Public Health Nutrition: 26(12), 2748–2757 doi:10.1017/S1368980023002197

Prevalence and factors associated with the coexistence of overweight/obesity and anaemia among women of reproductive age in Guinea

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Submitted 5 January 2023: Final revision received 7 September 2023: Accepted 6 October 2023: First published online 19 October 2023

Abstract

Objective: To determine the prevalence and associated factors of the coexistence of overweight or obesity (OWOB) and anaemia among non-pregnant Guinean women aged 15–49 years.
Design: The analysis was performed using data from the 2018 Guinean Demographic and Health Survey. Multivariate logistic regression was used to identify factors associated with the coexistence of OWOB and anaemia (OWOB + anaemia) among non-pregnant Guinean women.
Setting: Guinea
Participants: A total of 4783 non-pregnant women aged 15–49 years with valid data on the nutritional status (BMI and Hb level) were included in the analysis.
Results: The prevalence of coexistence of OWOB and anaemia among non-pregnant women was 11·16 % (95% CI: 10·05, 12·37). The following variables were associated with OWOB + anaemia in multivariate models (adjusted OR (AOR) 95% CI): higher wealth index (AOR = 4·69; 95% CI: 2·62, 8·39), middle wealth index (AOR = 1·96; 95% CI: 1·31, 2·93), four or more antenatal visits (AOR = 1·62; CI: 1·16, 2·28), having four or more children (AOR = 2·47; 95% CI: 1·37, 4·43) and the rural areas (AOR = 0·59; 95% CI: 0·37, 0·95).
Conclusion: The current study's findings reveal that OWOB + anaemia concerned one-tenth of non-pregnant women. Associated factors were household wealth index, multiparity, antenatal visits and rural areas. Thus, there is a need to design specific interventions to prevent the double burden of malnutrition among women of reproductive age. Interventions should include promoting physical exercise, family planning, healthy eating and raising awareness of behavioural change.

Keywords
Overweight or obesity
Anaemia
Coexistence
Women
Guinea

Malnutrition is a real global public health problem affecting young children and women. According to the Global Nutrition Report 2021, 40·8 % of all women worldwide were overweight and 29·9 % of all girls and women aged 15–49 years had anaemia[1]. Maternal anaemia is associated with maternal and newborn mortality and morbidity. Therefore, one of the global nutrition targets is the 50 % reduction in anaemia among women of reproductive age by 2025[2]. Malnutrition is widespread in the African region, with a high prevalence of undernutrition, overweight and diet-related non-communicable diseases[3]. According to the WHO, the coexistence of undernutrition and overweight/obesity (OWOB) or diet-related non-communicable diseases is called the double burden of malnutrition. The double burden of malnutrition can exist within individuals, households, populations and across the life course[4]. At an individual level, the coexistence of OWOB and anaemia is one of the forms of the double burden of malnutrition. On the one hand, this can be explained by the dietary and nutritional transition resulting from societal changes characterised in particular by high energy intakes, low micronutrient intakes and a reduction in physical activity[5]. On the other hand, the rise in hepcidin levels in obese individuals is thought to reduce iron absorption and lead to anaemia[6,7].

The coexistence of OWOB and anaemia is influenced by economic growth, globalisation, urbanisation and the

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nutritional transition[4,8–10]. It negatively impacts individuals, increasing health expenditures, reducing productivity and slowing economic growth[4].

The coexistence of OWOB and anaemia varies considerably from country to country. A study conducted among Mexican women aged 15–49 found a prevalence of coexistence of overweight and anaemia of 7·4 %[11]. The study conducted among non-pregnant Colombian women aged 13–49 found a prevalence of coexistence of OWOB and anaemia of 12·8 %[12].

