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Hidden Financial Hardship and Inequity in Health Spending: Beyond SDG 3.8.2 Evidence from Somalia

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Research Article

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Abstract

Somalia's first official financial protection estimates, produced through the 2025 WHO/World Bank country consultation and published in the December 2025 Global Monitoring Report on universal health coverage, report that 38.8% of the population faced financial hardship from out-of-pocket (OOP) health spending in 2022 — almost entirely (36.7 of 38.8 percentage points) through impoverishing rather than merely large payments. Threshold-based indicators, however, systematically miss hardship that households finance through borrowing, asset depletion, food sacrifice, and forgone care. No study has yet measured these coping mechanisms in Somalia or examined how far official estimates diverge from household-reported hardship in a fragile state.

Methods: We triangulated two sources. First, we extracted Somalia's official revised SDG 3.8.2 estimates, components, disaggregations, and ancillary statistics (2016, 2017, 2022) as published in the 2025 WHO/World Bank Global Monitoring Report and the WHO Global Health Observatory (GHO) financial protection database, based on the Somalia Integrated Household Budget Survey (SIHBS) 2022. Second, we analysed a cross-sectional survey of 2,000 Somali households (2023–2024) capturing insurance status, banded OOP payments, cost drivers, and self-reported coping responses, from which we operationalised tiered indicators — core hardship, severe hardship, and proxy impoverishment risk — grounded in coping-adjusted measurement theory. Correlates of hardship were estimated by multivariable logistic regression.

Results: Official estimates show hardship rising from 33.2% (2016) to 38.8% (2022; corresponding to approximately 6.8 million people), universal (100%) hardship in the poorest consumption quintile versus 0.1% in the richest, and rural prevalence (55.4%) nearly double urban (28.8%). In the household survey, 88.8% reported OOP payments in the previous month; core financial hardship affected 67.0% of households, severe hardship 45.9%, and proxy impoverishment risk 52.1% — a representing an additional 28 percentage points beyond the official threshold-based estimate. Borrowing (22.4%) and cutting food or necessities (21.6%) were the leading coping responses; absence of insurance (aOR 2.71, 95% CI 1.53–4.79) and payments above US$100 (aOR 18.71, 95% CI 12.73–27.48) strongly predicted hardship. Medicines constituted the largest reported driver of out-of-pocket spending (27.4%), addressing the OOP-composition gap unreported for Somalia in the official statistics.

Conclusions: Somalia's official SDG 3.8.2 estimates and household coping evidence are complements, not substitutes: the revised indicator captures the impoverishing core of the crisis, while coping-based measurement reveals an additional tier of hardship that consumption-smoothing renders invisible to thresholds — and that widespread forgone care further hides. A two-tier monitoring framework — official SIHBS-based estimation plus routine coping indicators — should anchor financial protection tracking under the Health Financing Strategy 2026–2030 and offers a transferable model for fragile states.

Key messages

What is already known

The revised SDG 3.8.2 definition (adopted March 2025) captures both large and impoverishing OOP health spending in one indicator. Coping-adjusted measurement theory shows that threshold indicators understate hardship where households borrow, sell assets, or forgo care. Somalia's first official estimates, published in December 2025, report 38.8% hardship in 2022, but no household coping evidence existed.

What this study adds

First triangulation of official revised SDG 3.8.2 estimates against household coping evidence in a fragile state: coping-based core hardship (67.0%) exceeds the official estimate (38.8%) by roughly 28 percentage points, with 95% of official hardship impoverishing, universal hardship in the poorest quintile, and medication identified as the leading cost driver — filling the composition gap unreported in the official statistics.

How this might affect policy

Financial protection monitoring in Somalia should institutionalise coping indicators alongside official SIHBS-based SDG 3.8.2 estimation; pro-poor and rural targeting plus medicines-cost reform are the highest-yield responses under the Health Financing Strategy 2026–2030.

Background

Financial protection — the assurance that people can use needed health services without suffering financial hardship — is a constitutive dimension of universal health coverage (UHC) and is monitored globally through Sustainable Development Goal (SDG) indicator 3.8.2 [1]. Progress has stalled. The WHO/World Bank 2025 Global Monitoring Report estimates that approximately 2.1 billion people experienced financial hardship from OOP health spending, with about 1.6 billion pushed into or further into poverty, and that fewer than one third of countries improved service coverage while reducing catastrophic OOP spending over the past two decades [34].

The dominant measurement tradition defines catastrophic health expenditure (CHE) as OOP payments exceeding a threshold share of household resources — 40% of capacity to pay in the foundational multicountry analysis [2], or 10% and 25% of total consumption or income in the budget-share approach long used for SDG monitoring [3, 6] — with companion impoverishment measures comparing welfare to a poverty line before and after netting out OOP payments [3, 4, 7]. In March 2025, the UN Statistical Commission formally revised indicator 3.8.2 to a single measure capturing both dimensions: the proportion of the population with positive OOP health spending exceeding 40% of the household's discretionary budget, defined as consumption net of a societal poverty line [15]. The revision was an explicit acknowledgement that the previous budget-share thresholds overestimated hardship among the rich and underestimated it among the poor [14, 15] — for households at or below the poverty line, the discretionary budget is zero or negative, and any positive OOP payment is impoverishing.

Even the revised indicator, however, remains an expenditure-ratio measure, and the limitations of that family of measures are well established. Flores and colleagues demonstrated formally that when households finance care through borrowing, savings depletion, and asset sales, expenditure-based measures misstate true welfare impact: current consumption is artificially smoothed, hardship is displaced into the future as debt and lost assets, and poverty can be hidden because coping inflates the consumption aggregate [8]. Wagstaff showed that for a borrowing household, both income- and consumption-based ratios diverge from the theoretically preferred coping-adjusted measure [9]. Households may also avoid thresholds entirely by not seeking care — financial sacrifice invisible to any expenditure-based indicator, and a barrier that WHO itself notes mechanically suppresses the measured 3.8.2 rate by removing non-spenders from the numerator [9, 14, 35]. The empirical record confirms coping is pervasive: across 15 African countries, borrowing or asset sales financed health payments in 23–68% of households [10]; across 40 low- and middle-income countries, 25.9% of households borrowed or sold assets for care [11]; and the downstream consequences for nutrition, assets, debt, and earnings are lasting [12, 13].

