faso, Côte d'Ivoire, Mali, and Senegal. The variables included age, educational level, place of residence, household wealth index, and marital status. Across all countries, young women aged 15–25 years constitute the largest age group in the sample: 44.22% in Benin, 43.64% in Burkina Faso, 42.21% in Côte d'Ivoire, 43.85% in Mali, and 47.56% in Senegal. This demographic was more likely to require reproductive health services. In contrast, women aged 37–59 years represented 21% to 25% of the sample. The average age of women is fairly consistent across countries, ranging from 28.09 years in Senegal to 28.94 years in Côte d'Ivoire. Education levels remained low. In all five countries, the majority of the women had no formal education, ranging from 46.27% in Senegal to 66.26% in Mali. Women with secondary education constitute the second largest group, while those with higher education represent less than 4% of the sample in all countries. This highlights persistent disparities in women's access to education across the region. The majority of respondents resided in rural areas, underscoring the rural profile of the female population and its implications for access to basic health and social services. Regarding household wealth, most women in Benin, Burkina Faso, and Mali lived in wealthier households. In Côte d'Ivoire, women are mostly in "rich" households, whereas in Senegal, they are predominantly in "poorer" households. The marital status distribution revealed that most women were currently married. Never-married women represent the second largest category, followed by widows, who make up the smallest proportion in all countries.

Table N°3: Descriptive Statistics of Women in the Sample (in number and percentage)

Variable	Category	Benin		Burkina Faso		Côte d'Ivoire		Mali		Senegal	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Age group (years)	15–25	7044	44.22	7706	43.64	6280	42.21	4613	43.85	7887	47.56
	26–36	5236	32.87	5575	31.57	4903	32.96	3663	34.82	4898	29.54
	37–59	3648	22.90	4378	24.79	3694	24.83	2243	21.32	3798	22.90
	Total	15928	100	17659	100	14877	100	10519	100	16583	100

Highest education level	None	8762	55.01	10254	58.07	7994	53.73	6970	66.26	7673	46.27
	Primary	3116	19.56	2515	14.24	2741	18.42	1371	13.03	3251	19.60
	Secondary	3685	23.14	4548	25.75	3590	24.13	1974	18.77	5074	30.60
	Higher	365	2.29	342	1.94	552	3.71	204	1.94	585	3.53
	Total	15928	100	17659	100	14877	100	10519	100	16583	100
Place of residence	Urban	7045	44.23	6227	35.26	7420	49.88	3518	33.44	7471	45.05
	Rural	8883	55.77	11432	64.74	7457	50.12	7001	66.56	9112	54.95
	Total	15928	100	17659	100	14877	100	10519	100	16583	100
Wealth quintile	Poorest	2856	17.93	2869	16.25	3135	21.07	1868	17.76	3900	23.52
	Poorer	2976	18.68	3185	18.04	3142	21.12	1837	17.46	3600	21.71
	Middle	2985	18.74	3613	20.46	3439	23.12	1961	18.64	3670	22.13
	Richer	3281	20.60	3816	21.61	2748	18.47	2344	22.28	2971	17.92
	Richest	3830	24.05	4176	23.65	2413	16.22	2509	23.85	2442	14.73
	Total	15928	100	17659	100	14877	100	10519	100	16583	100
Marital status	Never in union	3897	24.47	4146	23.48	4500	30.25	1816	17.26	4753	28.66
	Married	8828	55.42	9593	54.32	5218	35.07	8250	78.43	11005	66.36
	Living with partner	2342	14.70	3275	18.55	4406	29.62	82	0.78	66	0.40
	Widowed	322	2.02	301	1.70	248	1.67	148	1.41	186	1.12
	Divorced	155	0.97	61	0.35	52	0.35	151	1.44	507	3.06
	Separated	384	2.41	283	1.60	453	3.04	72	0.68	66	0.40
	Total	15928	100	17659	100	14877	100	10519	100	16583	100

Source: ***Authors' calculations based on DHS data***

3.2. Weighting of Health Dimensions Using Multiple Correspondence Analysis (MCA)

Table 4 presents the relative weights of 11 indicators of women's health across the five WAEMU countries (Benin, Burkina Faso, Côte d'Ivoire, Mali, and Senegal). These weights were computed using Multiple Correspondence Analysis (MCA) on the DHS datasets and estimated using Stata 14. The weight attributed to each indicator reflects its relative importance in the construction of a multidimensional Women's Health Index. A higher weight indicates greater contribution of the corresponding indicator to disparities in women's health within a given country.

In **Benin**, the indicators with the highest weights were access to antenatal care (15.5%), skilled birth attendance (15.7%), and family planning (13%), suggesting a policy focus on delivery-related services. In contrast, preeclampsia/eclampsia (1.4%) and pregnancy interruption (1.8%) had the lowest weight, indicating either low prevalence or limited discriminatory power. In **Burkina Faso**, seeking medical help (19.9%), general healthcare (19.2%), and skilled birth attendance (16.5%) received the highest weights, reflecting the dominant role of barriers to care access. Conversely, birth interval (1.7%) and health insurance coverage (3.1%) had minimal

weights, suggesting that these indicators are less informative in this context. In **Côte d'Ivoire**, key contributing indicators included birth interval (14.7%), antenatal care (14%), and skilled birth attendance (14.9%), highlighting the importance of perinatal dimensions. Family planning (4.6%) and health insurance coverage (4.9%) had comparatively low weights. In **Mali**, the highest weighted indicators were general health care (22.3%), medical help-seeking (13.3%), and pregnancy interruption (11.4%), suggesting that structural health care access and pregnancy-related challenges are central issues. The birth interval was extremely low (0.3%), underscoring its limited role in explaining the variations in women's health status. In **Senegal**, postpartum care (19.6%), skilled birth attendance (19.5%), anemia (11%), and preeclampsia/eclampsia (9.2%) were among the highest-weighted indicators. In contrast, general health care (2.9%) and health insurance coverage (1.6%) were among the least weighted, indicating a prioritization of obstetric complications in assessing women's health.

