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Deriving the roles of health as limitative factor in livelihood and wellbeing among poultry farm holders: An empirical magnitudinal disintegration of the Alkire-Foster Multidimensional poverty indicators

Popoola DP

ABSTRACT

Health has been considered critical to humans' existence, while its roles in livelihood and wellbeing, remained largely unquantified among susceptible economic stakeholders. This study seeks to explore the limitative health roles in livelihood and wellbeing, using primary data from 210 poultry farm households, collected by a multistaged sampling procedure, and analysed using parametric, and non-parametric tools. Analytical result showed that; majorities (70.83%) of the health-limited households were solely farmers, with higher multidimensional poverty incidence, and significantly fewer rooms per household, relative to the health non-limited households category. Furthermore, result from the derived- disintegrated Alkire- Foster Multidimensional poverty measure on determining health limitational contributions to multidimensional poverty, found that the mean weighted health deprivation (Mean HW) score, and mean deprivation counts (Mean DC) for the health-limited households was 16.667, and 29.398 respectively, while the computed health-livelihood limitation contributions to multidimensional poverty was 56.69%, implying that health constituted Lion's share of their multidimensional poverty weights (DC), with a very high difference significance. Also, the result of the analyses on the influence of health- livelihood limitation on output level showed that daily output of the health non-limited farmers significantly exceeds the health-limited category by 268.91%, wherein, daily output suffers a cumulative average of about 38.4 crates shortages per day, in association with health's livelihood limitation, which also amounts to $2800.941 monthly, per head, using the current exchange rate of 1700 NGN/ $ while; Marital status, Household size, Primary occupation, Access to infrastructure, and Housing; but Farm income, and Cooperative membership,

significantly influence health-limiting livelihood, and wellbeing positively. The empirical work also impacted existing health economics theories, with the consequential contributory limiting health theoretical concept, while empirical finding-based recommendations were further proffered.

Keywords: Health limiting factors, Health livelihood roles, Livestock Farmers, Health Wellbeing, Health economics.

1. INTRODUCTION

As the world pools efforts to tackle the problems of food shortages embattling it, the roles of health and wellbeing at the upstream becomes a matter of concern. Agriculture, which encompasses production of crops, and livestock for households, and industrial consumption remains the mainstay of the World's economies besides being the primary source of humans existence from the provision of Ornamental, Medicinal, and crops/ livestock upon which humans subsists, and thrives for their Satisfaction/Relieves, Healings/Cures, and Quality nutrition/livelihoods respectively required for a healthy life, while Carol et al., (2009) stated that health is considered as a critical wellbeing component, and an essential socioeconomic development factor among any people, Jones et al., (2008), Bank, (2009) concluded that, poor health can considerably lower national development prospects hence, concerns for the poors' health becomes a topical development issue, but about 60.0% of known infectious vectors, and 75.0% of emerging human pathogens are zoonotic.

It is hence, imperative for farmers to implement adequate precautions such as; Adequate Bio-security measures by frequent quarantining, and Sanitation; Periodic Health Monitoring; Timely Vaccination; Quality Nutrition; Pest Control; and Effective farm management practices to curb many pathogenic epidemy. Similarly, besides these pathogenic transmissions, it is factual that many Agricultural-Farm tasks usually involve exposure to either; harsh work environments, fatiguing or aching postures, and routine-brainstorming tasks, or their combinations alongside their multipliers, which increases susceptibility to stress-induced sicknesses such as vector transmitted infections, head-body aches, rheumatism, metabolic disorders, and other infectious and noninfectious maladies which may have otherwise been prevented.

An implication of the afore is health becoming a limiting factor to livelihood, and other necessary routines. The International labour Organization- ILO, (2000), concluded that the agricultural sector is one of the most hazardous, when considering occupational hazards. Consequentially, there is therefore a need for individuals always to seek to optimise and maintain a quality health-safety standard measures to sustain their increasing productivity capabilities, while reducing the potential losses, and wasteful demands during health limiting periods. When health becomes a limiting factor to life routines, it posses a national loss, beyond individual's deprivations as increasing wellbeing, and productivity becomes threatened at the Household (Income)- National (GDP) level, in addition to its transference on other dependants, thereby making it a subject of enormous importance.

Although, there appears to be an increasing global attention on health economics, owing to trending health-systemic cost consciousness, surges in environmental variables, and the metamorphism from the overly humanists, towards increasing integration of manageability techniques and quantitative inquiry research needs. However, it appears that many social science authors have concluded the quantification of health as nearly impossible, using numerical approach, which probably makes it quite less explored. At the same time, very few (rare) researchers investigated the magnitudinal roles of health in livelihood and well-being yet, none quantified the burdens which health imposes when it becomes limiting factor to livelihood among farm holders.