Fragile and conflict-affected settings (FCAS) represent one of the greatest challenges for measuring financial protection. Health financing in FCAS combines low government spending, exceptionally high OOP shares, donor dependence, and thin routine data [16, 17]; the sub-Saharan financial protection literature — Kenya [18, 20], Uganda [19], Ethiopia [21] — remains skewed towards relatively data-rich settings [16]. Somalia is the most consequential gap: the lowest UHC service coverage index in the world (27 in 2024) [25, 26], 54.4% of the population below the national poverty line of US$2.06 per person per day [22, 23], more than 90% of Essential Package of Health Services funding donor-financed, and OOP constituting roughly 45% of total health expenditure [27].

Somalia's evidence base has just changed in one decisive respect. Through the 2025 WHO/World Bank country consultation, and now published in the December 2025 Global Monitoring Report and the accompanying WHO Global Health Observatory (GHO) financial protection database, Somalia received its first official estimates of revised SDG 3.8.2, produced by the Somalia National Bureau of Statistics from the Somalia Integrated Household Budget Survey (SIHBS) 2022 — the first household budget survey since 1985 [24, 34, 35]. The headline figures are stark: 38.8% of the population faced financial hardship in 2022, up from 33.2% in 2016; 36.7 of those 38.8 percentage points reflect impoverishing OOP spending; hardship is universal (100%) in the poorest consumption quintile and negligible (0.1%) in the richest; and rural prevalence (55.4%) is nearly double urban (28.8%) [34, 35]. A recent equity analysis of Somalia's UHC progress likewise finds that the most economically disadvantaged groups face the highest risk of catastrophic health spending [38]. Yet the official statistics also expose what population-level estimation cannot yet do for Somalia: components are not released for 2016–2017, the composition of OOP spending is unreported, sub-national estimates beyond the urban–rural split are absent, and — most fundamentally — an expenditure-ratio indicator cannot register the coping mechanisms through which households absorb costs.

One recent study began to address household-level evidence. Mohamud and colleagues analysed a 2,000-household survey and reported that OOP constitutes 44.9% of total health expenditure, that only 3.5% of Somalis hold insurance, and that 24% of households incur CHE at a single 10%-of-income threshold [29]. That analysis remained within the conventional threshold paradigm: it did not quantify coping mechanisms, construct hardship indicators from them, or engage the official SDG 3.8.2 architecture.

This study makes four contributions. First, we present and interpret Somalia's official revised SDG 3.8.2 estimates and ancillary statistics as published in 2025, situating them against regional comparators. Second, we quantify the full distribution of self-reported coping responses to OOP spending in a 2,000-household survey and operationalise a tiered indicator set — core hardship, severe hardship, proxy impoverishment risk — grounded in coping-adjusted measurement theory [8, 9]. Third, we triangulate the two evidence streams, showing that coping-based hardship exceeds the official threshold estimate by roughly 28 percentage points and explaining why through the consumption-smoothing logic the revised definition cannot capture. Fourth, we specify a replication-and-extension protocol enabling national institutions to reproduce, disaggregate, and extend the official estimates — including the OOP-composition analysis the official statistics omit. The result is, to our knowledge, the first triangulation of official revised SDG 3.8.2 estimates with coping-based hardship measurement in any fragile state.

Methods

Study design and setting

This is a triangulation study combining (i) secondary analysis of Somalia's official revised SDG 3.8.2 estimates as published in the WHO/World Bank 2025 Global Monitoring Report and the WHO GHO financial protection database, and (ii) a cross-sectional household survey on OOP health expenditure conducted in 2023–2024. Reporting follows the STROBE statement for cross-sectional studies [30]; the completed checklist is provided as a supplementary file. Somalia is a federal state of approximately 18 million people with high poverty, displacement, and informality; services are delivered through public facilities, donor-supported programmes, and a large private sector [22, 23, 27].

A target sample of 2,000 households was selected to provide adequate precision for estimating household financial hardship and to permit multivariable regression analyses. Reporting follows the STROBE Statement for cross-sectional studies.

Data sources

Three sources were used (Table 1). The first is Somalia's official SDG 3.8.2 estimates, produced through the 2025 WHO/World Bank country consultation and published in the December 2025 Global Monitoring Report and the accompanying WHO GHO financial protection database, with WHO as custodian agency and the World Bank as co-custodian [34, 35]. These contain revised-definition estimates and

components for 2016 (High Frequency Survey, World Bank producer), 2017 (High Frequency Survey, World Bank), and 2022 (SIHBS, Somalia National Bureau of Statistics), disaggregated by consumption quintile, residence, household type, and household-head sex and age, together with ancillary statistics (OOP prevalence, budget shares, welfare distributions, societal poverty line values) and related impoverishment estimates at the PPP2017$2.15 extreme poverty line. Values are reported here as published; because WHO revises societal-poverty-line values as purchasing-power-parity factors are updated, readers should reconfirm the precise figures against the live GHO database accession at the date of use [35]. The second source is the OOP Health Expenditure Survey 2023–2024 (2,000 households after exclusion of one blank record), capturing demographics, household size, insurance status, banded OOP payments in the previous month, primary cost drivers, and binary financial-consequence items; sampling concentrated in accessible regions, with Banadir over-represented, and design weights were unavailable. The financial-consequences item wording presented here was reconstructed to match exactly the coded response categories recorded in the analysis dataset, and the full module is provided in Supplementary File 3; the original questionnaire as administered is available from the author on request. The third source is the SIHBS 2022 DDI codebook and Somalia Poverty Report, documenting the national consumption aggregate and poverty lines [22, 24]. The survey and the SIHBS are not household-linked; their roles are strictly complementary.

Table 1
Data sources and analytical roles

Data source	Role in this study	Key contents
WHO/World Bank 2025 Global Monitoring Report and WHO GHO financial protection database (Somalia)	Official revised SDG 3.8.2 estimates, components, disaggregations, ancillary statistics; cross-country comparators	National 3.8.2 (2016, 2017, 2022); components; quintile, residence, household-type, head-sex/age splits; impoverishment at PPP$2.15; OOP prevalence and budget share
OOP Health Expenditure Survey 2023–2024 (n = 2,000)	Coping responses, tiered hardship indicators, proxy impoverishment risk; correlates of hardship; OOP cost-driver composition	Insurance; banded OOP; service type; cost driver; binary financial-consequence items (item wording reconstructed from dataset variables)
SIHBS 2022 DDI codebook and Somalia Poverty Report	National welfare framework; variable map for the replication-and-extension protocol	hid; hhsize; pce; pcer; paasche; fpl; npl; poor; wgt_adj; wgt_adj_pop

OOP: out-of-pocket; SIHBS: Somalia Integrated Household Budget Survey; DDI: Data Documentation Initiative; GHO: Global Health Observatory. Official values are reproduced from the 2025 Global Monitoring Report [34] *and GHO database* [35].