In Africa, the prevalence of the coexistence of OWOB and anaemia among women aged 15–49 was 6·7 % in a study combining data from recent demographic surveys of twenty-three countries in sub-Saharan Africa[13]. In Ghana, a study conducted on women aged 15–49 using data from the 2014 Demographic and Health Survey (DHS) found a prevalence of the coexistence of OWOB and anaemia of 12·4 %[14]. Various studies have found a positive association between household wealth index[14,15], multiparity[12,16,17] and the coexistence of OWOB and anaemia among women.

Guinea is not on track to meet global nutrition target 2025. According to the results of the 2018 DHS, 27 % of women of childbearing age were overweight and 46 % suffered from anaemia[18]. It is possible that both types of malnutrition can coexist in the same women. To our knowledge, no study has yet explored the factors associated with the coexistence of OWOB and anaemia in women of childbearing age. To fill these knowledge gaps, this study was conducted to examine the factors associated with the coexistence of OWOB and anaemia in women aged 15–49 in Guinea.

Methods

Study design and population

The present study is based on an analysis of Guinea DHS-2018 data. The DHS-2018 was a nationally representative household survey. The survey collected data on the fertility, socioeconomic status, health status and nutritional status of participating households and individuals. It was carried out by the National Institute of Statistics with the technical support of the World Program of DHS (Program DHS, ICF/USAID). Two-stage stratified cluster sampling was used based on a list of enumeration areas from the 2014 census. In each region, apart from Conakry, two strata have been formed: the urban environment and the rural environment. In total, fifteen sampling strata were formed and 401 enumeration areas were drawn proportionally to size, including 138 in urban areas and 263 in rural areas. All women aged 15–49 years from the selected households in the eight administrative regions of Guinea (Conakry, Boké, Faranah, Kankan, Kindia, Labé, Mamou and N'zérékoré) were eligible to be interviewed for the household survey. The total sample was 10 874 women aged 15–49 in the 2018 DHS. A nationally representative household sub-sample was drawn for anthropometric measurements and Hb levels[18]. All women aged 15–49 (n 5237) in this sub-sample were eligible for Hb and anthropometric (weight and height) measurements (Fig. 1).

Anthropometric measurements and nutritional status

Data on anthropometry (weight and height) and Hb were gathered for women who consented. Weights were measured using SECA electronic scales. While height measurements were taken using measuring rods in standing position. Before blood collection, the finger was cleaned with an alcohol swab. The finger was dried in the open air, and then, the investigator performed a prick on the palmar surface of the end of the finger (or the heel) using a self-retracting, sterile and non-reusable lancet. A drop of blood was collected from a HemoCue microcuvette and inserted into the photometer which displayed the level of Hb. Hb level was adjusted for altitude[19,20]. Participants with Hb < 120 g/dl were classified as anaemic, while those with Hb > 120 g/dl were classified as not anaemic[20]. BMI Z-scores for age were calculated for adolescent girls according to WHO standards. Scores less than two SD above the median but greater than or equal to one SD were classified as overweight, and those with Z-scores greater than or equal to two were classified as obese[21,22]. Using the standard WHO's cut-off points, BMI categories were defined as underweight (< 18·5 kg/m^2), normal weight (18·5–24·99 kg/m^2), OWOB (≥ 25·0 kg/m^2) for women 19 years and older[23].

Outcome variable

The two components of malnutrition were anaemia and OWOB in women. The coexistence of OWOB and anaemia in women was coded '1' and the absence coded '0'.

Independent variables

These household and individual factors constituted the independent variables for the study. These included the woman's age, age at birth of first child, marital status, level of education, current working, husband's education level, parity, iron folic acid supplementation during pregnancy, delivered by caesarean, household size, household wealth index, currently breastfeeding, ethnicity, antenatal consultation, place of residence (rural and urban area) and administrative region. The household wealth index was calculated by assigning scores to households based on the number and type of assets consumer goods owned, goods ranging from a television to a bicycle or bicycle, and on dwelling characteristics such as source of drinking water, type of toilets used and flooring material. These scores were generated using principal component analysis. Economic welfare tertile was constructed by dividing the distribution into three equal categories.