Review of literature

Regarding some existing works; the World Health Organization reported that a combination of many factors affects individuals' and, or communities' health. Whether people are healthy, or not, is a determinant of their circumstances, and environment. Largely, factors such as where they resides, income, genetics, and education level, alongside their relationships all have considerable impacts on health. In contrast, the more widely expected factors such as access to, and use of health care services usually have lesser health impacts. To bridge existing gaps, this study quantified the role of health as limitative factor in livelihood and wellbeing, while revealing the actual magnitudinal burdens that health imposes on existing multidimensional poverty pools, alongside its determinant factors among susceptible homogeneous population, using asserted globalised quantitative indices.

Olatunji et al., (2013), in their research titled 'Utilization of Western, and traditional healthcare services by Farm Families', using a multistaged sampling technique to select 133 samples, analyzed with descriptive statistics, discovered that, the prevalent health limitations in the study area were related to occupational hazard induced conditions such as injuries, acute headache, waist pains, and inadequate hygiene-related illnesses. Their research focused on health care dynamics, and health care accessibility problems. To bridge existing gaps, this study will proceed to quantify the role of health as limitative factor in livelihood and wellbeing, while revealing the actual magnitudinal burdens of health to the existing deprivation pools, and its determinant factors among susceptible homogeneous population, using asserted globalised quantitative indices.

Adeyeye et al., (2020) in their work titled; 'Influence of disease outbreak initiator on livelihood of small-holder poultry farmers in Abeokuta', using a multistage sampling procedure in selection of 67 respondents from two communities, and analyzed using descriptive and inferential statistics found that; fall in household income level (85.1%) and number of birds (46.3%), were influence of disease outbreaks on livelihood, while Poor sanitation of poultry housing (p=0.000), untimely sickly- culling (p=0.001), and late litter changing (p=0.02) were associated with disease outbreaks. Their research focused more on livestock properties and less on farmers' household properties influences on livelihood. Hence, to bridge existing gaps, this study resolved to quantify and reveal the actual magnitudinal burdens of health to the existing households' deprivation pools, and its determinant factors among susceptible homogeneous population, using asserted globalised quantitative indices.

Also, John, (2009), in a research titled 'Farmers' health and agricultural productivity in rural Ethiopia', using the 1999 Ethiopian Rural Household Survey data, a longitudinal household dataset covering households in rural Ethiopia since 1989, including about 1,500 rural households found that; healthy farmers produce more per unit of inputs, earns more income and supply more labor per time, than farmers affected by sickness. The model results showed that production inefficiency increases significantly with number of sick days. Although, this research investigated the influence of health limitations on income and productivity, it however ignored some existing research gaps such as quantifying and revealing the actual magnitudinal variations, while the burdens of health on the existing households' deprivation pools, and its determinant factors among susceptible homogeneous population are wanting, perhaps due to data limitations, as I seek to address in this research.

Furthermore, Cao et al., (2020) conducted a research titled 'Health literacy toward zoonotic diseases among livestock Farmers in Vietnam', using questionnaire survey data among 218 farmers, collected by a cross-sectional mixed-methods, and found that half of the participants were men, with average age 49.3 years, and a majority (82.0%) of the respondents had moderate level of health literacy on zoonosis. To bridge existing gaps, this study resolved to quantify and reveal the actual magnitudinal burdens of health on the existing households' deprivation weights, alongside its determinant factors among a susceptible homogeneous population, using asserted globalised quantitative indices.

To add, Kazeem et al., (2023) in a study titled; 'Impact of the decision to use health care facilities among farming households on labof productivity in Ogun State Nigeria', using a multistage sampling procedure to select 200 households found that; productivity of health facilities users was ₦652.34/ man-day higher than the non-users. To bridge existing research gaps, this study resolved to quantify, and reveal the actual magnitudinal influence of health on livelihood, contributions of health limitations to the existing households' deprivation count pools, and the determinant factors among susceptible homogeneous population, using asserted globalised quantitative indices.

Findings from this study would be beneficial to the Government towards understanding the current state of health challenges, and proffering relevant institutional policies. At the same time, Health care service providers would be exposed to the dynamics of health care to further manage it, more effectively, especially for advancing human medicine, and medical biotechnology. Also, farm firms will obtain more sound knowledge of their health economics, with factors influencing it, towards a more productive life. This study hereby seeks to unravel the role and magnitudes of health as limitative factor in livelihood and wellbeing, alongside its determinant factors among the poultry farm holders in the study area, with the following major specificities;

Profile the significance of their socioeconomic characteristics by health-livelihood limiting statuses,

Compute the level of health-livelihood limitation contributions to multidimensional poverty pool,

Quantify the influence of health-livelihood limitation on output, and

Analyse the factors determining the likelihood of health as being limitation to livelihood.