Official indicator definitions

Revised SDG 3.8.2 is the proportion of the population with positive OOP health expenditure exceeding 40% of the household discretionary budget, where the discretionary budget is total consumption net of

the societal poverty line — the greater of PPP2017$2.15 per person per day or PPP2017$1.15 plus 50% of median welfare net of OOP spending; for Somalia 2022 the binding line is the latter [15, 34, 35]. Component 1 comprises individuals with OOP between 40% and 100% of the discretionary budget (large but not impoverishing); Component 2 comprises those with OOP at or exceeding 100% of the discretionary budget — including all households whose discretionary budget is zero or negative, for whom any positive payment is impoverishing [34, 35]. Complementary impoverishment statistics, reported separately from the headline indicator and conceptually linked to SDG 1.1.1, measure the population pushed into or further into extreme poverty at the PPP2017$2.15 line by OOP spending [7, 35].

Survey outcome definitions

Survey outcome definitions

Survey outcomes were constructed from the financial-consequences item, with binary responses for cutting back on food and necessities; borrowing money; delaying or not receiving necessary care; selling possessions; other impacts; and no significant impact. Following coping-adjusted measurement theory [8, 9] and the African coping literature [10, 11], we defined four indicators (Table 2): core financial hardship (any of the four substantive coping or sacrifice responses); any hardship (adding other impacts); severe hardship (debt, asset depletion, or unmet need); and proxy impoverishment risk (borrowing, asset sales, or food sacrifice — behavioural signals of poverty entry or deepening in the absence of linked consumption data). The proxy complements, and is explicitly benchmarked against, the official impoverishment statistics in the triangulation analysis.

Table 2
Survey outcome definitions

Indicator	Operational definition	Interpretation
Core financial hardship	Cut food/necessities OR borrowed money OR delayed/forwent necessary care OR sold possessions	Health spending directly disrupted household welfare
Any hardship	Core hardship OR other reported financial impact	Broadest hardship envelope
Severe hardship	Borrowed money OR sold possessions OR delayed/forwent necessary care	Debt, asset depletion, or unmet need with long-run consequences
Proxy impoverishment risk	Borrowed money OR sold possessions OR cut food/necessities	Behavioural signal of poverty entry or deepening, benchmarked against official impoverishment statistics

Statistical analysis and triangulation

Survey results are reported as counts and percentages. Because OOP payments were elicited in ordinal bands (nothing; under US$10; US$10–50; US$51–100; over US$100; don't remember), payment levels were analysed categorically and never imputed to continuous values: midpoint imputation compresses variance and biases threshold-crossing statistics [32, 33], and OOP estimates are highly sensitive to instrument design [31]. The coping items mirror the financial-hardship constructs — borrowing, asset sales, food sacrifice, and forgone care — used in established multi-country instruments [8, 10, 11], supporting their construct validity, although they were not separately psychometrically validated in Somalia. Correlates of core hardship were estimated with multivariable logistic regression (insurance status, OOP band, household size, respondent sex, age group), reported as adjusted odds ratios (aOR) with 95% confidence intervals; estimates are unweighted. Complete-case analysis was used; the 0.9% answering "don't remember" to the OOP item were retained as a category. Our analytical objective is conceptual triangulation — quantifying the gap between official threshold estimates and household coping and explaining its mechanisms — not national estimation; accordingly, the survey is used to characterise magnitudes and mechanisms among surveyed households, while all nationally representative claims rest solely on the official SIHBS-based figures. Triangulation proceeded by juxtaposing the official revised SDG 3.8.2 estimates, components, and impoverishment statistics against the survey-based coping indicators on a common interpretive frame (Table 8), attending to definitional, population, recall-window, and survey-instrument differences. The official estimates (2022) and the survey (2023–2024) are close in time and describe the same health-financing regime — no national pooling reform or insurance expansion intervened between them — so the comparison reflects differences in measurement construct rather than temporal change. We emphasise that the two sources measure different constructs by design — expenditure ratios versus coping behaviour — and that their divergence is the analytic object, not a discrepancy to be reconciled away. No variables exceeded 1% missingness.

Replication and extension protocol

Because official estimation now exists, the role of national analysis shifts from production to replication, verification, and extension. We specify a protocol with five products, implementable on SIHBS 2022 microdata using the published codebook [24]: (i) replication of the official revised-definition national estimate (38.8%) and its components as a verification exercise; (ii) the OOP-composition breakdown (medicines, outpatient, inpatient, health products) unreported for Somalia in the official statistics [34, 35]; (iii) Federal Member State and sub-national disaggregation beyond the urban–rural split; (iv) parallel estimates under the pre-2025 budget-share definition (10% and 25% thresholds) to preserve comparability with the historical literature [14, 15]; and (v) impoverishment and poverty-gap statistics at both the national poverty line and the societal poverty line. Annotated pseudocode with Stata and R reference implementations, including mandatory validation against the published 54.4% poverty headcount and the official revised-3.8.2 verification targets, is provided in Supplementary File 2.

Ethics

The study was conducted in accordance with the principles of the Declaration of Helsinki. The household survey collected no biomedical specimens and posed minimal risk; participation was voluntary, informed consent was obtained from all respondents before interview, and responses were anonymised prior to analysis. Ethics approval was granted by Ministry of Health and Human Services. The official SDG 3.8.2 estimates and the WHO Global Health Observatory database contain no individual-level data.