https://doi.org/10.1017/S1368980023002197 Published online by Cambridge University Press

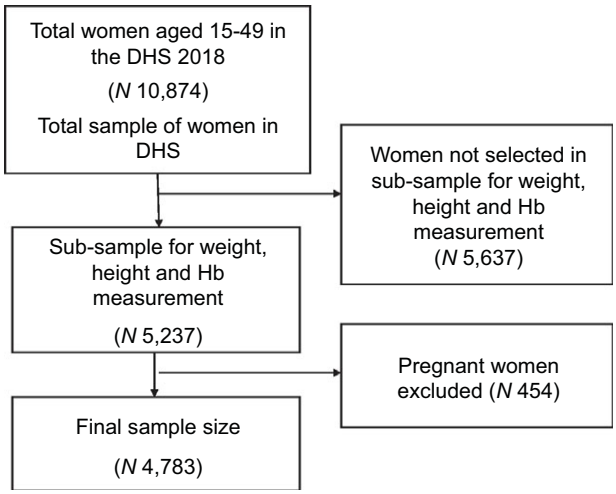

Fig. 1 Flow chart for sample size selection

Statistical analysis

All analyses were conducted in Stata 14·2 software using survey weights 'svy' to generate results representative of women in Guinea. Descriptive statistics, including frequencies and percentages, were computed for all the variables. Cross-tabulations with chi-square tests were used to show the variation of underweight, normal weight, OWOB, anaemia and coexistence of OWOB and anaemia among women. Multicollinearity was checked using the variance inflation factor. The marital status variable was excluded because of its collinearity. To examine the independent effect of the covariates, we performed logistic regression. Crude OR and adjusted OR(AOR) were calculated to examine the probability of coexistence of OWOB and anaemia among women. The explanatory variables that had a *P*-value < 0·2 in the bivariate logistic regression analysis were reintegrated into the multivariate logistic regression. OR and their 95 % CI were reported. The significance level was set at a *P*-value < 0·05.

Results

Sociodemographic characteristics of participants

A total of 4783 women aged 15–49 years were selected for this study (Fig. 1). The weighted mean age of the women was 28·57 (±0·29) years. Table 1 describes the socio-demographic characteristics of the participants. 21·34% of women are teenagers. About 41·52 % of the women were under eighteen at the time of their first birth, 68·2% were married, the majority (67·7%) had no education and only 27·7% were breastfeeding at the time of the survey. Among the women, 63% lived in rural areas and 34% had at least four children.

Proportion of underweight, normal weight, OWOB, anaemia, coexistence of OWOB and anaemia

Table 2 presents the percentage distribution of underweight, normal weight and OWOB according to the characteristics of women in Guinea. The prevalence of the underweight, normal weight and OWOB was 6·7 % (95 % CI: 5·8, 7·6), 66·7 % (95 % CI: 64·8, 68·7) and 26·6 % (95 % CI: 24·7, 28·5), respectively.

Table 3 presents the prevalence of the anaemia, coexistence OWOB and anaemia among the women. The prevalence of anaemia was 45·64 % (95 % CI: 43·8, 47·5). Women living in the Kindia region had a higher prevalence of the anaemia than women in other regions. The prevalence of the coexistence OWOB and anaemia was 11·16 % (95 % CI: 10·05, 12·37). The prevalence of the OWOB and anaemia increased with the woman's age, the husband's level of education, the household wealth index, the number of antenatal visits and parity. Women in couples had a higher prevalence of the OWOB and anaemia than women not in couples. Working women had a higher prevalence of the OWOB and anaemia than non-working women. Women who had given birth by caesarean section had a higher prevalence of the OWOB and anaemia than women who had given birth vaginally. Women living in urban areas had a higher prevalence of the OWOB and anaemia than women living in rural areas. Women living in Conakry had a higher prevalence of the OWOB and anaemia than women living in other regions.