Overall, antenatal care and skilled birth attendance have consistently emerged as key contributors across countries. Senegal appears to emphasize obstetric complications, whereas Burkina Faso and Mali highlight accessibility challenges. Family planning and pregnancy interruption generally result in lower weights, possibly due to low statistical variability or cultural sensitivity. These variations in indicator weights across countries indicate heterogeneous vulnerability profiles, emphasizing the need for context-specific maternal health policies in the WAEMU region. Such an analysis supports targeted investments and national reforms by identifying the most impactful dimensions that contribute to health deprivation.

Table N°4: Indicators and Weights Generated by Multiple Correspondence Analysis (MCA)

Indicator	General Health Care	Health Insurance Coverage	Medical Help Seeking	Birth Interval	Family Planning	Antenatal Care	Anemia	Preeclampsia & Eclampsia	Skilled Birth Attendance	Postpartum Care	Pregnancy Interruption
Benin	0.089	0.098	0.1215	0.1055	0.130	0.155	0.044	0.014	0.157	0.068	0.018
Burkina Faso	0.192	0.031	0.1985	0.0165	0.0485	0.1475	0.0325	0.0275	0.1655	0.107	0.035
Côte d'Ivoire	0.095	0.0485	0.079	0.1465	0.0455	0.1395	0.0695	0.061	0.1485	0.126	0.041
Mali	0.223	0.0555	0.1325	0.003	0.0695	0.1235	0.0485	0.043	0.132	0.056	0.1135
Senegal	0.029	0.0155	0.0635	0.030	0.106	0.0735	0.1105	0.092	0.1955	0.196	0.0885

Source: ***Authors' estimates using DHS data***

3.3. Estimates of Women's Multidimensional Health Index

3.3.1. Variation of the Health Index by Deprivation Threshold (k)

Table 5 presents how the multidimensional health index evolves as deprivation cutoff *k* increases. A general trend of decreasing health index values was observed as *k* increased. This pattern is consistent with Aminou (2019) and Aminou & Zahonogo (2019). For example, in

Benin's study, when $k = 1$, the incidence rate (H) was 100%. It declines to 95.6% for $k = 3$, 70.2% for $k = 5$, and 38% for $k = 7$. In Burkina Faso, the corresponding values are 99.7%, 86.3%, 47.9%, and 15.9%, respectively. Côte d'Ivoire shows rates of 100%, 95%, 70%, and 31.6%. In Mali, these are 99.8%, 94.7%, 72.2%, and 37.1%, respectively. Senegal reports 99.4%, 85.9%, 28.8%, and 6.0%. These results reflect the scale of health-related deprivation across the WAEMU, with Benin showing particularly high levels.

The adjusted deprivation index, which accounts for both the incidence (H) and the intensity (A) of deprivation, provides a more nuanced understanding. In Benin, 56.8% of women were deprived when $k = 1$, 55.8% when $k = 3$, 46% when $k = 5$, and 28.6% when $k = 7$. The corresponding values for Burkina Faso are 47.2%, 44.5%, 29.9%, and 12.1%, respectively. Côte d'Ivoire records 55.0%, 53.9%, 44.4%, and 23.7%. Mali shows 55.8%, 54.7%, 46.2%, and 27.5%, while Senegal reports 41.3%, 38.1%, 16.3%, and 4.2%. These findings indicate that women in Senegal experience the lowest levels of multidimensional health deprivation, followed by Burkina Faso, Côte d'Ivoire, Mali, and Benin, where deprivation is most severe. This trend in the women's multidimensional health index is confirmed in Figure 1.

Although the overall health index decreases as k increases, indicating a lower number of deprived women, the average intensity of deprivation among those remaining deprived tends to increase. This aligns with Alkire & Foster (2011) and the findings of Aminou (2019) and Aminou & Zahonogo (2019), who show that reductions in the multidimensional deprivation index are more attributable to declining incidence rather than reduced intensity.