Hypotheses testing

H01 = There exists no significant socioeconomic characteristics differences between the health- livelihood limited and the health-livelihood non-limited farm holders,

H02 = There are no significant differentials between the deprivation counts of the health- livelihood limited and health-livelihood non-limited households,

H03 = There are no significant variations between the output level of the health- livelihood limited and the health-livelihood non-limited farm holders, and

H04 = No valid determinants of health as a limitation to livelihood likelihoods among the farmholders.

Theoretical and Conceptual Framework

The linkage between health and labor productivity builds majorly on the household production theory of Becker, (1965), where households are regarded as producers of 'goods and services' rather than mere consumers of commodities. This later metamorphosed into the Grossman, (1972), Grossman, (1999) model, where health was perceived as durable capital commodity, yielding an output of 'healthy time'. Here individuals assumed to be endowed with, and depreciates with time, but may increase when invested into. Furthermore, Pitt and Rosenzweig, (1986) developed a framework that enables evaluating the impact of a changes in health on firm's productivity, labor supply and overall income. Considering the need to go beyond the gross term 'Health' as presided by many existing theoretical schools, this research hence conceptualised a "limiting health economic theory".

Limiting Health Theory

With health already established to be a capital commodity, it can hence appreciate or depreciate, like some other economic capitals under some tangible, and intangible phenomenal variabilities that needs to be identified for their measurability. To achieve this, this study goes further by introducing some conjectural health influencing variables, such as the; Time, Income, Environmental, and Manageability dimensions, that were largely ignored by many other existing health economics theories. Concerning Health, Health assumes a dualistic function of determining how sooner a task is completed, and how sooner a sick or health-limited individual recovers, while everyone has varying or equal chance in time.

Also, Income level triggers or motivates good self-perception and healthy self-esteem, as may be determined by workload, influence, capacity, dispensability, and potentials, hereby boosting a latent mental health process, while the Environmental dimension has to do with the humans' physical and non-physical environment, where a healthy environment is a comparative asset, and may be influenced by housing, occupation, climatic condition, etc. The Manageability dimension integrates all others as it assumes health to be phenomenally a vast natural, yet limited economic resource endowment with its rationable scarcity, while its availability hinges on its manageability, in decision making. Manageability may be influenced by years of experience, physical capability, age, education, associations, etc.

Hence, in this research, it is theoretically deductible that health is a capital stock, hypothetically subjective to a set of commodity accomplishments vis-à-vis budget constraints within a permissible functional minimum limit as follows;

$$HLim = \hat{E}\,[\,\bar{G}1, \bar{G}2, \bar{G}3, \bar{G}4, \mu\,]t \geqq Lim \quad (1)$$

But, when in a situation where health becomes a limiting factor to livelihood, it assumes a functional representation as;

$$H'Lim(W_t) < Lim \quad (2)$$

Or limiting factor to life (at its critical), and the functional representation is;

$$H''Lim(W_t) < \sim Lim \quad (3)$$

Where;

HLim= Health budget, $\hat{E}$ = Workload mean, $\bar{G}1$= Time mean, $\bar{G}2$= Income mean, $\bar{G}3$= Environmental factor mean, $\bar{G}4$= Manageability mean, μ = Stochastic mean, and Lim = Limiting threshold.

2. METHODOLOGY

Study Area/Sampling

The sample for this study was generated among South West Nigerian Poultry Farmers, by multistaged sampling procedures. Initially, Oyo State was purposively selected from the six existing South Western States (Osun, Lagos, Ogun, Ondo, Oyo, and Ekiti), since there are a large number of poultry farmers within, with a land surface area of about 35,743 square kilometers as located between latitudes 2oN and 5°N; longitudes 9.3°E and 7°E, with a mean temperature range between 24°C and 25°C. Second stage followed a stratification by non-heterogeneous and non-overlapping grouping into; the dense poultry production areas and less dense poultry producer areas strata (majorly on poultry production intensity), among which two agricultural zones (Oyo and Ibadan/ Ibarapa respectively) were randomly selected per strata from the existing four (Ogbomoso, Ibadan/ Ibarapa, Saki and Oyo) Agricultural Zones in the State (Figure 1).