Factors associated with the coexistence of the coexistence OWOB and anaemia

Table 4 presents the factors associated with the coexistence OWOB and anaemia among women aged 15–49 years. In this study, women's age, currently working, husband's level of education, ethnicity, household wealth index, parity, number of antenatal visits, currently breast-feeding, caesarean delivery section, place of residence and region showed an association in bivariate logistic analysis and were reintroduced in multivariate logistic regression. The presence of the coexistence OWOB and anaemia showed a statistically significant positive association with higher wealth index (AOR = 4·69; 95 % CI: 2·62, 8·39), middle wealth index (AOR = 1·96; 95 % CI: 1·31, 2·93), four or more antenatal visits (AOR = 1·62; CI: 1·16, 2·28) and having four or more children (AOR = 2·47; 95 % CI: 1·37, 4·43).

In addition, the rural area (AOR = 0·59; 95 % CI: 0·37, 0·95), the region of Faranah (AOR = 0·37; 95 % CI: 0·20, 0·70), Labe (AOR = 0·45; 95 % CI: 0·22, 0·92) and Mamou (AOR = 0·48; 95 % CI: 0·23, 0·99) were found to be protective against the coexistence of OWOB and anaemia.

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Table 1 Sociodemographic characteristics of the respondents (*n* 4783). Data from the Guinea Demographic and Health Survey 2018

Characteristics	Number	(%)*
Age group (year)		
15–18	988	21·34
19–34	2309	48·32
35 and over	1486	30·34
Age at birth of first child (year)		
Under 18	1445	41·52
18–29	1919	55·94
30 and over	87	2·54
Marital status		
Married/cohabiting	3318	68·23
Single	1465	31·77
Level of education		
No education	3290	67·74
Primary	581	12·28
Secondary or more	912	19·98
Currently working		
No	1831	37·02
Yes	2952	62·98
Husband's level of education		
No education	2397	72·37
Primary	251	7·45
Secondary or more	630	20·17
Number of antenatal visits		
Less than 4	1628	67·54
At least 4	788	32·46
Ethnic group		
Soussou	914	20·24
Fulani	1914	35·54
Malinke	1300	27·65
Foresters/other	655	16·57
Parity		
0–1	1913	41·6
2–3	1149	23·77
4 or more	1721	34·63
Delivered by caesarean		
No	2380	97·14
Yes	71	2·86
Number IFA taking during pregnancy		
Less than 90	1295	67·27
At least 90	620	32·73
Currently breastfeeding		
No	3413	72·25
Yes	1370	27·75
Household size		
1–4	848	17·93
5–9	2625	54·52
10 or more	1310	27·55
Household Wealth Index		
Poorer	1595	32·9
Middle	1594	33·11
Higher	1594	33·99
Place of residence		
Urban	1747	36·7
Rural	3036	63·3
Administrative region		
Boké	609	16·69
Conakry	666	10·45
Faranah	610	9·82
Kankan	501	11·67
Kindia	595	13·97
Labé	532	10·25
Mamou	574	9·36
N'zérékoré	696	17·78

IFA: Iron folic acid.
*(%): Weighted percentage.