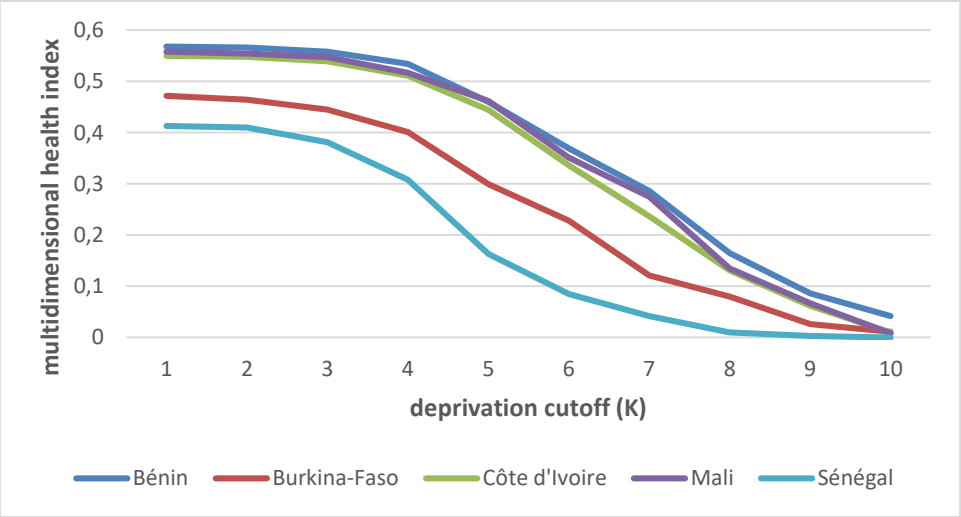
In Benin, the average number of deprivations among women deprived in at least one dimension is 6.248; for those deprived in at least three dimensions, this figure increases to 6.424. At thresholds of $k = 5$ and $k = 7$, the averages increased to 7.216 and 8.294, respectively. In Burkina Faso, the average deprivation level ranged from 5.203 ($k = 1$) to 8.393 ($k = 7$). Côte d'Ivoire records averages of 6.050 ($k = 1$), 6.237 ($k = 3$), 6.985 ($k = 5$), and 8.162 ($k = 7$). Mali shows averages of 6.138, 6.358, 7.051, and 8.162. In Senegal, the average deprivation levels were lower: 4.576 for $k = 1$, 4.884 for $k = 3$, 6.237 for $k = 5$, and 7.788 for $k = 7$. These results again underscore that, on average, women in Senegal face the least severe health-related deprivation compared with their counterparts in the other countries studied.

Table N°5: Women's Multidimensional Health Indices by Deprivation Cutoff (k)

	BENIN				BURKINA-FASO				CÔTE D'IVOIRE				MALI				SENEGAL			
K	M_0	H	A	Mean deprivation	M_0	H	A	Mean deprivation	M_0	H	A	Mean deprivation	M_0	H	A	Mean deprivation	M_0	H	A	Mean deprivation
1	0.568	1	0.568	6.248	0.472	0.997	0.473	5.203	0.55	1	0.55	6.050	0.558	0.998	0.558	6.138	0.413	0.994	0.416	4.576
2	0.566	0.989	0.573	6.303	0.464	0.95	0.488	5.368	0.548	0.989	0.554	6.094	0.554	0.977	0.567	6.237	0.41	0.977	0.42	4.620
3	0.558	0.956	0.584	6.424	0.445	0.863	0.516	5.676	0.539	0.95	0.567	6.237	0.547	0.947	0.578	6.358	0.381	0.859	0.444	4.884
4	0.534	0.881	0.606	6.666	0.401	0.731	0.548	6.028	0.511	0.86	0.593	6.523	0.517	0.855	0.605	6.655	0.308	0.641	0.482	5.302
5	0.460	0.702	0.656	7.216	0.299	0.479	0.625	6.875	0.444	0.7	0.635	6.985	0.462	0.722	0.641	7.051	0.163	0.288	0.567	6.237
6	0.369	0.521	0.708	7.788	0.228	0.341	0.669	7.359	0.336	0.486	0.692	7.612	0.351	0.5	0.702	7.722	0.085	0.132	0.645	7.095
7	0.286	0.38	0.754	8.294	0.121	0.159	0.763	8.393	0.237	0.316	0.747	8.217	0.275	0.371	0.742	8.162	0.042	0.06	0.708	7.788
8	0.165	0.199	0.83	9.13	0.08	0.099	0.805	8.855	0.131	0.162	0.811	8.921	0.135	0.165	0.818	8.998	0.01	0.013	0.79	8.690
9	0.086	0.098	0.883	9.713	0.026	0.029	0.902	9.922	0.062	0.071	0.872	9.592	0.067	0.078	0.858	9.438	0.003	0.004	0.85	9.350
10	0.042	0.045	0.934	10.274	0.011	0.012	0.934	10.274	0.01	0.011	0.949	10.439	0.008	0.008	0.958	10.538	0.000	0		

Source: Authors' estimations based on DHS data

Figure N°1: Women's multidimensional health index by deprivation cutoff



Source : Authors' estimations based on DHS data

3.3.2. Contribution of Indicators to Women's Multidimensional Health

Table 6 presents the relative contributions of key indicators to women's overall multidimensional health across the five WAEMU countries. In **Benin**, the largest contributor is the "Birth interval" indicator, ranging from 19.6% (k = 1) to 14.7% (k = 9), followed by "Health insurance coverage," whose influence declines as k increases, and then "Postpartum care" or "Access to prenatal care" depending on the threshold. Deprivation in "Preeclampsia and eclampsia" is minimal, suggesting effective monitoring. Policy priorities should focus on birth spacing and insurance coverage.

In **Burkina Faso**, "Women's health care" dominates (27.3% to 21.3%), followed by "Postpartum care" (or "Skilled personnel assistance" at higher thresholds) and "Obtaining medical help for oneself." Strengthening women's autonomy and access to postpartum services is recommended.