A random selection of three Local Government Areas (LGAs) per Ibadan/ Ibarapa Zone (Ibadan North, Ibadan South, and Ido), and Oyo agricultural zones (Oyo Central, Oyo West, and Afijio) was the third sampling stage, which was followed by random selection of 10 farm communities; one community within Ibadan South, Ibadan North, and two from Ido LGAs (with Ido's relatively larger poultry production), while one community was selected per Oyo central, Oyo west, and four communities from the Afijio LGA (due to relatively larger poultry production activities taking place against the former), from which 240 poultry farming household was randomly selected, but 210 research instruments were appreciably completed, and returned.

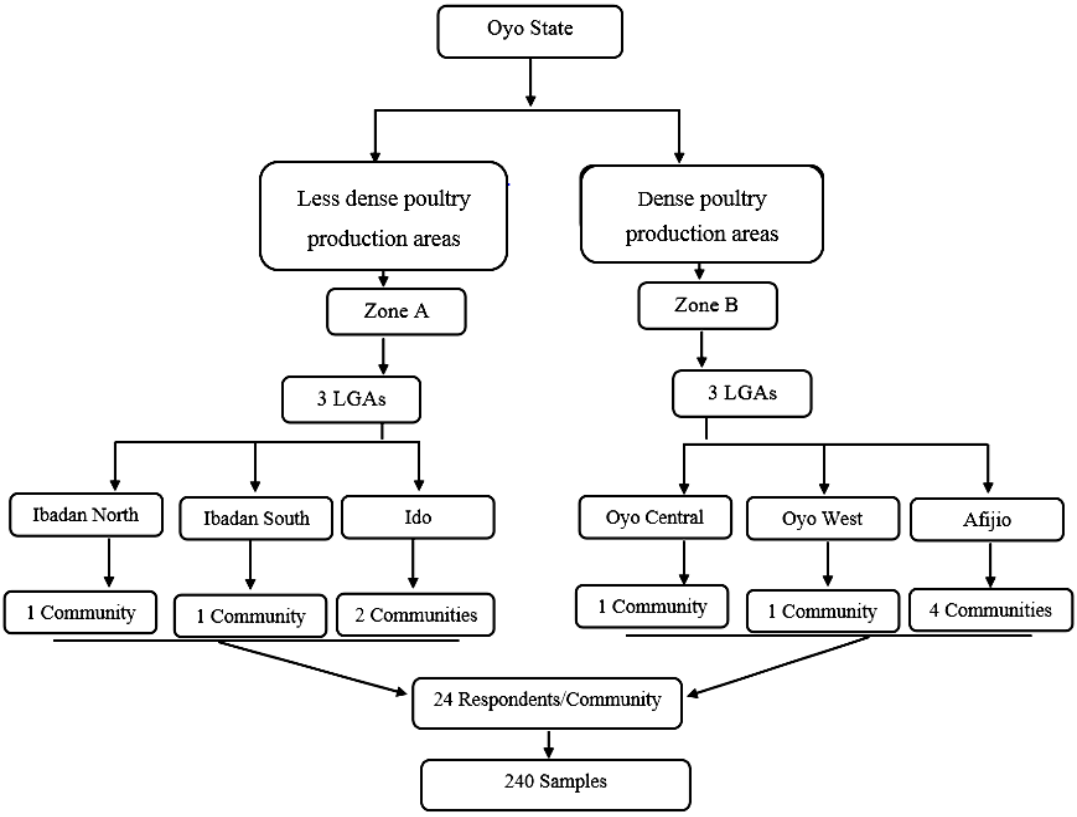

Figure 1 Sampling procedures for the study
Source: Adapted from Oyo State Government, (2020).

Analytical framework

Z-Test

Z-test was employed to test the significance of existing differentials between two parameters of the hypothesized variables. It goes as;

$$X = \frac{M_2 - M_1}{\sqrt{SE_2 + SE_1}} \quad (4)$$

Where; M1, and M2= Mean of two unpaired groups, SE1, and SE2= Variance parameters of the two unpaired categories.
H0 = There is no significant differentials between the parameters (such as Output level) between the health-limited, and health non-limited categories of poultry farmers.