Discussion

This study explored the prevalence and factors associated with the coexistence of OWOB and anaemia among women aged 15–49 years in Guinea. The prevalence of anaemia and OWOB was 45·6 % and 26·6 %, respectively. The prevalence of the coexistence OWOB and anaemia among women was 11·16 %. The transition from a traditional local diet to a diet characterised by the consumption of energy-dense foods, the rapid urbanisation of the population and the lack of physical activity have contributed to increased overweight among women of reproductive age in sub-Saharan Africa[4,8–10]. Low consumption of iron-rich foods, increased requirements during pregnancy, iron losses during menstruation, poor hygiene, sanitary conditions and malaria are determining factors in the occurrence of anaemia in sub-Saharan Africa[2,13,24]. Various studies on the coexistence of OWOB and anaemia in women have been conducted and the prevalence ranges from one region to another. A study on the extent and determinants of the double burden of malnutrition at the individual level in a rural population in southern India found a prevalence of the coexistence of OWOB and anaemia of 23·1 % among non-pregnant women over the age of 19[25]. These results are not directly comparable, as this study was carried out only in rural areas and used BMI thresholds for Asian populations (overweight for BMI ≥ 23 kg/m^2) that are different from the thresholds used in our study[25]. Another study conducted in women of childbearing age with data from seventeen national surveys spanning low- and middle-income countries and high-income countries from the 'Biomarkers Reflecting Inflammation and Nutritional Determinants of Anaemia' project found a prevalence of the coexistence of OWOB and anaemia of 8·6 %[15]. In addition, this study grouped together surveys carried out in high-, middle- and low-income countries, but only took into account the median prevalence of the different surveys. A national micronutrient survey conducted among non-pregnant women aged 15–49 years in Malawi from 2015–2016 showed a prevalence of coexistence of OWOB and anaemia of 3·4 %[26]. It is not surprising that the prevalence of OWOB and anaemia is low in Malawi compared to Guinea, as only 19·9 % of women in Malawi suffered from anaemia and 14·5 % were OWOB[26].

The link between obesity and anaemia is still controversial in the literature. The results of a meta-analysis showed that the prevalence of iron deficiency was higher in OWOB populations than in non-overweight populations[27]. According to certain studies, the increase in hepcidin levels in obese people leads to a disturbance in iron homeostasis and reduces its absorption, resulting in anaemia[6,7,28].

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Table 2 Proportion of underweight, normal weight and overweight/obesity among women aged 15–49 (*n* 4783). Data from the Guinea Demographic and Health Survey 2018

Characteristics	Underweight (%)	Normal weight (%)	Overweight/obese (%)	*P*
Age group (year)				< 0·001
15–18	3·4	83·5	13·1	
19–34	8·04	66·19	25·76	
35 and over	6·81	55·83	37·36	
Age at birth of first child (year)				0·007
Under 18	5·31	67·01	27·61	
18–29	7·76	61·11	31·13	
30 and over	6·8	63·91	29·3	
Marital status				< 0·001
Married/cohabiting	6·72	63·49	29·79	
Single	6·59	73·72	19·68	
Level of education				0·029
No education	6·7	68·1	25·2	
Primary	7·68	65·72	26·6	
Secondary or more	5·98	62·78	31·24	
Currently working				< 0·001
No	8·31	72	19·69	
Yes	5·72	63·65	30·63	
Husband's level of education				< 0·001
No education	7·35	67·07	25·58	
Primary	7	56·6	36·41	
Secondary or more	4·25	53·94	41·81	
Number of antenatal visits				< 0·001
Less than 4	7·63	70·84	21·53	
At least 4	6·3	59·02	34·69	
Ethnic group				< 0·001
Soussou	3·46	61·82	34·71	
Fulani	10·5	68·65	20·86	
Malinke	4·39	67·76	27·84	
Foresters/other	6·22	66·98	26·8	
Parity				< 0·001
0–1	6·42	73·01	20·57	
2–3	6·69	67·14	26·17	
4 or more	6·98	58·94	34·08	
Delivered by caesarean				< 0·001
No	7·31	67·56	25·13	
Yes	1·08	53·2	45·71	
Number IFA taking during pregnancy				0·641
Less than 90	6·97	66·99	24·05	
At least 90	6·71	64·9	28·4	
Currently breastfeeding				< 0·001
No	6·67	64·88	28·45	
Yes	6·71	71·59	21·7	
Household size				0·555
1–4	7·58	66·3	26·11	
5–9	6·64	65·97	27·4	
10 or more	6·17	68·57	25·26	
Household Wealth Index				< 0·001
Poorer	8·81	75·85	15·35	
Middle	6·56	69·06	24·39	
Higher	4·73	55·68	39·59	
Place of residence				< 0·001
Urban	4·66	57·19	38·14	
Rural	7·85	72·28	19·87	
Administrative region				< 0·001
Boké	6·99	62·02	30·99	
Conakry	5·13	51·62	43·25	
Faranah	6·73	76·52	16·75	
Kankan	3·75	71·78	24·46	
Kindia	4·6	70·3	25·1	
Labé	12·54	70·06	17·4	
Mamou	8·71	72·21	19·09	
N'zérékoré	7·02	67·42	25·55	
Overall	6·7	66·7	26·6	
95 % CI	5·8, 7·6	64·8, 68·7	24·7, 28·5	