In **Côte d'Ivoire**, "Family planning" is the leading contributor (19.1–16.7%), followed by "Postpartum care" and "Access to prenatal care." Policies should emphasize family planning and postpartum care.

In **Mali**, "Women's health care" remains the most significant indicator (31.9–26%), followed by prenatal care access and skilled personnel assistance. Enhancing access to prenatal services and decision-making capacity is essential.

In **Senegal**, "Postpartum care" dominates (45.6–23.1%), with "Birth interval" and either "Obtaining medical help for oneself" or "Skilled personnel assistance" following. Priority should be given to postpartum care, birth spacing, and facilitating autonomous healthcare access.

The consistently low deprivation for "Preeclampsia and eclampsia" likely reflects improved antenatal monitoring, yet caution is warranted due to potential under-reporting in self-reported survey data (Geller et al., 2018; Chou et al., 2016).

Table N°6: Relative contribution of dimensions to the multidimensional women's health index

Dimensions	Access to health services					Prenatal care			Childbirth and post-partum		
	General Health Care	Health Insurance Coverage	Medical Help Seeking	Birth Interval	Family Planning	Antenatal Care	Anemia	Preeclampsia & Eclampsia	Skilled Birth Attendance	Postpartum Care	Pregnancy Interruption
BENIN											
K = 1	0.087	0.191	0.064	0.196	0.136	0.111	0.013	0	0.072	0.125	0.004
K = 3	0.088	0.181	0.067	0.204	0.133	0.117	0.013	0	0.076	0.118	0.004
K = 5	0.095	0.155	0.08	0.187	0.13	0.143	0.012	0	0.094	0.1	0.004
K = 7	0.093	0.132	0.088	0.164	0.117	0.178	0.011	0.001	0.127	0.087	0.002
K = 9	0.083	0.111	0.125	0.147	0.093	0.175	0.012	0.001	0.177	0.073	0.002
BURKINA-FASO											
K = 1	0.273	0.078	0.143	0.059	0.027	0.069	0.042	0.001	0.054	0.245	0.01
K = 3	0.306	0.065	0.165	0.052	0.023	0.079	0.036	0.001	0.061	0.206	0.008
K = 5	0.275	0.051	0.206	0.045	0.018	0.113	0.03	0.001	0.093	0.163	0.006
K = 7	0.242	0.041	0.227	0.041	0.014	0.132	0.026	0.001	0.139	0.131	0.006
K = 9	0.213	0.034	0.22	0.036	0.012	0.164	0.024	0	0.184	0.112	0.001
CÔTE D'IVOIRE											
K = 1	0.11	0.095	0.068	0.066	0.191	0.113	0.064	0.005	0.082	0.19	0.016
K = 3	0.111	0.089	0.068	0.063	0.196	0.118	0.064	0.005	0.086	0.185	0.016
K = 5	0.11	0.078	0.07	0.059	0.191	0.14	0.067	0.005	0.104	0.164	0.014
K = 7	0.101	0.065	0.072	0.054	0.175	0.164	0.067	0.008	0.135	0.147	0.012
K = 9	0.104	0.056	0.069	0.047	0.167	0.160	0.062	0.011	0.169	0.145	0.009
MALI											
K = 1	0.319	0.107	0.066	0.108	0.005	0.121	0.034	0.003	0.112	0.102	0.024
K = 3	0.335	0.098	0.068	0.103	0.004	0.123	0.033	0.003	0.116	0.093	0.022
K = 5	0.322	0.088	0.079	0.095	0.004	0.139	0.035	0.003	0.134	0.08	0.022
K = 7	0.3	0.075	0.095	0.09	0.003	0.15	0.032	0.002	0.158	0.07	0.025
K = 9	0.26	0.065	0.145	0.08	0.003	0.14	0.05	0.003	0.151	0.065	0.038
SENEGAL											
K = 1	0.052	0.036	0.063	0.178	0.055	0.044	0.022	0.002	0.059	0.456	0.033
K = 3	0.047	0.033	0.068	0.19	0.049	0.048	0.025	0.003	0.066	0.435	0.036
K = 5	0.041	0.026	0.071	0.175	0.04	0.069	0.054	0.007	0.144	0.325	0.049
K = 7	0.034	0.021	0.065	0.144	0.032	0.08	0.045	0.008	0.263	0.274	0.034
K = 9	0.032	0.016	0.075	0.125	0.032	0.077	0.13	0.023	0.23	0.231	0.028

Source: Authors' estimations based on DHS data

3.3.3. Regional Analysis of Women's Health Deprivations in the WAEMU Region

Table 7 highlights substantial disparities in women's multidimensional health deprivation across the five WAEMU countries, regardless of the deprivation threshold (k values).

In **Benin**, the highest deprivation rates were observed in the northern departments of Atacora (70.1%–22.3%), Borgou (68.4%–23.8%), and Alibori, likely linked to socio-cultural practices limiting hospital-based care and favoring self-medication or traditional treatments (INSAE & ICF, 2019). The lowest rates occurred in Littoral (43.3%–0.5%) and Zou (45.3%–0.3%).

In **Burkina Faso**, the Est (62.1%–6.6%), Sahel (57.7%–15.7%), and Sud-Ouest (52.9%–7.4%) regions exhibited the highest deprivation, while Centre (40.8%–0%) and Nord (45.3%–0.3%) had the lowest, highlighting areas requiring targeted interventions.

