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Impact of Occupational Environment on Uptake of Routine Health Checkups Among Ghanaian Artisanal Miners

Abdoulaye Traoré[1], Oumar Coulibaly[1], Issa Koné[1]*

[1]Department of Health Systems Research, Faculty of Medicine, University of Bamako, Bamako, Mali.

***E-mail** ✉ issa.kone.hsr@outlook.com

ABSTRACT

The socio-economic consequences of unexpected health problems among mine workers are substantial. In Ghana's artisanal mining sector, miners typically bear the full responsibility for their own health care, making it crucial to understand the factors that shape their self-care practices. This study employed a cross-sectional survey of 500 artisanal gold miners and used a nested binary logistic regression model to examine how working conditions influence miners' decisions to voluntarily undertake routine medical checkups, even in the absence of adequate institutional support. Across all three models, indicators of working conditions significantly predicted the likelihood of seeking routine medical examinations. Miners who perceived their health, safety, and environmental conditions as favorable were more inclined to undergo routine checkups compared to those who reported poor conditions. In contrast, miners who rated their economic circumstances positively were *less* likely to pursue routine medical care relative to those who described poorer economic conditions. Additionally, routine checkups were less common among miners who failed to use protective measures at work and among those who had already experienced work-related health problems. Regarding compositional factors, miners with a senior high school education were more likely to seek routine medical care than those without formal schooling. Older miners also showed a greater likelihood of undergoing routine checkups compared to their younger peers. At the contextual level, miners working in shift systems and those employed in non-production departments demonstrated a higher probability of seeking routine medical examinations. Overall, the findings shed light on the complexities of self-care practices within the artisanal mining sector and point to ways these practices might be strengthened to promote a healthier workforce and its broader benefits. To enhance health awareness and preventive care among artisanal miners, a national dialogue is needed to address and improve their working conditions in Ghana.

Keywords: Goldmining, Artisanal mining, Working conditions, Routine medical checkup, Self-care culture, Ghana

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Introduction

Mineral extraction has taken place in Ghana for more than a millennium [1]. Growing global demand for minerals has driven a significant expansion of mining activities in the country. Ghana is now the leading gold producer in Africa and ranks seventh globally [2]. Artisanal mining represents a complex interaction among environmental, economic, technological, social, and health dimensions [3]. It is typically characterized by low skill levels, small-scale production, and limited financial resources [4]. Despite their small operational scale, the sheer number and concentration of artisanal miners generate considerable economic and social effects in developing countries [5]. In Ghana, artisanal mining serves as a primary livelihood for many rural households.

However, alongside its benefits, artisanal mining is widely regarded as a hazardous occupation [6]. The sector faces significant occupational health and safety concerns [5, 7-9]. Most artisanal mining operations lack long-term planning and rely heavily on rudimentary technology [3]. Miners often work under dangerous, labor-

intensive, and precarious conditions, heightening the risk of occupational injuries and diseases—especially in cases where personal protective equipment (PPE) is not used [10, 11]. These challenges persist partly because government regulation has not adequately addressed health and safety issues. For instance, Ghana's artisanal mining regulation (PNDC Law 218) mandates good mining practices without specifying what standards should be followed, leaving room for varied interpretations. Moreover, many artisanal mining operations are located in rural settings, frequently shaped by local customs [6]. Consequently, compliance mechanisms are minimal, reporting systems are weak or nonexistent, and resources to address health and safety concerns remain scarce [10]. Exposure to hazardous substances and unsafe conditions makes artisanal miners susceptible to various health problems [12]. Common illnesses include upper respiratory tract infections, pulmonary tuberculosis, silicosis, and dermatological conditions [13]. These occupational health issues carry substantial social and economic consequences for miners, their families, and their communities [14]. At the national level, the economic burden is also significant; mining-related health costs affect not only the workers but all who benefit from mining activity [13]. Occupational injuries and diseases are estimated to cost countries between 1% and 3% of GDP [14], and the International Labour Organization suggests that 4% of global GDP is lost due to workplace accidents and illnesses [15]. Such ill-health may result in disability, dependency on benefits (where available), premature retirement, loss of household income, and poverty.