Disintegrated Alkire- Foster Multidimensional poverty measure

To compute the level of health- livelihood limitation contributions to multidimensional poverty, this study adapted the Alkire-Fosters' Health as a Limiting factor to Multidimensional poverty Index Weighing Method, where a household is considered deprived if their health condition is a limiting factor in many routines, such household is scored a deprivation count of -6-1 and zero if otherwise out of unitary wellbeing summative. The Multidimensional Poverty average intensity of deprivations (A), is a summation of 10 poverty indicators vis-à-vis; Schooling years, Childs' enrolment, Electricity, Drinking water, Sanitation, Housing, Cooking fuel, Assets, Quality of Health access, and Health as a Limiting factor. Hence, deriving their multidimensional poverty deprivation counts for the model built on the Average Intensity of deprivation (A) from is specified in eqn 5;

$$A\ (Y; k; P) \equiv \frac{\sum_{n=1}^{N} I\ (Dc \geq k)Dn}{q} = \frac{\sum_{1}^{q} D}{q} \quad (5)$$

Where;
A = Average deprivation intensity, q = Number of the multidimensionally poor, N= Total individuals, Dc= deprivation score, k= Poverty cut- off, I () = "assumes unitary if the parenthesized expression is true. It otherwise becomes zero".
The 'A' captures those of the multidimensionally poor household category, and to quantify the proportional contributions of health-livelihood limitation within the multidimensionally poor households, the decomposability by a population sub-group(s) approach was utilised as follows;

Decomposability by a population sub-group(s)

A major characteristic of the multidimensional poverty index is that it can well be decomposed/ disintegrated into a population sub-group such as that of ethnicity, religious, social statuses, etc., as determined by the research objectives, and sampling scope. The decomposition formula is:

$$M0 = \frac{Nx}{N}Mx + \frac{Ny}{N}My \quad (6)$$

Where x denotes sub-group X, and Y denotes subgroup Y, while Nx/N equals the population subgroup Nx which is a total population proportion, and it is similar for Ny/N (and, Nx + Ny = N). This interrelationship can also be an extension of other group numbers, in so far as their respective populations adds up to give the entire population counts/ indices. Where the share of each group within the overall poverty estimate is computable as sub-group X to M0;

$$= \frac{Nx}{N}Mx/\ M0 \times 100 \quad (7)$$

For whole derivation of the proportionate contributions of health- livelihood limitations to multidimensional poverty (HL-MPI), or Health-Poverty Limiting Ratio (H-PL), this study further disintegrated the Average Intensity of deprivation (A), and the decomposability by a population sub-group(s). Study based further -final H- PL derivations outcomes goes as follows;

$$H - PL = \frac{\sum_{0=1}^{n} LHW_{HL}}{\sum_{0=1}^{N} DC_{HL}} \quad (8)$$

The percentage contributions was further computed from the derived eqn. 5, where;

$$\%H - PL = \frac{\sum_{0=1}^{n} LHW_{HL}}{\sum_{0=1}^{N} D_{HL}} * 100 \quad (9)$$

HL = health-limited households, where health poses a major limitations to livelihood,
DC = Deprivation counts, and
LHW = Limiting health weight extraction from the Alkire-Foster Multidimensional Poverty Dimensions, Indicators and Weights.

Determinants of health condition as a limiting factor in many routines.

The sample for this study mainly composes of poultry farmers that solely practices poultry production for livelihood. To analyse the factors determining health as a limitation to livelihood, multiple regression analyses was utilised as follows;

Multiple regression model

A multiple regression model was used due to its capability to sufficiently capture the maximum likelihood and depths (magnitudes) in its analyses, hence preferred to the Logit and Probit models in terms of measuring the likelihood and the magnitude of associations between the hypothesized independent and dependent variables.

The implicit model is specified as;

$$Y_i = \beta_0 + \sum_{i=1}^{n} \beta_i X_i + \mu_i \quad (10)$$

Explicit model specification;

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_n X_n + \mu_i \quad (11)$$

Where; Yi = Absolute Limiting Health Weight (|LHW|), Xi = Explanatory variables, n=12, μi= Random term; μ~$N(0, \sigma 2)$, β($_0$, $_i$) = Estimated Intercept, and Marginality parameters

X1= Output (Egg Crates/ day), X2 = Farm labof employed (Dummy; Paid labor=1, Family Labor=0), X3 = Access to credit (dummy; Yes=1; No=0), X4 = Cooperative membership (dummy; Yes=1; No=0), X5= Electricity Infrastructural access (Yes= 1; No=0), X6 = Number of persons in the household, X7= Farming experience in years, X8= Farm size (Stock headcount), X9= Marital status (married=1, otherwise=0), X10= Farming as primary occupation (dummy; Yes=1; No=0), X11 = Housing status (Number of persons per room), X12 = Income of ith household (N), μi = Error term.