In **Côte d'Ivoire**, Denguélé (62.8%–12.8%), Woroba (62.3%–11.6%), and Montagnes (56.8%–4.8%) were most affected, whereas Yamoussoukro (44.1%–2.4%) and Abidjan (45.8%–1.7%) showed lower deprivation.

In **Mali**, the regions of Tombouctou (64.7%–15.9%), Kidal (60.8%–7%), and Gao (60.3%–6.9%) were severely affected, partly due to insecurity, while Bamako (40.6%–0.5%) and Koulikoro (52.7%–6.1%) fared better.

In **Senegal**, Sédhiou (46%–0.9%), Tambacounda (45.6%–0.5%), and Matam (45.6%–11.4%) had the highest deprivation, contrasting with Dakar (34.7%–0%) and Kaolack (36.7%–0%).

These results emphasize the need for **region-specific health policies** targeting the most vulnerable populations. However, caution is advised when comparing regions across all thresholds due to methodological limitations (Kabubo et al., 2013).

Table N°7: Breakdown of women's multidimensional health indices by region

Deprivation cutoff	K = 1			K = 3			K = 5			K = 7			K = 9		
Region	M_0	H	A	M_0	H	A	M_0	H	A	M_0	H	A	M_0	H	A
BENIN															
Alibori	0.613	1	0.613	0.608	0.981	0.62	0.54	0.805	0.671	0.372	0.491	0.758	0.118	0.134	0.882
Atacora	0.701	1	0.701	0.7	0.997	0.702	0.668	0.918	0.728	0.55	0.704	0.781	0.223	0.254	0.879
Atlantique	0.5	1	0.5	0.482	0.92	0.524	0.353	0.584	0.605	0.155	0.215	0.723	0.011	0.013	0.88
Borgou	0.684	0.998	0.685	0.68	0.982	0.693	0.64	0.881	0.727	0.512	0.646	0.793	0.238	0.267	0.892
Collines	0.524	1	0.524	0.514	0.958	0.537	0.389	0.633	0.614	0.199	0.279	0.712	0.030	0.035	0.864
Couffo	0.55	1	0.55	0.547	0.987	0.554	0.504	0.707	0.713	0.239	0.335	0.713	0.035	0.04	0.867
Donga	0.607	1	0.607	0.604	0.985	0.613	0.538	0.816	0.66	0.353	0.474	0.745	0.104	0.118	0.882
Littoral	0.433	0.996	0.435	0.403	0.868	0.464	0.225	0.402	0.561	0.054	0.077	0.697	0.005	0.006	0.858
Mono	0.503	1	0.503	0.484	0.92	0.526	0.345	0.56	0.616	0.169	0.234	0.723	0.024	0.028	0.868
Ouémé	0.504	1	0.504	0.487	0.926	0.526	0.373	0.628	0.594	0.149	0.211	0.707	0.012	0.014	0.852
Plateau	0.599	1	0.599	0.594	0.978	0.608	0.527	0.802	0.657	0.326	0.438	0.745	0.053	0.06	0.88
Zou	0.453	1	0.453	0.433	0.914	0.474	0.255	0.446	0.573	0.078	0.112	0.699	0.003	0.004	0.889
BURKINA-FASO															
Boucle du mouhoun	0.491	1	0.491	0.47	0.899	0.523	0.324	0.519	0.626	0.135	0.178	0.756	0.017	0.019	0.91
Cascades	0.463	1	0.463	0.453	0.953	0.475	0.264	0.453	0.58	0.049	0.066	0.746	0.008	0.009	0.906
Centre	0.408	1	0.408	0.373	0.82	0.455	0.15	0.33	0.455	0.037	0.05	0.733	0	0	0
Centre Est	0.429	1	0.429	0.394	0.813	0.485	0.25	0.43	0.581	0.056	0.078	0.721	0.003	0.004	0.832
Centre Nord	0.482	1	0.482	0.454	0.856	0.53	0.317	0.508	0.625	0.124	0.171	0.723	0.015	0.017	0.876
Centre Ouest	0.466	0.995	0.468	0.436	0.841	0.519	0.29	0.449	0.647	0.142	0.182	0.778	0.038	0.042	0.899
Centre Sud	0.414	1	0.414	0.376	0.789	0.476	0.210	0.347	0.607	0.064	0.082	0.778	0.018	0.02	0.907
Est	0.621	1	0.621	0.616	0.974	0.633	0.547	0.797	0.686	0.33	0.425	0.777	0.066	0.072	0.919
Hauts-bassins	0.471	1	0.471	0.453	0.898	0.504	0.301	0.5	0.603	0.095	0.127	0.752	0.022	0.025	0.882
Nord	0.408	1	0.408	0.356	0.758	0.47	0.199	0.335	0.593	0.048	0.065	0.738	0	0	0
Plateau central	0.463	1	0.463	0.443	0.904	0.489	0.278	0.477	0.583	0.045	0.064	0.707	0	0	0
Sahel	0.577	0.99	0.583	0.548	0.837	0.654	0.485	0.673	0.722	0.385	0.49	0.786	0.157	0.173	0.906
Sud-Ouest	0.529	0.99	0.534	0.518	0.929	0.557	0.374	0.556	0.672	0.237	0.306	0.776	0.074	0.082	0.899
CÔTE D'IVOIRE															
Abidjan	0.458	1	0.458	0.435	0.901	0.483	0.258	0.446	0.577	0.088	0.119	0.74	0.017	0.02	0.858
Bas Sassandra	0.543	1	0.543	0.543	0.975	0.556	0.44	0.709	0.621	0.242	0.335	0.722	0.033	0.038	0.864
Comoe	0.451	1	0.451	0.423	0.865	0.489	0.288	0.5	0.577	0.095	0.135	0.705	0.012	0.014	0.853
Denguele	0.628	1	0.628	0.619	0.966	0.642	0.562	0.815	0.69	0.384	0.498	0.771	0.128	0.146	0.879