IFA: Iron folic acid.
Pearson's chi-square test was used for multiple comparisons.

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Table 3 Prevalence of anaemia and OWOB + anaemia according to categories in women aged 15–49 years (*n* 4783). Data from the 2018 Guinea Demographic and Health Survey

	Anaemia		Anaemia + OWOB	
Characteristics	(%)*	*P*	(%)*	*P*
Age group (year)				
15–18	47·35		6·41	
19–34	44·87	0·449	10·66	< 0·001
35 and over	45·66		15·28	
Age at birth of first child (year)				
Under 18	47·32		11·98	
18–29	44·90	0·278	13·13	
30 and over	39·85		7·51	0·200
Marital status				
Married/Cohabiting	46·05		12·67	
Single	44·75	0·452	7·91	< 0·001
Level of education				
No education	46·26		10·70	
Primary	47·05		11·61	
Secondary or more	42·64	0·166	12·42	0·418
Currently working				
No	44·48		7·86	
Yes	46·32	0·241	13·10	< 0·001
Husband's level of education				
No education	46·08		10·91	
Primary	46·67		19·30	
Secondary or more	45·94	0·984	16·32	< 0·001
Number of antenatal visits				
Less than 4	46·37		8·60	
At least 4	45·69	0·788	16·57	< 0·001
Ethnic group				
Soussou	49·49		14·55	
Fulani	44·06		7·59	
Malinke	47·05		13·53	
Foresters/other	41·98	0·056	10·71	< 0·001
Parity				
0–1	45·42		8·41	
2–3	44·64		10·74	
4 or more	46·59	0·648	14·74	< 0·001
Delivered by caesarean				
No	44·69		10·77	
Yes	48·11	0·058	23·18	0·005
Number IFA taking during pregnancy				
Less than 90	45·58		11·07	
At least 90	46·29	0·834	13·57	0·200
Currently breastfeeding				
No	46·19		11·55	
Yes	47·19	0·882	10·15	0·194
Household size				
1–4	46·52		10·58	
5–9	44·09		10·98	
10 or more	48·23	0·085	11·88	0·695
Household Wealth Index				
Poorer	46·55		6·20	
Middle	45·61		10·63	
Higher	44·78	0·692	16·47	< 0·001
Place of residence				
Urban	43·51		14·68	
Rural	46·87	0·067	9·12	< 0·001
Administrative region				
Boké	43·97		13·91	
Conakry	48·79		16·78	
Faranah	43·62		6·26	
Kankan	46·83		12·62	
Kindia	57·06		12·21	
Labé	37·21		4·24	
Mamou	46·09		7·82	
N'zérékoré	41·33	< 0·001	10·93	< 0·001
Overall prevalence	45·64		11·16	
95 % CI	43·82, 47·47		10·05, 12·37	

OWOB: Overweight/obesity; IFA: Iron folic acid.
*(%): Weighted percentage. Pearson's chi-square test was used for multiple comparisons.

https://doi.org/10.1017/S1368980023002197 Published online by Cambridge University Press

Table 4 Bivariate and multivariate logistic regression of factors associated with OWOB + anaemia among women aged 15–49 (*n* 4783). Data from the Guinea Demographic and Health Survey 2018