Results

Official revised SDG 3.8.2 estimates for Somalia

Financial hardship under the revised definition rose from 33.2% in 2016 and 35.9% in 2017 to 38.8% in 2022 — an increase of 5.6 percentage points, equivalent to roughly two in five Somalis and corresponding to approximately 6.8 million people (Table 3) [34, 35]. The 2022 decomposition reveals that 36.7 percentage points (approximately 95% of all hardship) reflect impoverishing OOP spending (Component 2), against only 2.1 points of large-but-not-impoverishing spending (Component 1); components are not released for 2016–2017. Inequality is extreme: hardship is universal (100%) in the poorest consumption quintile and near-universal (87.3%) in the second, collapsing to 6.0%, 0.7%, and 0.1% in the third, fourth, and richest quintiles. Rural prevalence (55.4%) is nearly double urban (28.8%). Variation across household types and head characteristics is modest by comparison — highest among multigenerational households (42.3%) and households with children and adolescents (38.1%), with differences of 2.2 points by head's sex and 1.9 points by head's age. The related impoverishment statistics at the PPP2017$2.15 extreme poverty line show 1.7% of the population impoverished and a further 19.3% — already extremely poor — pushed deeper, a combined 21.1%. Ancillary statistics explain the mechanics: OOP spending was universal (100% of the population in households with positive OOP), the average OOP budget share quadrupled between 2016 and 2022 (0.64% to 2.65%), and median daily consumption (44,439 LCU per capita) sits only some 29% above the societal poverty line (34,531 LCU), so the poorest two quintiles hold zero or negative discretionary budgets — for them, any payment is impoverishing by construction [34, 35].

Table 3
Official revised SDG 3.8.2 estimates and components, Somalia 2016–2022

Indicator	2016 (HFS)	2017 (HFS)	2022 (SIHBS)
Revised SDG 3.8.2, national (%)	33.2	35.9	38.8
Component 1: large, not impoverishing (%)	NR	NR	2.1
Component 2: large and impoverishing (%)	NR	NR	36.7
Impoverished at PPP$2.15 (%)	NR	NR	1.7
Further impoverished at PPP$2.15 (%)	NR	NR	19.3
Impoverished + further impoverished (%)	NR	NR	21.1
Population with positive OOP (%)	33.2*	35.9*	100
Mean OOP budget share (%)	0.64	0.59	2.65
Producer	World Bank	World Bank	SNBS

*NR: not released owing to PPP/CPI concerns. *2016–2017 OOP prevalence as reported in the ancillary statistics. The PPP$2.15 impoverishment figures are reported separately from the headline 3.8.2 indicator and are conceptually linked to SDG 1.1.1. HFS: High Frequency Survey; SIHBS: Somalia Integrated Household Budget Survey; SNBS: Somalia National Bureau of Statistics. Source: WHO/World Bank 2025 Global Monitoring Report* [34]; *WHO GHO financial protection database* [35]. *Reconfirm precise values against the live GHO accession at publication.*

Table 4 presents the official revised SDG 3.8.2 estimates across key equity dimensions, demonstrating substantial inequalities by consumption quintile, place of residence, household type, and household-head characteristics.

Table 4
Official revised SDG 3.8.2 by equity dimension, Somalia 2022 (%)

Dimension	Estimate
Quintile 1 (poorest) / Quintile 2	100 / 87.3
Quintile 3 / Quintile 4 / Quintile 5 (richest)	6.0 / 0.7 / 0.1
Rural / Urban	55.4 / 28.8
Multigenerational households / Adults with children and adolescents	42.3 / 38.1 (other household types NQ)
Male-headed / Female-headed households	39.9 / 37.8
Household head under 60 / 60 and over	38.6 / 40.4

NQ: did not pass quality checks. Household-type categories follow WHO age-structure technical-brief definitions [36]. *Source: WHO/World Bank 2025 Global Monitoring Report* [34]; *GHO database* [35].

Figure 1 illustrates the pronounced socioeconomic inequalities in financial hardship across consumption quintiles and between rural and urban populations (Fig. 1):

Source. Financial hardship from out-of-pocket health spending (revised SDG 3.8.2), Somalia 2022, by consumption quintile (A) and area of residence (B). Source: WHO/World Bank 2025 Global Monitoring Report and WHO Global Health Observatory financial protection database (SIHBS 2022).

Survey sample characteristics

The analytic survey sample comprised 2,000 households (Table 5). Respondents were 62.5% male; 35.1% were aged 35–44 and 33.1% aged 45–54; 42.0% of households had seven or more members. Insurance coverage was nearly absent — 70 respondents (3.5%) — consistent with the absence of an operational pooling mechanism [27, 29].

Table 5
Survey sample characteristics (n = 2,000)

Characteristic	Category	n	%
Sex	Male	1,250	62.5
	Female	750	37.5
Age group (years)	18–24	53	2.6
	25–34	490	24.5
	35–44	702	35.1
	45–54	662	33.1
	55–64	93	4.7
Household size	1–2	260	13.0
	3–4	480	24.0
	5–6	420	21.0
	7 or more	840	42.0
Health insurance	Yes	70	3.5
	No	1,930	96.5

Source: authors' analysis of the OOP Health Expenditure Survey 2023–2024.

OOP payments, cost drivers, and coping responses

Non-zero OOP payments in the previous month were reported by 1,777 households (88.8%) — closely consistent with the universal annual OOP prevalence in the official statistics once the one-month recall window is considered — and 759 households (38.0%) reported payments above US$100 against a national poverty line of US$2.06 per person per day [22] (Table 6). The leading cost drivers were medication (548; 27.4%), diagnostic tests (443; 22.1%), and consultation fees (339; 17.0%) — evidence that directly addresses the OOP-composition breakdown unreported for Somalia in the official statistics [34, 35]. Core financial hardship affected 1,339 households (67.0%); any hardship, 1,481 (74.1%); severe hardship, 917 (45.9%); and proxy impoverishment risk, 1,042 (52.1%). Borrowing (449; 22.4%) and cutting food or necessities (432; 21.6%) led the coping distribution, followed by delaying or forgoing care (307; 15.3%) and selling possessions (175; 8.8%); 526 households (26.3%) reported no significant impact.