Variance Inflation Factor (VIF)

With multicollinearity, multiple regression estimators possesses an outrageous covariance and variance hence, an outlier insignificant T-values, and an outrageous determination coefficient. The VIF reveals validity with which the covariances and the variances of the estimator moves. The VIF diagnostic is specified as;

$$\text{VIF} = \frac{1}{(1 - R_j^2)} \quad (12)$$

Where: = $1 - R_j^2$ = Tolerance, j= Range of explanatory variables, R_j^2 = Regression determination Coefficient of "jth" explanators. Idiosyncratically, if VIF ≥ 5, the variable is said to be highly collinear and irrelevant, once it reaches values ≥10 (University College, Louis Angeles-UCLA, undated).

3. RESULTS AND DISCUSSIONS

Socio economic characteristics by health- livelihood limiting statuses

The significantly skewed distribution was normalised, and with the analyses following a significantly unbiased condition, hypotheses testing was proceeded. The result of the analyses on the Socio-economic characteristics by health- livelihood limiting statuses of the poultry farm holders is presented in (Table 1). The result shows that majorities (70.83) of the health-limited households primarily engaged in farming has livelihood, relative to the health non-limited households. Also, the health-limited, and health non-limited households had an average of about 2-3, and 3-4 rooms per household, which was found significant at 5% probabilistic level, while the causality result was presented in (Table 5). Also, regarding their multidimensional wellbeing status, about 37% of the health-limited households are multidimensionally poor, in comparison, it is lower (21%) for the health non-limited households, and there exists a significant difference in their multidimensional wellbeing index at 1% probabilistic level.

Table 1 Result on Socio economic characteristics by health- livelihood limiting statuses.

Variables	Limited (percentage)	Non- Limited (percentage)	Pooled (percentage)
Skewness- Diagnostics	N= 24	N= 186	210 P=0.0000***
	N= 24	N= 38	62 P= 0.1149
Household size (Persons)			
1-2	25.00	10.53	16.13
3-4	29.17	42.11	37.10
5-6	41.67	26.32	32.26
>7	4.17	21.05	14.52 P= 0.1521
Mean	3.916667	4.605263	4.33871
Access to infrastructure			
Yes	4.17	13.6	9.68
No	95.83	86.84	90.32
Economically diversified			
Yes	29.17	60.53	48.39
No	70.83	39.47	51.61 P=0.0715*
Formal education (Years)			
<1	0.00	10.53	6.45
1-6	0.00	2.63	1.61
10-12	4.17	2.63	3.23
13-16	25.00	7.89	14.52
>16	70.83	76.32	74.19 P=0.4072
Mean	18.20833	17	17.46774
Marital status			
Non married	20.83	21.05	20.97
Married	79.17	78.95	79.03
Housing (Rooms/ House)			
1	12.50	7.89	9.68
2-3	66.67	26.32	41.94
4 -5	16.67	57.89	41.94
≧6	4.17	7.89	6.45 P=0.0213**
Mean	2.916667	3.815789	3.467742
Quality healthcare access			
No	25.00	31.58	29.03
Yes	75.00	68.42	70.97
Multidimensional poverty			
Poor	37.50	21.05	27.42
Nonpoor	62.50	78.95	72.58 P=0.0056***
Pooled	N= 24	N= 38	62

Source: Field survey data analyses. Significant at; *** 1%, **5%, and *10%.

Health-livelihood limitation contributions to multidimensional poverty.

To determine the level of health-livelihood limitation contributions to multidimensional poverty, the Alkire-Foster Multidimensional poverty measure was adapted by disintegration into subgroup, with the result presented in (Table 2). The result showed that the mean

weighted health deprivation (Mean HW) score, and mean deprivation counts (Mean DC) for the health-limited households was 16.667, and 29.398 respectively, while the computed Health-Livelihood Limitation contributions to multidimensional poverty was 56.693. Also, the deprivation counts of the health-limited households was significantly higher than their health non-limited counterparts, and found significant at 1% probabilistic level, which attunes.

Table 2 Result on level of health- livelihood limitation contributions to multidimensional poverty.

Variables	Mean Health Weight (HW)	Health- Poverty Limiting Ratio (H-PL)	Percentage H-PL
Health-limited	16.667	0.56693	56.69291
Diagnostics	Mean Deprivation Counts (DC) = 29.398, MinDC = 0.166667, MaxDC = 0.5, STD.DEV= 0.1002937.		P =0.0056***

Source: Field survey data analyses. Significant at; *** 1%, **5%, and *10%.

Influence of health- livelihood limitations on output level.

The magnitudinal influence of health could provide important insight on its relevance to health economics of agricultural households, and improve decision makings. When health condition becomes a limiting factor in many routines, it might impose considerable differences in the outcome of crucial economic variables such as in farm output, among the health-limited and non-limited households, as revealed herewith. The result of the analyses on the influence of health- livelihood limitation on output level is presented in Table 3 & Figure 2, and it showed that the daily output of the health non-limited farm holders is significantly higher than the health-limited category by 268.91%.