Characteristics	OR	95 % CI	AOR	95 % CI
Age group (year)				
15–18		Ref.		Ref.
19–34	1·74	1·28, 2·36***	0·85	0·35, 2·07
35 and over	2·63	1·93, 3·59***	0·99	0·39, 2·57
Age at birth of first child (year)				
Under 18		Ref.		
18–29	1·11	0·90, 1·38		
30 and over	0·60	0·29, 1·23		
Level of education				
No education		Ref.		
Primary	1·10	0·78, 1·54		
Secondary or more	1·18	0·92, 1·52		
Currently working				
No		Ref.		Ref.
Yes	1·77	1·40, 2·23***	1·20	0·85, 1·69
Husband's level of education				
No education		Ref.		Ref.
Primary	1·95	1·33, 2·86**	1·37	0·83, 2·27
Secondary or more	1·59	1·19, 2·14**	0·80	0·53, 1·22
Number of antenatal visits				
Less than 4		Ref.		Ref.
At least 4	2·11	1·56, 2·86***	1·62	1·16, 2·28**
Ethnic group				
Soussou		Ref.		Ref.
Fulani	0·48	0·36, 0·65***	0·87	0·53, 1·43
Malinke	0·92	0·67, 1·26	1·16	0·64, 2·09
Foresters/other	0·70	0·47, 1·06	0·82	0·37, 1·82
Parity				
0–1		Ref.		Ref.
2–3	1·31	0·99, 1·73	1·72	0·96, 3·05
4 or more	1·88	1·50, 2·36***	2·47	1·37, 4·43**
Currently breastfeeding				
No		Ref.		Ref.
Yes	0·86	0·69, 1·08	0·90	0·66, 1·23
Delivered by caesarean				
No		Ref.		Ref.
Yes	2·50	1·30, 4·79**	1·85	0·89, 3·84
Number IFA taking during pregnancy				
Less than 60		Ref.		
At least 60	1·23	0·89, 1·70		
Household size				
1–4		Ref.		
5–9	1·04	0·75, 1·44		
10 or more	1·14	0·83, 1·57		
Household Wealth Index				
Poorer		Ref.		Ref.
Middle	1·80	1·34, 2·42***	1·96	1·31, 2·93**
Higher	2·98	2·25, 3·97***	4·69	2·62, 8·39***
Place of residence				
Urban		Ref.		Ref.
Rural	0·58	0·46, 0·74***	0·59	0·37, 0·95*
Administrative region				
Boké		Ref.		Ref.
Conakry	1·25	0·88, 1·78	0·80	0·44, 1·47
Faranah	0·41	0·27, 0·64***	0·37	0·20, 0·70**
Kankan	0·89	0·58, 1·38	0·72	0·36, 1·43
Kindia	0·86	0·59, 1·26	0·70	0·42, 1·19
Labé	0·27	0·16, 0·48***	0·45	0·22, 0·92*
Mamou	0·53	0·35, 0·79**	0·48	0·23, 0·99*
N'zérékoré	0·76	0·49, 1·18	1·13	0·55, 2·31

OR: Crude odds ratio; AOR: Adjusted OR; Ref.: Reference category; IFA: Iron folic acid.
Multivariate logistic regression: adjusted covariates are age group, currently working, husband's level of education, number of antenatal visits, ethnic group, parity, currently breastfeeding, delivered by caesarean, household Wealth Index, place of residence, administrative region.
Statistical significance:
*$P < 0·05$.
**$P < 0·01$.
***$P < 0·001$.

https://doi.org/10.1017/S1368980023002197 Published online by Cambridge University Press

In this study, the coexistence OWOB and anaemia among women was associated with household wealth index, parity, rural areas and administrative region. The risk of the double burden of malnutrition increased with household wealth index. Various studies have shown a positive association between the double burden of malnutrition and the higher wealth index. In high-income countries, high socioeconomic status is negatively associated with the coexistence of OWOB and anaemia among women, while in low-income countries, high socioeconomic status is positively associated with the coexistence of OWOB and anaemia among women[15]. Two studies conducted in Ghana and the fifteen countries in sub-Saharan Africa showed a positive association between the coexistence of OWOB and anaemia and household wealth quintile[14,29]. In low-income countries, wealthy households are at risk of obesity[30]. Lack of physical activity and wealthy households' access to hearty meals that are high in fat, high in calories and low in micronutrients are determining factors[13]. Another factor related to OWOB among women would be their perception of body image, according to which overweight is a sign of well-being[31–33].