Goh-djiboua	0.515	1	0.515	0.498	0.925	0.538	0.445	0.6	0.741	0.19	0.256	0.741	0.047	0.056	0.845
Lacs	0.527	1	0.527	0.509	0.908	0.561	0.417	0.655	0.637	0.225	0.31	0.726	0.04	0.046	0.87
Lagunes	0.522	1	0.522	0.510	0.952	0.536	0.409	0.673	0.607	0.15	0.192	0.78	0.058	0.067	0.87
Montagnes	0.568	1	0.568	0.565	0.983	0.575	0.49	0.785	0.624	0.252	0.345	0.731	0.048	0.056	0.863
Sassandra-marahoue	0.558	1	0.558	0.547	0.952	0.575	0.477	0.771	0.618	0.204	0.277	0.737	0.051	0.059	0.861
Savanes	0.557	1	0.557	0.554	0.981	0.564	0.46	0.731	0.63	0.224	0.3	0.746	0.07	0.081	0.86
Vallee du bandama	0.499	1	0.499	0.48	0.912	0.526	0.368	0.608	0.605	0.16	0.224	0.715	0.028	0.032	0.863
Woroba	0.623	1	0.623	0.617	0.972	0.635	0.549	0.802	0.685	0.388	0.508	0.764	0.116	0.13	0.896
Yamoussoukro	0.441	1	0.441	0.416	0.886	0.47	0.255	0.429	0.595	0.106	0.143	0.739	0.024	0.029	0.829
Zanzan	0.568	1	0.568	0.562	0.974	0.577	0.484	0.763	0.634	0.265	0.351	0.754	0.084	0.096	0.878
MALI															
Bamako	0.406	0.997	0.408	0.378	0.837	0.452	0.201	0.362	0.556	0.052	0.075	0.699	0.005	0.006	0.876
Gao	0.603	1	0.603	0.601	0.985	0.61	0.543	0.836	0.65	0.36	0.497	0.723	0.069	0.082	0.842
Kayes	0.567	0.995	0.57	0.557	0.936	0.594	0.478	0.731	0.654	0.316	0.427	0.741	0.085	0.1	0.849
Kidal	0.608	1	0.608	0.602	0.979	0.616	0.538	0.819	0.657	0.33	0.438	0.754	0.07	0.083	0.843
Koulikoro	0.527	1	0.527	0.517	0.945	0.547	0.413	0.666	0.621	0.209	0.279	0.748	0.061	0.07	0.872
Mopti	0.571	0.991	0.577	0.563	0.95	0.593	0.506	0.793	0.638	0.27	0.36	0.75	0.058	0.068	0.861
Segou	0.589	1	0.589	0.584	0.977	0.598	0.521	0.81	0.643	0.317	0.429	0.74	0.073	0.086	0.853
Sikasso	0.566	0.998	0.567	0.561	0.972	0.576	0.488	0.781	0.625	0.27	0.374	0.722	0.043	0.05	0.857
Toumbouctou	0.647	1	0.647	0.642	0.977	0.658	0.587	0.831	0.706	0.457	0.591	0.774	0.159	0.183	0.867
SENEGAL															
Dakar	0.347	0.993	0.35	0.277	0.698	0.397	0.063	0.119	0.526	0.005	0.007	0.687	0	0	0
Diourbel	0.405	0.992	0.408	0.377	0.874	0.431	0.142	0.258	0.549	0.019	0.027	0.721	0	0	0
Fatick	0.404	0.997	0.406	0.371	0.86	0.432	0.135	0.244	0.555	0.026	0.036	0.724	0.004	0.005	0.864
Kaffrine	0.43	0.994	0.433	0.398	0.858	0.464	0.205	0.356	0.577	0.064	0.088	0.726	0.009	0.011	0.855
Kaolack	0.367	0.97	0.378	0.322	0.769	0.419	0.111	0.204	0.542	0.018	0.027	0.678	0	0	0
Kedougou	0.432	1	0.432	0.399	0.856	0.466	0.191	0.321	0.596	0.082	0.114	0.717	0.005	0.006	0.908
Kolda	0.419	1	0.419	0.398	0.91	0.437	0.159	0.292	0.545	0.021	0.029	0.724	0	0	0
Louga	0.39	0.984	0.396	0.349	0.806	0.433	0.121	0.217	0.559	0.031	0.045	0.683	0	0	0
Matam	0.456	0.997	0.457	0.435	0.903	0.482	0.247	0.41	0.602	0.114	0.163	0.702	0.002	0.003	0.819
Saint-louis	0.415	0.993	0.418	0.379	0.844	0.449	0.167	0.284	0.588	0.068	0.098	0.694	0.003	0.004	0.819
Sedhiou	0.46	0.995	0.462	0.449	0.954	0.471	0.243	0.425	0.573	0.064	0.089	0.717	0.009	0.011	0.835
Tambacounda	0.456	0.997	0.457	0.443	0.939	0.472	0.238	0.413	0.576	0.056	0.08	0.697	0.005	0.006	0.819
Thiès	0.386	1	0.386	0.348	0.852	0.409	0.093	0.177	0.527	0.005	0.008	0.653	0	0	0
Zinguinchor	0.386	1	0.386	0.355	0.85	0.418	0.114	0.216	0.526	0.008	0.012	0.685	0	0	0