In other words, with the well specified model, we can conclude that daily output suffers a cumulative average of about 38.4 Crates shortages per day, in association with health being a limiting factor to livelihood, in a yet climatically favourably located production zone. This loss also amounts to $2800.941 monthly, per production unit when monetized, using the current exchange rate of 1700 NGN/$, and found significant at 5% probabilistic level, and relates to the findings of (John, 2009; Adeyeye et al., 2020).

Table 3 Result on the magnitudinal influence of health- livelihood limitation imposition on output level.

Variables	Non- Limited	Limited	Pooled
Mean daily output (Crates)	52.72368	14.29167	37.84677
STD-DEV	77.49409	20.42692	64.46766
DIFF	38.43202		P= 0.0209**

Source: Field survey data analyses. Significant at; *** 1%, **5%, and *10%.

Multicollinearity

Multicollinearity is a problem of magnitudinal intensity, and less of existential occurrence, given its permissible occurrence interval of <10. The result of the multicollinearity diagnostic analysis showed that, the independent variables varies randomly, and the dependent variable does not drag any explanatory variable in the model used, hereby certifying an acceptable model specification. The result is presented in (Table 4).

Factors determining the likelihood of health becoming a limitation to livelihood.

Multiple regression analyses was used to analyse the factors determining the likelihood of health becoming a limitation to livelihood, and the model indicated a good fit with a deterministic coefficient of 51.24%, adjusted to 37.63% and significant at 1%. Also, out of the 12 analytical conjecture variables, only six were validated vis-à-vis; Marital status, Household size, Primary occupation, Cooperative membership, Infrastructural access, Housing, and Income, as presented in (Table 5). Marital status positively influenced the magnitude of health becoming a limitation to livelihood with a coefficient of 0.0486037. This is likely due to the increased marital socioeconomic responsibilities and its demands, considering the relatively higher financial resource demands, human resource demands, and other demands of poultry farming. This was found significant at 5% probability level.

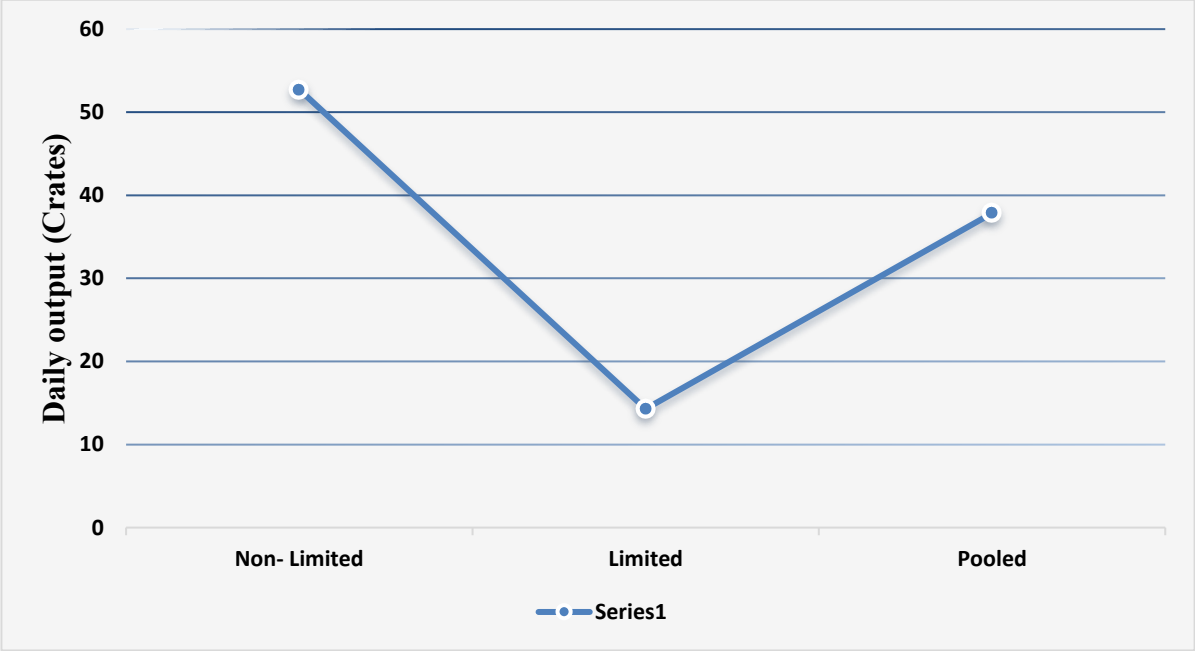

Figure 2 Magnitudinal Influence of Health- Livelihood Limitations on Output Level.
Source: Field survey data analyses