The socio-economic implications of unexpected medical conditions are therefore severe. Good health protects individuals and families from economic hardship, social exclusion, and long-term suffering. In the artisanal mining context, miners are responsible for their own health care, making self-care practices crucial. While prior research has concentrated on unsafe health, safety, and environmental practices [13, 16-18], risk perception [19-22], and the economic effects of artisanal mining [23-25], no study has examined the complexities of self-care culture or strategies for strengthening it in the sector.

The artisanal mining industry in Ghana lacks clear, sector-specific regulations that ensure safe working conditions and help miners manage unforeseen health challenges. As a result, practices such as routine medical checkups become critical components of responsible self-care. Routine health examinations—comprising medical history, physical assessments, and screenings of asymptomatic individuals—support disease prevention and early detection [26]. Evidence indicates that routine checkups reduce morbidity and mortality by enabling timely preventive or curative interventions [27]. Against this backdrop, the present study aimed to assess how working conditions influence artisanal miners' decisions to voluntarily seek routine medical checkups, while accounting for relevant compositional and contextual factors, using a nested binary logistic regression approach. This modeling strategy allows for identifying the independent effect of key predictors after controlling for other variables.

Materials and Methods

Study area

The study took place in the southwestern region of Ghana **(Figure 1)**, an area underlain by the Birimian and Tarkwaian geological formations [28]. These formations account for the region's rich mineral deposits. This location offers an ideal context for examining how working conditions influence routine medical checkups among artisanal gold miners, as it contains the highest concentration of such miners per capita in the country.