Source : Authors' estimations based on DHS data

3.4. Determinants of Women's Multidimensional Health in WAEMU Countries

Table 8 presents the results of the multidimensional health deprivation model for women across the five WAEMU countries included in this study. The analysis highlights several key determinants of women's health deprivation, including having a twin child, age, educational attainment (for both the woman and her partner), place of residence, number of children under five, gender of the household head, household wealth status, the regional average health deprivation index, and the regional contraceptive prevalence rate.

In Benin, women who have twin children were significantly less likely to experience multidimensional health deprivation. This result may be explained by the greater medical attention and follow-up associated with multiple births, which are generally considered high-risk. Age also plays a protective role in both Benin and Senegal, where older women are less likely to suffer deprivation—possibly reflecting accumulated experience in navigating health systems, increased autonomy, and greater health literacy (Yaya et al., 2018).

In Côte d'Ivoire and Mali, women in consensual unions are less likely to be deprived of health compared to those in formal marriages. This may indicate greater autonomy, more flexible household roles, or a younger and more urban profile among women in informal unions. These findings echo Osamor & Grady (2016), who emphasize the role of spousal decision-making dynamics in accessing healthcare.

Education—both of women and their partners—emerges as a protective factor in all countries except Senegal. Education improves health knowledge, strengthens decision-making autonomy, and promotes preventive health practices, contributing to better use of health services (Yaya et al., 2018; Alam et al., 2020; Adedokun & Yaya, 2020; Aminou & Okpeïtchan, 2017). Similarly, household wealth significantly reduces the likelihood of health deprivation in Benin, Côte d'Ivoire, Mali, and Senegal, reinforcing the role of economic resources in improving access to healthcare, nutrition, and safe living conditions (Wagstaff, 2002; Victora, 2007; Gwatkin et al., 2000).

The number of young children in the household is positively associated with health deprivation in Benin, Mali, and Senegal. The physical, emotional, and resource-related demands of childcare may contribute to maternal health stress and reduced healthcare access (Ahmed et al., 2010; Yaya et al., 2018).

Place of residence produces contrasting effects across countries. In Benin, rural women are less likely to be deprived, likely due to the effectiveness of community-based health worker programs that strengthen household-level health promotion and facilitate access to primary care

services (Okonofua et al., 2022). In contrast, in Côte d'Ivoire and Mali, rural residence significantly increases health deprivation, reflecting persistent inequalities related to infrastructure, healthcare workforce distribution, and geographic accessibility (Kabubo-Mariara et al., 2013; WHO, 2023). These contrasting effects underscore the need for territorialized health policies sensitive to local institutional contexts.

Contextual health environments also play a significant role. In Benin, Burkina Faso, and Mali, the regional average health deprivation index is positively associated with individual deprivation, indicating clustering effects and shared structural vulnerabilities. This suggests that community-level conditions—such as weak healthcare systems, social norms, and collective behavioral patterns—shape individual health outcomes. Conversely, in the same countries, higher regional contraceptive prevalence rates reduce the likelihood of health deprivation, highlighting the role of accessible and effectively delivered reproductive health services in improving women's health outcomes.

Table N°8: Determinants of Women's Multidimensional Health in WAEMU

Variables	Benin	Burkina Faso	Côte d'Ivoire	Mali	Senegal
Child's age (in months)	-0.001 (0.001)	0 (0.003)	0.002 (0.003)	0 (0.002)	0.007** (0.003)
Child's sex (ref: Male)					
Female	0.009 (0.03)	-0.048 (0.052)	0.023 (0.06)	0.088* (0.05)	0.116** (0.055)
Twins (ref: Singleton)					
Twin birth	-0.216** (0.102)	-0.3 (0.184)	0.034 (0.192)	-0.112 (0.191)	0.175 (0.212)
Mother's age	-0.015*** (0.002)	-0.003 (0.004)	-0.009* (0.005)	0 (0.004)	-0.007* (0.004)
Marital status (ref: Married)					
Living with a partner	-0.044 (0.038)	0.077 (0.059)	-0.164*** (0.061)	-0.867* (0.5)	-0.376 (0.42)
Woman's education (ref: None)					
Primary	-0.042 (0.044)	-0.097 (0.082)	-0.153* (0.087)	-0.164** (0.078)	-0.096 (0.075)
Secondary	-0.126** (0.052)	-0.079 (0.085)	-0.215** (0.109)	-0.129 (0.092)	-0.036 (0.079)
Higher education	0.104 (0.148)	0.525* (0.307)	-0.309 (0.286)	0.188 (0.247)	0.085 (0.21)
Partner's education (ref: None)					
Primary	-0.114*** (0.043)	-0.253*** (0.084)	-0.224*** (0.085)	-0.353*** (0.093)	-0.008 (0.093)
Secondary	-0.161*** (0.048)	-0.218** (0.095)	-0.093 (0.094)	-0.21** (0.092)	0.131 (0.104)
Higher education	-0.211** (0.083)	0.367* (0.217)	-0.298* (0.176)	-0.29* (0.153)	-0.118 (0.14)
Don't know	-0.211***	-0.058	-0.175	-0.225*	0.016 (0.102)