Table 6
OOP payments and hardship indicators, household survey (n = 2,000)

Indicator	**n**	**%**
OOP last month: nothing	204	10.2
OOP: under US$10 / US$10–50	204 / 407	10.2 / 20.3
OOP: US$51–100 / over US$100	407 / 759	20.3 / 38.0
OOP: don’t remember	19	0.9
Cut back on food/necessities	432	21.6
Borrowed money	449	22.4
Delayed or forwent necessary care	307	15.3
Sold possessions	175	8.8
No significant impact	526	26.3
Core financial hardship	1,339	67.0
Any hardship (core + other)	1,481	74.1
Severe hardship	917	45.9
Proxy impoverishment risk	1,042	52.1

Coping items are not mutually exclusive; composites defined in Table 2. *Source: authors’ analysis of the OOP Health Expenditure Survey 2023–2024.*

Figure 2 summarizes the distribution of household coping responses and compares the coping-based indicators with the official revised SDG 3.8.2 estimate (Fig. 2).

Source: Household financial hardship from out-of-pocket health spending, Somalia survey 2023–2024: individual coping responses (A) and composite hardship indicators against the official revised SDG 3.8.2

estimate (B). The dashed line marks the official 38.8% estimate; the bracket shows the 28-percentage-point wedge.

Correlates of core financial hardship

In the multivariable model (Table 7), absence of insurance nearly trebled the odds of core hardship (aOR 2.71, 95% CI 1.53–4.79), and a steep dose–response gradient ran across payment bands: relative to no payment, aORs were 4.07 (95% CI 2.78–5.95) for US$10–50, 12.93 (95% CI 8.60–19.46) for US$51–100, and 18.71 (95% CI 12.73–27.48) above US$100. Households of five to six members had elevated odds (aOR 1.77, 95% CI 1.21–2.60), with a borderline association for seven or more (aOR 1.39, 95% CI 1.00–1.94); respondent sex and age were not significant.

Table 7
Multivariable logistic regression: correlates of core financial hardship (n = 2,000)

Predictor (reference)	aOR	95% CI	p
No insurance (insured)	2.71	1.53–4.79	< 0.001
OOP < US$10 (nothing)	1.40	0.90–2.17	0.137
OOP US$10–50 (nothing)	4.07	2.78–5.95	< 0.001
OOP US$51–100 (nothing)	12.93	8.60–19.46	< 0.001
OOP > US$100 (nothing)	18.71	12.73–27.48	< 0.001
OOP don’t remember (nothing)	4.04	1.51–10.79	0.005
Household size 3–4 (1–2)	1.02	0.71–1.46	0.907
Household size 5–6 (1–2)	1.77	1.21–2.60	0.003
Household size ≥ 7 (1–2)	1.39	1.00–1.94	0.052
Male respondent (female)	1.16	0.93–1.45	0.190
Age 25–34 (18–24)	1.22	0.62–2.39	0.567
Age 35–44 (18–24)	1.53	0.79–2.98	0.208
Age 45–54 (18–24)	1.74	0.89–3.38	0.106
Age 55–64 (18–24)	1.82	0.80–4.11	0.153

aOR: adjusted odds ratio; CI: confidence interval. All covariates entered simultaneously. Estimates are unweighted.

Triangulation: official estimates versus coping-based hardship

Table 8 juxtaposes the two evidence streams. Coping-based core hardship (67.0%) exceeds the official revised SDG 3.8.2 estimate (38.8%) by roughly 28 percentage points; any hardship (74.1%) exceeds it by 35 points. The proxy impoverishment-risk indicator (52.1%) is two and a half times the official combined impoverishment statistic at the extreme poverty line (21.1%). The orderings are internally coherent: official statistics already establish that 95% of threshold-registered hardship is impoverishing and that the poorest two quintiles — holding zero or negative discretionary budgets — face universal or near-universal hardship; the survey shows the behavioural counterpart, with borrowing and food sacrifice leading the coping distribution and hardship odds rising eighteen-fold across payment bands. The wedge between the measures is precisely what coping-adjusted theory predicts: households that borrow, sell assets, or cut food smooth measured consumption, suppressing expenditure ratios below thresholds even as welfare deteriorates [8, 9].

Table 8
Triangulation of official and survey-based financial protection measures, Somalia

Measure	Estimate (%)	Source and construct
Revised SDG 3.8.2 (OOP > 40% of discretionary budget)	38.8	Official, SIHBS 2022; expenditure ratio [34, 35]
— Component 2: impoverishing OOP	36.7	Official, SIHBS 2022 [34, 35]
— Component 1: large-only OOP	2.1	Official, SIHBS 2022 [34, 35]
Impoverished + further impoverished (PPP$2.15)	21.1	Official, SIHBS 2022; linked to SDG 1.1.1 [35]
Population with positive OOP (annual)	100	Official ancillary, SIHBS 2022 [35]
Households with positive OOP (one month)	88.8	Survey 2023–2024; banded elicitation
Core financial hardship	67.0	Survey 2023–2024; coping-based
Any hardship	74.1	Survey 2023–2024; coping-based
Severe hardship (debt/assets/unmet need)	45.9	Survey 2023–2024; coping-based
Proxy impoverishment risk	52.1	Survey 2023–2024; coping-based

Constructs differ by design: official measures are population-level expenditure ratios on the SIHBS consumption aggregate; survey measures are household-level self-reported coping over a one-month recall. The divergence is the analytic object (see Discussion).

The relationship between the official SDG 3.8.2 indicator and the coping-based measures is summarized conceptually in Fig. 3, **which presents the proposed two-tier framework for measuring financial hardship in fragile settings.**

Source. A two-tier framework for measuring financial hardship in a fragile setting. The official SIHBS-based estimate (38.8%) is the nationally representative floor; survey-based coping hardship (67.0%) is the policy-relevant ceiling. Three mechanisms — consumption smoothing, forgone care, and impoverishing small payments by near-poor households — explain why an expenditure-ratio threshold cannot capture the full burden.

Discussion

Principal findings

Somalia now possesses complementary evidence that substantially improves understanding of financial protection. The official revised SDG 3.8.2 estimates establish the scale and structure of threshold-registered hardship: 38.8% of the population in 2022, rising since 2016, 95% of it impoverishing, universal among the poorest quintile, concentrated in rural areas, and affecting roughly 6.8 million people. The household survey establishes what thresholds cannot: two thirds of households report substantive coping or sacrifice — borrowing, food cuts, forgone care, asset sales — and more than half exhibit behavioural signatures of impoverishment risk. The 28-percentage-point wedge between the measures is not measurement failure on either side; it is the empirical signature of consumption smoothing in an economy where 96.5% of households are uninsured and any payment is impoverishing for the poorest 40% by construction.