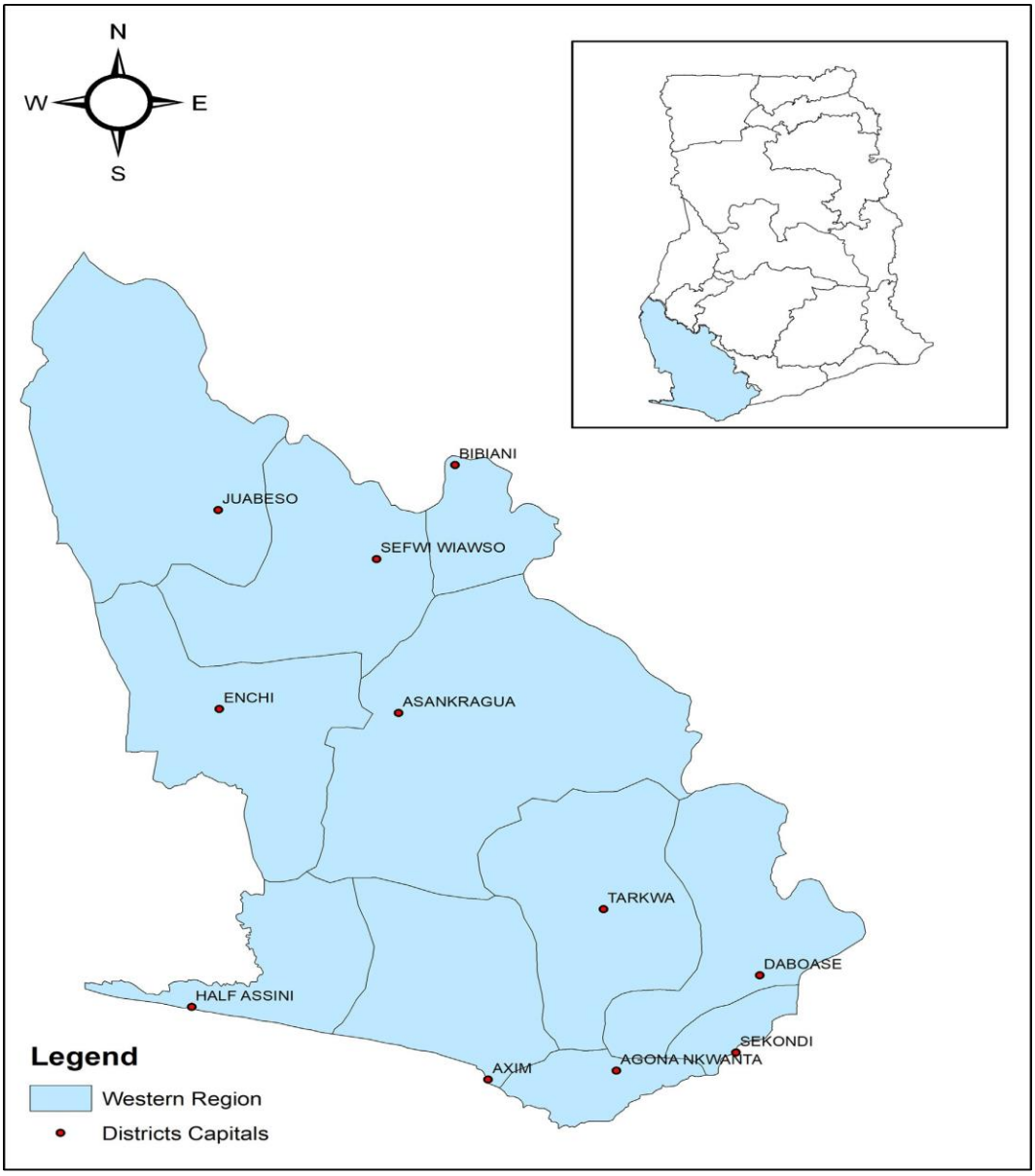

Figure 1. Map of the Western Region of Ghana.

Data collection and sampling procedure

A total of 20 artisanal small-scale (ASM) and medium-scale (AMM) mining sites were included in the study. Data were collected through a cross-sectional survey conducted between January 2018 and December 2019. The survey instrument was adapted from existing literature, refined, and subsequently approved by the Institutional Review Board of the University of Cape Coast, Ghana. The questionnaire consisted of three main sections—working conditions, compositional characteristics, and contextual factors—and featured exclusively closed-ended items that offered respondents multiple-choice options.

Miners from both the ASM and AMM subsectors were randomly selected at their respective work sites. Eligibility was limited to individuals aged 18 years and above who had been employed in mining for at least one month. Prior to the main survey, a pilot test involving 50 gold miners was conducted to evaluate and refine the questionnaire, ensuring it was suited to the study context. In total, 500 miners participated in the final survey, comprising 300 from ASM operations and 200 from AMM sites. The sample size was calculated using a 95% confidence level, an assumed population proportion of 50%, and a 5% margin of error.

As required by the Minerals Commission of Ghana [29], oral consent was obtained from all participants. Respondents were informed that participation was voluntary and that no financial incentives or coercion were involved.

Study variables

Dependent variable

The dependent variable for this study was the practice of routine medical checkups among artisanal gold miners. Participants were asked to report how frequently they underwent routine health examinations within a year. Miners who indicated that they voluntarily sought medical checkups were coded as "Yes," whereas those who reported never doing so were coded as "No."

Key predictor variables

The main explanatory variables in this study were measures of working conditions. These included miners' self-assessed health, safety, environmental, and economic conditions. Respondents rated ten items under each domain on a five-point scale ranging from "very poor" to "excellent." The aggregated scores for each domain were then used to classify conditions as either "poor" or "good."

An additional working-condition variable was constructed by combining two factors—use of personal protective measures and experience of work-related health problems. This yielded four mutually exclusive categories: "No Yes," "No No," "Yes No," and "Yes Yes."

For this study, **health** referred to miners' functional wellbeing, encompassing emotional health, physical fitness, and changes in overall health status [30]. **Safety** captured the availability and use of appropriate personal protective equipment—such as gloves, goggles, protective clothing—and adherence to practices related to hazardous waste handling, noise exposure limits, and fall prevention [8]. **Environment** was defined broadly to include both physical and social dimensions of the work setting, such as access to necessary resources, perceptions of workspace quality, physical surroundings, and adequacy of space [9]. **Economic conditions** covered earnings, benefits, incentives, and workload—factors that collectively shape miners' productivity and financial security.

Compositional and contextual factors

Compositional factors in this study encompassed the socio-demographic characteristics of artisanal gold miners, including age, gender, marital status, educational attainment, and years of mining experience. Contextual factors referred to workplace-related variables such as work shift, department, and mining subsector.