	(0.078)	(0.148)	(0.206)	(0.132)	
Residence (ref: Urban)					
Rural	-0.09*** (0.035)	0.03 (0.075)	0.171** (0.076)	0.264*** (0.079)	-0.04 (0.076)
Household size	-0.005 (0.006)	0.003 (0.009)	-0.004 (0.013)	-0.009 (0.011)	-0.002 (0.006)
Number of children < 5	0.038** (0.017)	-0.009 (0.029)	0.059 (0.04)	0.068** (0.032)	0.047** (0.021)
Household head (ref: Male)					
Female	-0.208*** (0.045)	0.03 (0.09)	0.035 (0.099)	0.03 (0.077)	-0.087 (0.071)
Age of household head	-0.003** (0.001)	0 (0.002)	0.001 (0.003)	0.001 (0.002)	0.001 (0.002)
Wealth index (ref: Poorest)					
Poor	-0.357*** (0.047)	0.021 (0.082)	-0.131* (0.08)	-0.016 (0.079)	-0.286*** (0.075)
Middle	-0.445*** (0.048)	-0.043 (0.081)	-0.417*** (0.09)	-0.183** (0.079)	-0.462*** (0.092)
Rich	-0.523*** (0.05)	-0.133 (0.089)	-0.558*** (0.116)	-0.417*** (0.08)	-0.288*** (0.108)
Richest	-0.685*** (0.06)	-0.11 (0.119)	-0.739*** (0.158)	-0.564*** (0.119)	-0.297** (0.133)
Regional health deprivation index	2.285*** (0.121)	1.891*** (0.294)	0.652* (0.339)	0.394 (0.241)	-0.108 (0.423)
Regional contraceptive prevalence	-1.082*** (0.223)	-0.995*** (0.282)	0.254 (0.43)	-1.283*** (0.36)	0.343 (0.29)
Mean dependent var	0.482	0.559	0.502	0.511	0.463
Akaike crit. (AIC)	0.500	0.497	0.500	0.500	0.499
SD dependent var	7,437	2,419	1,856	2,681	2,098
Number of obs	9243.885	3255.837	2440.113	3463.989	2878.370
Chi-square	1026.113	136.642	167.839	280.913	74.575
Prob > chi2	0.000	0.000	0.000	0.000	0.000

Note: Standard errors are in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1.

Source : Authors' estimations based on DHS data

Conclusion and Policy Implications

The empirical results highlight the multidimensional nature of health deprivation among women in the WAEMU region. The analysis of individual, household, and contextual determinants reveals the combined influence of structural and environmental factors in shaping women's health outcomes. Variables such as age, educational level (including that of the partner), household wealth status, place of residence, and the number of young children significantly contribute to the likelihood of experiencing multidimensional health deprivation. Moreover, the strong associations identified with contextual variables—such as the regional average deprivation index and contraceptive prevalence rates—demonstrate that women's health is not merely an individual condition but is deeply embedded in socioeconomic, cultural, and institutional environments. The presence of clustering effects suggests that local health

ecosystems and community-level norms play a decisive role in shaping access to healthcare and the realization of health well-being.

These findings carry significant implications for public policy. Targeted interventions should prioritize young women, those with limited education, rural residents, and economically disadvantaged households. Strengthening the synergy between education and health policies is crucial, especially through reproductive health education and literacy programs. Rural health services must be reinforced through improved infrastructure, personnel deployment, and effective decentralization. Similarly, family planning programs must be culturally sensitive while ensuring accessibility and confidentiality. The importance of territorialized health strategies implies the need for decentralized and region-specific policies that address local disparities. Women's empowerment—particularly in terms of decision-making autonomy within households—emerges as a key lever to reducing health deprivation.

However, this study is subject to certain limitations. It is based on data from only five WAEMU countries, due to variations in data availability and comparability across the region, which may limit the generalization of the findings to all member states. In addition, the cross-sectional nature of the data does not allow for capturing temporal dynamics or establishing causal relationships. Future research could broaden the geographical scope to include all WAEMU countries as more reliable datasets become available, and employ longitudinal or panel data to analyze changes in women's health deprivation over time. Complementary qualitative research—such as interviews and participatory methods—could also provide deeper insights into cultural norms, intra-household power relations, and health-seeking behaviors that are not fully observable in quantitative data.

In conclusion, addressing multidimensional health deprivation among women in the WAEMU region requires integrated, equitable, and context-sensitive policy strategies. Such an approach is essential to advancing progress toward the Sustainable Development Goals, particularly those related to maternal health, gender equality, and the reduction of social and territorial inequalities. The study contributes to the literature by demonstrating the importance of considering both individual and contextual determinants of women's health and by highlighting the need for policies that are simultaneously targeted, multisectoral, and territorially differentiated.

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