Comparison with the literature

Regionally, Somalia's official 38.8% places it in the upper-middle of FCAS comparators — essentially level with Cameroon (38.8%, 2022), below the Central African Republic (53.0%, 2021) and the highest pre-2015 estimate (DR Congo, 60.0%, 2012) [34]. The near-total dominance of the impoverishing component (95% of hardship) mirrors the pattern in the poorest FCAS and is the arithmetic consequence of a welfare distribution in which the median sits barely above the societal poverty line [14, 15, 34]. The coping evidence sits towards the upper end of the African record: combined borrowing-or-asset-sale prevalence of approximately 29% over one month exceeds the 25.9% annual average across 40 low- and middle-income countries [11] and falls within the 23–68% annual range across 15 African countries [10] — implying substantially higher annualised exposure. Within Somalia, the findings extend the single prior household analysis [29]: where a 10%-of-income threshold registered 24% CHE, coping-based measurement registers 67% hardship — and the official revised indicator, at 38.8%, sits between the two, exactly where a definition built to add impoverishing payments but still blind to coping should sit. An independent equity analysis of Somalia's UHC progress reaches a convergent conclusion from the official data alone — that the most economically disadvantaged groups bear the highest risk of catastrophic health spending [38] — reinforcing the pro-poor gradient we observe.

Why coping-based hardship exceeds the revised indicator

The revised SDG 3.8.2 definition was adopted precisely because the old budget-share thresholds understated hardship among the poor [14, 15], and the Somali data vindicate the revision: under the old 10% threshold logic, a near-poor household making small payments registers nothing, whereas the revised definition correctly classifies it as impoverished. But the revision does not — and by construction cannot — address the second understatement mechanism identified by Flores and colleagues: households that finance payments out of borrowing, asset sales, or food sacrifice hold their measured consumption ratio below any threshold while bearing the welfare cost in other periods and other currencies (debt service, lost productive assets, nutrition) [8, 9]. A third mechanism compounds the first two and points the same way. WHO notes that people who cannot overcome financial and non-financial barriers to care report no health spending and therefore never enter the indicator's numerator, mechanically suppressing the measured rate [35]. In Somalia — with the world's lowest service-coverage index — widespread forgone care means the official 38.8% is itself likely an underestimate of true financial need; our finding that 15.3% of households delayed or forwent necessary care is the direct behavioural evidence of that suppression, and these households would raise measured hardship further had they sought and paid for care [9, 14]. Somalia is thus close to a limiting case: with universal OOP exposure, a quadrupling OOP budget share, and the poorest 40% at or below the societal poverty line [34, 35], the marginal hardship event is a small payment by a near-poor household financed through coping — visible to our survey instrument, invisible to the consumption aggregate. The two instruments bracket the truth: the official indicator is the defensible floor, the coping indicators the policy-relevant ceiling.

A two-tier framework, now demonstrated

Earlier we could only propose a two-tier measurement framework for fragile states; the 2025 publication allows it to be demonstrated (Fig. 3). Tier two — official, SIHBS-based, internationally comparable estimation under the revised definition — now exists and should be replicated, verified against the published 54.4% poverty headcount, and extended along the five products specified in the Methods, beginning with the OOP-composition breakdown the official statistics omit and which our cost-driver evidence (medication 27.4%, diagnostics 22.1%, consultations 17.0%) provisionally fills. Tier one — coping-based indicators implementable in any survey with a single financial-consequences item — supplies timely monitoring between budget-survey rounds and captures the hardship tier thresholds cannot. The deliberate refusal to convert banded payments into pseudo-continuous CHE inputs remains correct: midpoint imputation compresses variance and biases threshold-crossing statistics [31–33], and Somalia now has official threshold statistics produced from the proper instrument.

Policy implications

Five implications follow for the Health Financing Strategy 2026–2030 [28]. First, targeting: with hardship universal in the poorest quintile, near-universal in the second, and negligible in the top two, financial protection resources — exemption regimes, subsidised enrolment in the prospective National Health Insurance Fund, demand-side transfers — should be explicitly pro-poor and rural-weighted (55.4% rural versus 28.8% urban prevalence), rather than population-wide. Second, medicines: as the leading cost driver, pharmaceutical availability and price regulation in the public supply chain remain the high-impact

intervention, consistent with global OOP composition evidence [1]. Third, pooling: the near-trebling of hardship odds among the uninsured provides the empirical warrant for the NHIF and community-based pathways. Fourth, monitoring: coping items should be institutionalised in routine surveys, and the SNBS should implement the replication-and-extension protocol — reconfirming the published figures against the live GHO accession, producing the composition and Federal Member State disaggregations, and reporting under both definitional vintages. Fifth, trend interpretation: the 2016–2017 estimates derive from a different instrument (High Frequency Survey) than 2022 (SIHBS), so the 5.6-point rise should be read as indicative rather than precisely measured.

Generalisability and external validity

The survey was not weighted to the national population and over-represents Banadir and other accessible, predominantly urban areas; its results therefore describe surveyed households rather than Somalia as a whole, and every nationally representative figure in this paper comes exclusively from the official SIHBS-based estimates. Crucially, the direction of this sampling bias works against our central finding rather than inflating it. The official data show rural prevalence (55.4%) nearly double urban (28.8%) and near-universal hardship in the poorest two quintiles — precisely the populations under-represented in an urban-skewed sample. A nationally representative survey would therefore be expected to record coping-based hardship at least as high as, and plausibly higher than, the 67% observed here. The 28-percentage-point wedge between coping-based and official measures should accordingly be read as a conservative lower bound on the true gap, consistent with our stated objective of conceptual triangulation rather than national prevalence estimation.