The choice of key predictors, along with compositional and contextual variables, was guided by existing literature, theoretical relevance, practical significance, and the principle of parsimony in model selection.

Statistical analyses

The dataset was processed and analyzed using Stata 15 SE (StataCorp, College Station, Texas). Analysis began with descriptive statistics to summarize the distribution of predictors in relation to routine medical checkup behavior. Associations between routine checkups and working conditions, as well as compositional and contextual factors, were evaluated using Pearson's chi-square tests and Cramer's V.

To explore the influence of these factors on routine medical checkup uptake, both bivariate and multivariate binary logistic regression analyses were conducted, adjusting for relevant compositional and contextual covariates. Since 61% of miners reported attending routine medical checkups, the outcome variable exhibited an asymmetrical distribution, making the complementary log-log link function the most appropriate for modeling. Statistical significance was determined at the 0.05 level, with results reported using 95% confidence intervals.

Results and Discussion

Descriptive and bivariate analysis

Table 1 summarizes the sample characteristics by percentage. Participant ages ranged from 18 to 60 years, and years of mining experience varied from 1 to 52 years (M = 7.09, SD = 6.48). **Table 2** presents the distribution of predictor variables in relation to routine medical checkup behavior.

Notably, 84.5% of AMM miners reported attending routine medical checkups, compared to only 45.3% of ASM miners. Gender differences were also observed: 63.8% of male miners routinely went for medical checkups, whereas just 42.7% of female miners did so. Among miners with no formal education or only primary/junior high school education, 58.9% did not engage in routine medical checkups. Departmental differences were evident as

well; 80.6% of miners in non-production departments did not undergo routine checkups, while 51.3% of those in production-related roles also failed to attend regular medical examinations.

Table 1. Demographic characteristics of respondents.

Variable	Category	Frequency (N)	Percentage (%)
Age	18–24 years	166	33.2
	25–34 years	239	47.8
	35–54 years	67	13.4
	Above 55 years	28	5.6
Gender	Male	432	86.4
	Female	68	13.6
Marital Status	Single	332	66.4
	Married	168	33.6
Education	No formal education	202	40.4
	Senior High School	129	25.8
	Tertiary	169	33.8
Work Experience (years)	1–5	287	57.4
	6–10	116	23.2
	Above 10	97	19.4
Shift Work	No	392	78.4
	Yes	108	21.6
Department	Production	335	67.0
	Non-production	165	33.0
Subsector	ASM	300	60.0
	AMM	200	40.0
Health Conditions	Poor	89	17.8
	Good	411	82.2
Safety Conditions	Poor	249	49.8
	Good	251	50.2
Environmental Conditions	Poor	209	41.8
	Good	291	58.2
Economic Conditions	Poor	271	54.2
	Good	229	45.8
Self-protection & Health Problems	No / Yes	46	9.2
	No / No	67	13.4
	Yes / No	273	54.6
	Yes / Yes	114	22.8

Table 2. Percentage distribution of routine medical checkup by predictor variables.

Variable	Category	Frequency (N)	Percentage (%)
Age (years)	18–24	166	33.2
	25–34	239	47.8
	35–54	67	13.4
	≥55	28	5.6
Gender	Male	432	86.4
	Female	68	13.6
Marital Status	Single	332	66.4
	Married	168	33.6
Education Level	No formal education	202	40.4

	Senior High School	129	25.8
	Tertiary	169	33.8
Work Experience (years)	1–5	287	57.4
	6–10	116	23.2
	>10	97	19.4
Shift Work	No	392	78.4
	Yes	108	21.6
Department	Production	335	67.0
	Non-production	165	33.0
Subsector	ASM	300	60.0
	AMM	200	40.0
Health Status	Poor	89	17.8
	Good	411	82.2
Safety Conditions	Poor	249	49.8
	Good	251	50.2
Environmental Conditions	Poor	209	41.8
	Good	291	58.2
Economic Conditions	Poor	271	54.2
	Good	229	45.8
Self-protection & Health Problems	No / Yes	46	9.2
	No / No	67	13.4
	Yes / No	273	54.6
	Yes / Yes	114	22.8