Women with four or more children were more likely to suffer from the coexistence of OWOB and anaemia than women with at most one child. This result corroborates those of other studies showing that multiparity increases the risk of suffering from OWOB[12,16,17]. Several studies have shown that the significant gestational weight gain may contribute to maternal weight retention in the long term. This gestational weight gain would be related to physiological changes, dietary behaviour and physical inactivity during pregnancy[34–36].

Four or more antenatal visits were positively associated with the coexistence of OWOB and anaemia in women. We did not find any data in the literature for a comparison. However, this result could be because overweight and anaemic women are more likely to keep appointments than those who are not.

In southern India, the rural area was a protective factor for the coexistence of OWOB and anaemia in women[25]. The urban area is positively associated with the coexistence of OWOB and anaemia in women in a context of deforestation in sub-Saharan Africa[29]. The likelihood of a woman of childbearing age being simultaneously overweight and anaemic was higher in per-urban and urban areas than in rural area[37].

Women in the regions of Faranah, Labe and Mamou were less at risk of the coexistence of OWOB and anaemia. This region had the lowest prevalence of overweight among women aged 15–49 years compared to other regions[18]. These regions are among the poorest in Guinea, with a poverty line above the national average (55·2 %)[38].

The factors associated with the coexistence of OWOB and anaemia in this study are the factors associated with OWOB. This can be explained by the fact that in our study, the prevalence of obesity varied according to social category, ranging from 13·1 % to 45·7 %. Apart from administrative region, the prevalence of anaemia was almost homogeneous across social categories, ranging from 39·5 % to 49·5 %. These results show that all social categories are highly exposed to anaemia and that integrated actions to prevent and combat anaemia should be carried out at population level.

This study has some limitations. Deficiencies of other micronutrients were not included in this study. Determinants such as dietary intake, physical activity, and socio-cultural influences were not assessed. Despite these limitations, the strengths of this study are the use of a representative sample of the population. This study contributes to the evolution of knowledge by being the first to study the factors associated with the coexistence of OWOB and anaemia in women in Guinea.

Conclusion

This study showed that the coexistence of OWOB and anaemia concerned one-tenth of women aged 15–49 years. Household wealth index, multiparity, antenatal visits, rural area and region were the associated factors.

The findings of this study reinforce that malnutrition prevention programmes should not ignore the nutritional concerns of women of reproductive age to prevent the coexistence of OWOB and anaemia. These programmes should be associated with the gradual introduction of physical exercise, while fighting against a widespread perception of being overweight as a symbol of well-being and social accomplishment. Then, these programmes should include family planning and awareness raising for behaviour change.

Acknowledgements

The authors thank the Guinea National Institute of Statistics and the DHS Program for making the data available.

Financial support

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

Conflict of interest

The authors declare that they have no competing interests

Authorship

D.D., S.S. and F.K. designed and developed the study protocol. D.D., S.S., F.C. and A.D. designed the analytical

https://doi.org/10.1017/S1368980023002197 Published online by Cambridge University Press

plan. D.D., S.S. and F.K. performed the data analyses, interpreted the results and drafted the manuscript with input from F.C., D.C., M.K. and A.D. All authors critically revised and approved the final manuscript.

Ethics of human subject participation

As we used publicly available data, ethical approval was not required. However, permission to use the datasets was obtained from DHS Program: https://www.dhsprogram.com. The datasets used during the current study are accessible on https://dhsprogram.com/data/available-datasets.cfm

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