Strengths and limitations

Strengths include the first integration of official revised SDG 3.8.2 estimates with household coping evidence in a fragile state, the largest financial protection survey yet analysed for Somalia, a theoretically grounded indicator set, and conservative analytic choices. Limitations are material. First, the official estimates are now published in the December 2025 Global Monitoring Report and the GHO database; because WHO revises societal-poverty-line values as purchasing-power-parity factors are updated, the precise figures should be reconfirmed against the live GHO accession at the date of publication. Second, the survey is unweighted and over-represents Banadir; survey-based prevalence describes surveyed households, and the urban skew likely makes the national coping burden higher than reported, given the official rural gradient. Third, the two sources differ in construct, population, period (2022 versus 2023–2024), and recall window (annual aggregate versus one month); the triangulation is interpretive, not a formal reconciliation, and the 28-point wedge should be read as an order of magnitude. Fourth, banded OOP elicitation precludes survey-side CHE computation and risks recall error, and the financial-consequences item wording was reconstructed from the analysis dataset variables rather than verified against the archived fielded instrument, which is available from the author [31]. Fifth, coping responses are self-reported and subject to social desirability and recall bias of uncertain net direction. Sixth, the cross-sectional design supports association, not causation; illness severity, unmeasured, plausibly co-

determines payments and hardship. Seventh, the proxy impoverishment-risk indicator is behavioural rather than monetary and is benchmarked against, not substitutable for, the official impoverishment statistics. Future nationally representative household surveys incorporating both expenditure-ratio measures and coping indicators would allow direct validation of the proposed framework.

Conclusions

Somalia's first official SDG 3.8.2 estimates reveal a financial protection crisis that is overwhelmingly impoverishing, extremely concentrated among the poor, and rural-weighted; household coping evidence reveals that the crisis extends roughly 28 percentage points beyond what even the revised threshold registers, through borrowing, food sacrifice, forgone care, and asset depletion that consumption-based measurement cannot see and that widespread unmet need further hides. Read together — official floor, coping-based ceiling — the two evidence streams give Somalia, for the first time, a a more comprehensive evidence base for monitoring financial protection. Institutionalising both tiers, and directing the Health Financing Strategy's pooling, exemption, and medicines reforms at the poorest two quintiles and rural populations where hardship is universal, is the measurable test the strategy must now pass.

Abbreviations

aOR
adjusted odds ratio
CHE
catastrophic health expenditure
CI
confidence interval
DDI
Data Documentation Initiative
FCAS
fragile and conflict-affected settings
GHO
Global Health Observatory
HFS
High Frequency Survey
LCU
local currency unit
NHIF
National Health Insurance Fund
NQ
did not pass quality checks
NR

not released
OOP
out-of-pocket
PPP
purchasing power parity
SDG
Sustainable Development Goal
SIHBS
Somalia Integrated Household Budget Survey
SNBS
Somalia National Bureau of Statistics
SPL
societal poverty line
UHC
universal health coverage.

Declarations

Supplementary files (to accompany submission)

Supplementary File 1: completed STROBE checklist. Supplementary File 2: annotated pseudocode and Stata/R reference implementations of the replication-and-extension protocol, including validation against the published 54.4% poverty headcount and the official revised-3.8.2 verification targets, and dual-definition (pre-2025 and revised) estimation. Supplementary File 3: survey instrument (financial-consequences module), reconstructed from the analysis dataset variables; the original instrument as fielded is available from the author on request. Supplementary File 4: extracted official tables (revised SDG 3.8.2 estimates, components, disaggregations, and ancillary statistics) as published in the 2025 Global Monitoring Report and GHO database.

Ethics approval and consent to participate:

The study was conducted in accordance with the principles of the Declaration of Helsinki. The household survey collected no biomedical specimens and posed minimal risk; participation was voluntary, informed consent was obtained from all respondents before interview, and all responses were anonymised prior to analysis. Ethics approval for the survey was granted by Ministry of Health and Human Services. The official SDG 3.8.2 estimates and the WHO Global Health Observatory database contain no individual-level data and required no separate ethics review.

Competing interests:

The author declare no competing interests.

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Author Contribution

KMM conceived the study, led the analysis and triangulation, contributed to data collection, analysis, and critical revision, and drafted the manuscript. The author read and approved the final manuscript.

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Availability of data and materials:

The de-identified survey dataset and analysis code are available from the corresponding author on reasonable request, as is the originally fielded survey instrument. Somalia's official SDG 3.8.2 estimates are published in the WHO/World Bank 2025 Global Monitoring Report and the WHO Global Health Observatory financial protection database; SIHBS 2022 documentation is publicly available from the Somalia National Bureau of Statistics.

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Figures

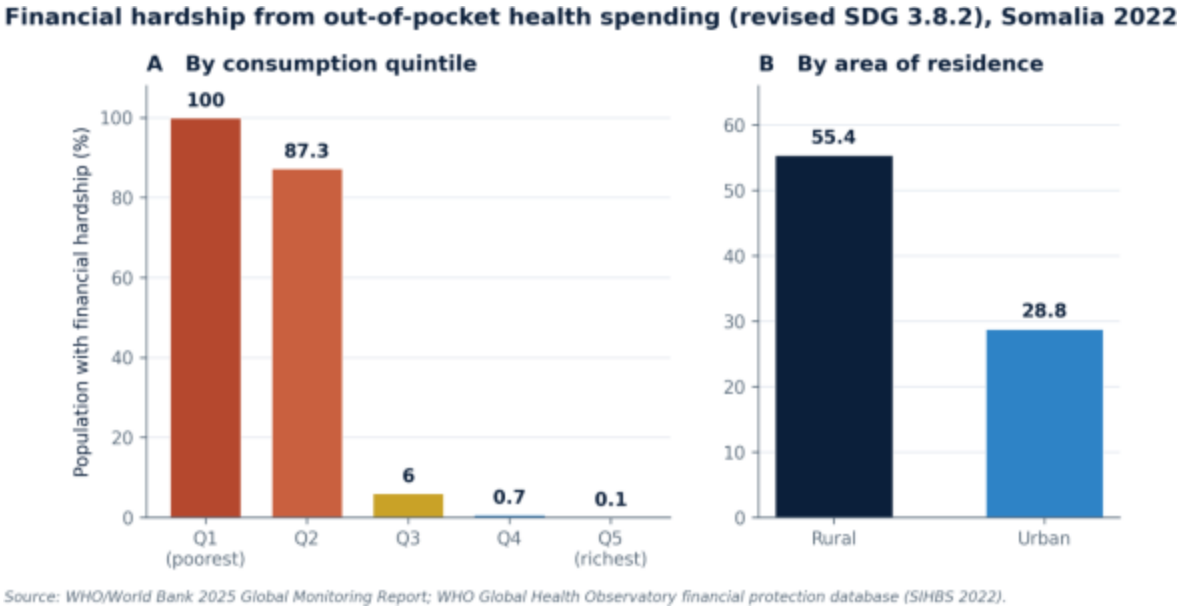


Figure 1

Socioeconomic inequalities in financial hardship across consumption quintiles and rural–urban populations

Source. Financial hardship from out-of-pocket health spending (revised SDG 3.8.2), Somalia 2022, by consumption quintile (A) and area of residence (B). Source: WHO/World Bank 2025 Global Monitoring Report and WHO Global Health Observatory financial protection database (SIHBS 2022).