Table 2 also presents the results of Pearson's chi-square tests of independence and Cramer's V statistics, which were used to assess whether routine medical checkup varied systematically with working conditions, compositional characteristics, and contextual factors. Significant associations were observed between routine medical checkup and all working condition variables: health conditions ($\chi^2(1) = 59.91$, $p < 0.001$), safety conditions ($\chi^2(1) = 116.62$, $p < 0.001$), environmental conditions ($\chi^2(1) = 134.95$, $p < 0.001$), and economic conditions ($\chi^2(1) = 75.80$, $p < 0.001$). Similarly, the combined variable of self-protection and work-related health problems was significantly related to routine checkups ($\chi^2(3) = 145.81$, $p < 0.001$), rejecting the null hypothesis that working conditions have no effect on miners' decision to attend routine medical checkups. Cramer's V indicated moderate to strong associations for these variables.

Among compositional factors, age ($\chi^2(3) = 21.46$, $p < 0.001$), gender ($\chi^2(1) = 11.14$, $p < 0.001$), education ($\chi^2(2) = 57.35$, $p < 0.001$), and years of experience ($\chi^2(2) = 12.94$, $p < 0.001$) were significantly associated with routine medical checkups. Marital status, however, showed no significant relationship ($\chi^2(1) = 1.60$, $p = 0.206$), suggesting that marital status does not systematically influence checkup behavior. Cramer's V indicated weak associations for age, gender, and experience, and a moderately strong association for education.

For contextual factors, shift work ($\chi^2(1) = 42.10$, $p < 0.001$), department ($\chi^2(1) = 39.79$, $p < 0.001$), and subsector ($\chi^2(1) = 77.38$, $p < 0.001$) were significantly related to routine medical checkup, indicating systematic differences across these workplace variables. Cramer's V suggested weak to moderately strong associations for these factors. Overall, the strength of the relationship between routine medical checkup and predictors, ranked from weakest to strongest, was: gender < experience < age < department < shift < education < health conditions < economic conditions < subsector < safety conditions < environmental conditions < self-protection combined with work-related health problems.

Bivariate logistic regression of routine medical checkup and predictor variables

Table 3 shows that in the bivariate analysis, artisanal gold miners reporting favorable working conditions were substantially more likely to participate in routine medical checkups than those reporting poor conditions. Miners who rated their health as good had 4.11 times higher odds of attending checkups ($p < 0.001$), while those with

good safety conditions (OR = 3.98, p < 0.001), supportive environmental conditions (OR = 4.68, p < 0.001), and positive economic conditions (OR = 2.97, p < 0.001) were also more likely to undergo routine examinations. Additionally, miners who adhered to protective measures at work and had not experienced work-related health issues were over 12 times more likely to seek checkups (OR = 12.61, p < 0.001), and those who used protection despite having work-related health problems were 11 times more likely (OR = 11.04, p < 0.001) compared to their peers who neither protected themselves nor faced work-related health problems.

Table 3. Bivariate complementary log-log regression of routine medical checkup by artisanal goldminers.

Variable	Reference	OR	Robust SE	P-value	95% CI
Health Conditions	Poor	4.108	0.917	<0.001	2.653 – 6.363
Safety Conditions	Poor	3.982	0.523	<0.001	3.079 – 5.150
Environmental Conditions	Poor	4.675	0.676	<0.001	3.521 – 6.208
Economic Conditions	Poor	2.967	0.369	<0.001	2.324 – 3.787
Self-protection & Health Problems	No / Yes				
	No / No	1.254	0.700	0.686	0.419 – 3.747
	Yes / No	12.606	5.726	<0.001	5.175 – 30.706
	Yes / Yes	11.041	5.114	<0.001	4.454 – 27.372
Age (years)	18–24				
	25–34	1.701	0.238	<0.001	1.294 – 2.237
	35–54	1.775	0.340	0.003	1.219 – 2.584
	≥55	0.822	0.258	0.531	0.444 – 1.519
Gender	Male				
	Female	0.546	0.108	0.002	0.370 – 0.805
Marital Status	Unmarried				
	Married	1.172	0.146	0.202	0.918 – 1.497
Education	No formal / Primary / Junior High				
	Senior High	2.821	0.440	<0.001	2.077 – 3.830
	Tertiary	2.419	0.357	<0.001	1.811 – 3.229
Experience (years)	1–5				
	6–10	1.700	0.241	<0.001	1.288 – 2.245
	>10	1.118	0.177	0.483	0.819 – 1.525
Shift Work	No	2.759	0.392	<0.001	2.089 – 3.644
Department	Production	2.277	0.283	<0.001	1.784 – 2.905
Subsector	ASM	3.087	0.384	<0.001	2.420 – 3.939

In bold are significant predictors at a 0.05 significance level

In terms of compositional characteristics, female miners were substantially less likely to participate in routine medical checkups, with a 45% lower likelihood compared to male miners. Educational attainment showed a clear effect: miners who had completed senior high school (OR = 2.82, p < 0.001) or tertiary education (OR = 2.42, p < 0.001) were more inclined to undergo routine checkups than those with no formal education or only primary/junior high schooling. Age also played a role, as miners aged 23–34 years (OR = 1.70, p < 0.001) and 35–54 years (OR = 1.78, p < 0.001) were more likely to attend checkups compared to those aged 18–24 years. Similarly, miners with 6–10 years of experience in the sector (OR = 1.70, p < 0.001) had higher odds of routine checkups than miners with 1–5 years of experience. Marital status, however, did not appear to influence checkup behavior.

Regarding contextual factors, miners working in shift-based schedules were significantly more likely to seek routine medical examinations (OR = 2.76, p < 0.001). Furthermore, miners assigned to non-production departments (OR = 2.28, p < 0.001) and those employed in the AMM subsector (OR = 3.09, p < 0.001) demonstrated a higher propensity to attend routine checkups compared to miners in production roles and the ASM subsector.

Multivariate complementary log-log nested logistic regression of routine medical checkup and predictor variables

Table 4 displays the results of the nested multivariate logistic regression, assessing how working conditions, compositional characteristics, and contextual factors relate to routine medical checkup attendance. In the model focusing solely on working conditions (Model 1), miners reporting good health (OR = 1.77, $p < 0.001$), adequate safety measures (OR = 2.66, $p < 0.001$), and favorable environmental conditions (OR = 2.49, $p < 0.001$) were significantly more likely to seek routine medical examinations compared to those with poorer conditions. Interestingly, miners with better economic conditions (OR = 0.37, $p < 0.001$) were less likely to participate in routine checkups than those with lower economic conditions.

Additionally, miners who adhered to protective practices and had not experienced work-related health problems (OR = 4.99, $p < 0.001$), as well as those who used protection despite having work-related health issues (OR = 4.66, $p < 0.001$), were markedly more likely to undergo routine medical checkups than miners who neither used protective measures nor had health problems related to work.

Table 4. Nested multivariate complementary log-log logistic regression model examining predictors of routine medical checkup among artisanal gold miners.