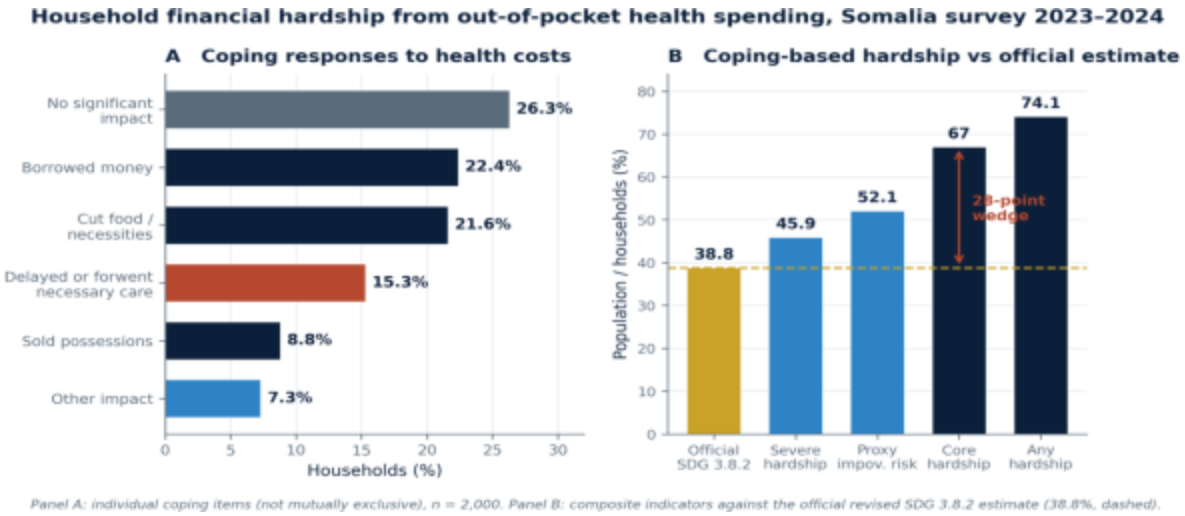


Figure 2

Household coping responses and coping-based indicators compared with the official revised SDG 3.8.2 estimate

Source: Household financial hardship from out-of-pocket health spending, Somalia survey 2023–2024: individual coping responses (A) and composite hardship indicators against the official revised SDG 3.8.2 estimate (B). The dashed line marks the official 38.8% estimate; the bracket shows the 28-percentage-point wedge.

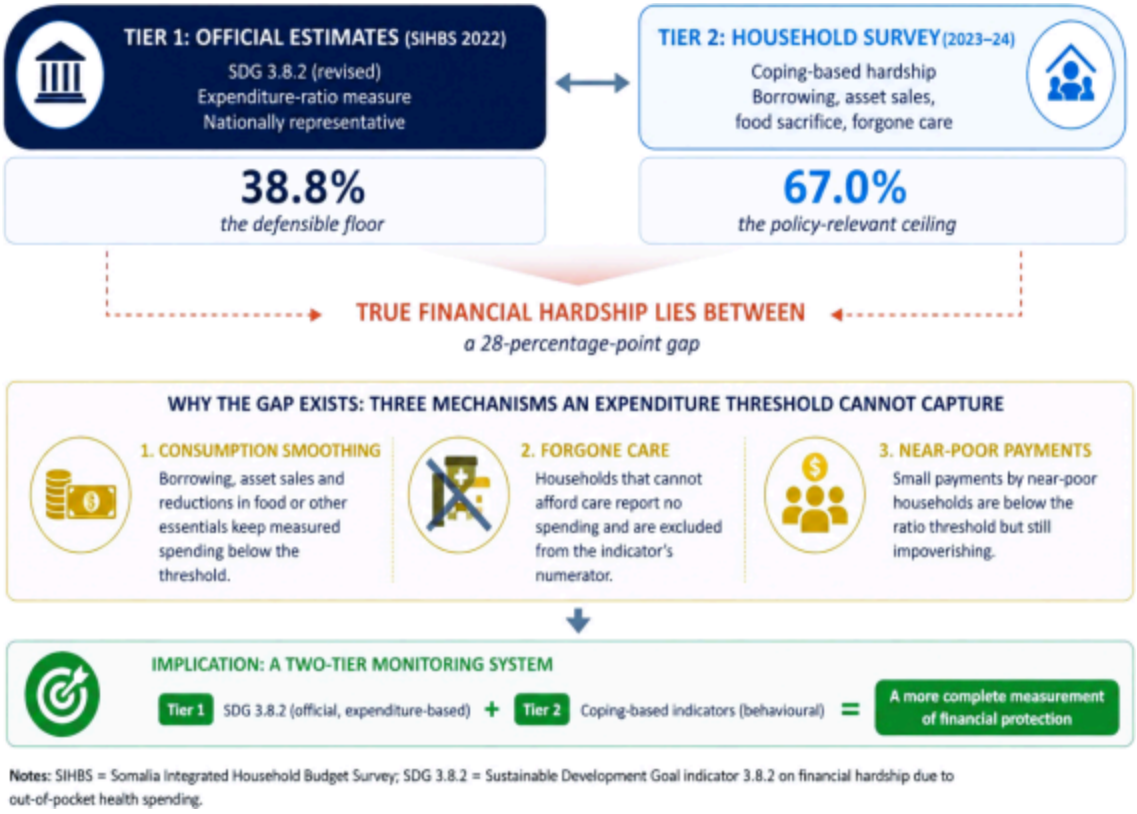


Figure 3

A Two-Tier Framework for Measuring Financial Hardship in Fragile Settings

Source. A two-tier framework for measuring financial hardship in a fragile setting. The official SIHBS-based estimate (38.8%) is the nationally representative floor; survey-based coping hardship (67.0%) is the policy-relevant ceiling. Three mechanisms — consumption smoothing, forgone care, and impoverishing small payments by near-poor households — explain why an expenditure-ratio threshold cannot capture the full burden.