Variable	Reference	Model 1: Working Conditions OR (Robust SE)	p-value	95% CI	Model 2: + Compositional Factors OR (Robust SE)	p-value	95% CI	Model 3: + Contextual Factors OR (Robust SE)	p-value	95% CI
Health Conditions	Poor	1.773 (0.478)	0.034	1.046–3.008	2.015 (0.565)	0.012	1.163–3.492	2.262 (0.660)	0.005	1.277–4.009
Safety Conditions	Poor	2.656 (0.865)	0.003	1.403–5.028	2.703 (0.955)	0.005	1.353–5.403	3.197 (1.118)	0.001	1.611–6.345
Environmental Conditions	Poor	2.492 (0.521)	<0.001	1.655–3.755	2.705 (0.618)	<0.001	1.729–4.232	3.071 (0.731)	<0.001	1.926–4.896
Economic Conditions	Poor	0.369 (0.120)	0.002	0.195–0.697	0.332 (0.130)	0.005	0.155–0.714	0.363 (0.125)	0.003	0.185–0.715
Self-protection & Health Problems	No / Yes									
	No / No	0.728 (0.394)	0.558	0.253–2.101	0.584 (0.337)	0.350	0.188–1.807	0.631 (0.359)	0.418	0.207–1.922
	Yes / No	4.989 (2.267)	<0.001	2.047–12.158	4.300 (2.095)	0.003	1.654–11.176	4.590 (2.234)	0.002	1.768–11.916
	Yes / Yes	4.662 (2.150)	0.001	1.888–11.512	3.587 (1.746)	0.009	1.382–9.313	3.461 (1.680)	0.011	1.337–8.960
Age (years)	18–24									
	25–34	—	—	—	0.974 (0.167)	0.879	0.697–1.362	0.968 (0.171)	0.852	0.685–1.367
	35–54	—	—	—	1.665 (0.411)	0.039	1.026–2.701	1.795 (0.468)	0.025	1.077–2.992
	≥55	—	—	—	0.680 (0.288)	0.362	0.297–1.558	0.649 (0.281)	0.319	0.277–1.518
Gender	Male	—	—	—	0.817 (0.184)	0.369	0.526–1.270	0.893 (0.212)	0.633	0.561–1.422
Marital Status	Unmarried	—	—	—	1.112 (0.188)	0.530	0.799–1.548	1.109 (0.192)	0.550	0.790–1.558
Education	No formal / Primary / Junior High	—	—	—	1.700 (0.336)	0.007	1.154–2.506	1.665 (0.335)	0.011	1.122–2.470
	Tertiary	—	—	—	1.135 (0.224)	0.522	0.771–1.671	1.276 (0.266)	0.243	0.848–1.919

Experience (years)	1–5	—	—	—	1.014 (0.169)	0.935	0.731–1.406	1.029 (0.176)	0.868	0.735–1.440
	6–10	—	—	—	0.848 (0.195)	0.473	0.541–1.330	0.855 (0.199)	0.501	0.543–1.348
Shift Work	No	—	—	—	—	—	—	1.470 (0.269)	0.036	1.026–2.105
Department	Production	—	—	—	—	—	—	1.548 (0.112)	0.003	0.367–0.819
Subsector	ASM	—	—	—	—	—	—	0.839 (0.245)	0.547	0.473–1.486

In bold are significant predictors at a 0.05 significance level

In Model 2, which incorporated compositional factors, the predictive strength of working conditions on routine medical checkups remained evident. Miners reporting good health (OR = 2.02, $p < 0.001$), adequate safety measures (OR = 2.70, $p < 0.001$), and favorable environmental conditions (OR = 2.71, $p < 0.001$) were significantly more likely to attend routine checkups than those reporting poor conditions. In contrast, miners with better economic conditions (OR = 0.33, $p < 0.001$) were less likely to seek routine medical checkups. Additionally, miners who used protective measures and had no work-related health issues (OR = 4.30, $p < 0.001$), as well as those who protected themselves despite experiencing work-related health challenges (OR = 3.59, $p < 0.001$), had higher odds of attending checkups compared to miners who neither used protection nor had health problems. The inclusion of compositional factors moderated some of the associations between working conditions and medical checkups.

Among compositional variables, miners aged 35–54 years (OR = 1.67, $p < 0.001$) were more likely to attend routine checkups than those aged 18–24 years. Likewise, miners with senior high school education (OR = 1.70, $p < 0.001$) were more likely to participate in routine checkups compared to those with no formal education or only primary/junior high education. Gender, marital status, and years of experience did not significantly predict routine checkup behavior.

In Model 3, which additionally controlled for contextual factors, the effects of working conditions remained strong. Health conditions (OR = 2.63, $p < 0.001$), safety (OR = 3.20, $p < 0.001$), environmental conditions (OR = 3.07, $p < 0.001$), and economic conditions (OR = 0.36, $p < 0.001$) continued to significantly influence checkup attendance. Similarly, miners who used protective measures—both those without (OR = 4.59, $p < 0.001$) and those with work-related health problems (OR = 3.46, $p < 0.001$)—remained more likely to seek routine checkups.

For compositional factors, miners aged 35–54 years (OR = 1.80, $p < 0.001$) and those with senior high school education (OR = 1.67, $p < 0.001$) continued to show higher likelihoods of attending checkups. Regarding contextual factors, miners working in shift systems (OR = 1.47, $p < 0.001$) and those in non-production departments (OR = 1.55, $p < 0.001$) were significantly more likely to attend routine medical checkups. Subsector, however, did not have a significant effect on checkup behavior.

This study examined how the working conditions of artisanal goldminers in Ghana influence their likelihood of voluntarily attending routine medical checkups, while accounting for compositional and contextual factors. Artisanal mining contributes significantly to Ghana's economy, yet it remains one of the most hazardous occupations in the country, with high rates of morbidity and mortality. The sector faces persistent challenges, including limited regulations, lack of stakeholder oversight, and insufficient investment in health and safety. Consequently, miners bear primary responsibility for their own health, highlighting the need to understand and enhance self-care practices in this workforce.

The findings indicate that working conditions strongly affect miners' engagement in routine medical checkups. Across all models, miners who reported favorable health, safety, and environmental conditions were more likely to seek regular checkups compared to those with poor conditions. This aligns with existing literature, which shows that positive workplace safety and environmental conditions improve risk perception and encourage proactive health behaviors [4, 31]. Conversely, miners exposed to poor conditions are more likely to adopt unsafe practices and demonstrate a lower self-care culture. Enhancing workplace health, safety, and environmental standards could therefore improve miners' awareness of occupational risks and promote routine medical care.

Interestingly, miners who reported better economic conditions were less likely to attend routine checkups. This counterintuitive finding suggests that economically secure miners may perceive themselves as capable of managing health issues should they arise, leading to complacency regarding preventive care.

The study also showed that miners who practiced protective measures at work—regardless of whether they experienced work-related health problems—were significantly more likely to attend routine medical checkups. This indicates that health and safety consciousness at the workplace translates directly into higher self-care behavior.

Among compositional factors, older miners (35–54 years) and those with senior high school education were more likely to attend routine checkups. These results support previous studies indicating that age and educational attainment positively influence health and safety awareness, experience, and proactive behaviors [32-34]. Younger and less-educated miners, often engaged in physically demanding production roles, demonstrated lower self-care tendencies.

Contextual factors further shaped checkup behaviors. Miners working in shift regimes and those in non-production departments were more likely to undergo routine checkups. Shift workers, particularly those on night shifts, may have heightened awareness of occupational risks, while non-production roles are often occupied by experienced or educated miners who are more health-conscious [4, 8].

Overall, miners with poor working conditions exhibited a lower sense of self-care and were less likely to attend routine medical checkups. While compositional and contextual factors were associated with checkup behavior, they did not diminish the strong influence of working conditions.

One limitation of this study is the reliance on self-reported measures of routine medical checkup, which may be subject to bias. Nevertheless, self-reports are widely used in occupational health research and can provide valid insights [35, 36].

These findings underscore the importance of improving working conditions to foster a culture of self-care in the artisanal mining sector. Interventions aimed at enhancing health, safety, and environmental standards, combined with education on occupational risks, could increase miners' engagement in preventive health practices. The study provides valuable guidance for mine managers, concession owners, NGOs, and policymakers seeking to improve occupational health in artisanal gold mining. National-level discussions on improving working conditions are warranted to strengthen self-care awareness and support sustainable, safe mining practices in Ghana.

Conclusion

Understanding the key determinants of a behavior is crucial to inducing change. This study examined how working conditions, compositional characteristics, and contextual factors influence artisanal miners' likelihood of attending routine medical checkups using a nested binary logistic regression model. Miners experiencing poor working conditions exhibited a lower sense of self-care, reflected in higher odds of skipping routine checkups. While compositional and contextual factors were associated with checkup behaviors, they did not alter the strong influence of working conditions on miners' self-care practices. These findings shed light on the dynamics of self-care among artisanal miners and suggest ways to enhance it, with the ultimate goal of promoting a healthier workforce. To strengthen self-care awareness in the sector, a national dialogue on improving working conditions for artisanal miners in Ghana is warranted.

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