Table 4 Variance Inflation Factor (VIF)

Variables	VIF	1/VIF
Farm size	5.87	0.170336
Daily output	5.46	0.183289
Access to credit	1.88	0.530859
Primary labof source	1.73	0.577825
Access to infrastructure	1.61	0.620926
Household size	1.49	0.667840
Cooperative membership	1.63	0.614635
Lnfi	1.49	0.669385
Primary occupation	1.28	0.778547
Housing	1.46	0.685476
Marital status	1.40	0.712806
Farming experience	1.19	0.842369
Mean	2.21	

Source: Field survey data analyses

Furthermore, Access to electricity infrastructure was also found to positively influence the magnitude of health-limitation to livelihood with a coefficient of 0.074171. This might be due to the likelihood that access to electricity may tend to increase livelihoods, and other activities engagements such as processing, packaging, and products differentiation or development of new product, in addition to unrestrained entertainment etc., that might be exhausting, hereby inducing stressful limitations to increasing productive engagements, and was found significant at 5% probability level. Similarly, housing status was found to positively determine the magnitude of health-limitation to livelihood, with a coefficient of 0.0203181. This is likely since housing congestion from overcrowding encourages rapid spread of contaminable diseases, in addition to undue competitions for essential natural resources such as oxygen, and confinement. This was found significant at 1% probability level.

In addition, primary occupation positively determined the magnitude of health-limitation to livelihood, with a coefficient of 0.0479382 perhaps, due to the fatiguing effect of routine farming/ drudgery, which aggravates when other livelihood activities are included Popoola et al., (2022) which might become limited when such practices does not incorporate adequate healthy measures, it however promotes increased income as found in recent study Popoola, (2022), and significant at 5% probability level, but Cooperative membership negatively determine the magnitude of health-limitation to livelihood mostly, with a coefficient of -0.0612016. This may be due to training, and other resourceful supports they receive from their cooperatives, relative to their non cooperator counterparts.

This was found significant at 1% probability level. To close, farm income was found to negatively determine the magnitude of health-limitation to livelihood, with a coefficient of -0.0143325. This may be due to the availability of adequate income from farmers investment as a good reward for their farm labofs to foot a healthy work- lifestyles. This relates to the findings of John, (2009), and significant at 1% probability level.

Table 5 Result of analyses on the factors determining the magnitude of health-limitation to livelihood.

Variables	Coefficient	Std-Dev	P>|t|
Daily output	-0.0000835	0.0002973	0.780
Marital status	0.0486037	0.023574	0.045**
Household size	0.0078139	0.0055851	0.169
Farming experience	0.0011195	0.0010098	0.274
Sole farming	0.0479382	0.019059	0.016**
Access to credit	0.0295113	0.0372884	0.433
Access to Electricity	0.074171	0.0373968	0.054**
Use of paid labof	-0.0141953	0.0230706	0.542
Farm size	5.88e-06	6.58e-06	0.376
Cooperative membership	-0.0612016	0.0221397	0.008***
Housing	0.0203181	0.0065166	0.003***
Ln Income	-0.0143325	0.0055799	0.014***
_cons	0.1224079	0.0566112	0.036**
Diagnostics	R- squared = 0.5124 Adj R-squared = 0.3763		Prob> F = 0.0006***

Source: Field survey data analyses. Significant at; *** 1%, **5%, and *10%.

4. CONCLUSION AND RECOMMENDATIONS

This study unravels the roles and the magnitudes of health as limitative factor in livelihood and wellbeing, alongside the determinant factors among poultry farm holders in South West Nigeria, using non parametric, and parametric statistical- econometrical analytical tools. The analyses on the Socio-economic characteristics by health- livelihood limiting statuses confirmed that majorities (70.83%) of the health-limited households primarily engaged in farming has livelihood, relative to the health non-limited households. Also, the health-limited, and health non-limited households had an average of about 2-3, and 3-4 rooms per household respectively, which was found significant at 5% probabilistic level, while the causality analysis was proceeded.

Regarding their multidimensional wellbeing status, about 37% of the health-limited households were poor, which is lower (21%) for the health non-limited households, and highly significant. Besides, results on the derived- disintegrated Alkire-Foster Multidimensional poverty measure to determine health-livelihood limitation contributions to multidimensional poverty pool, showed that the mean weighted health deprivation (Mean HW) score, and mean deprivation counts (Mean DC) for the health-limited households was 16.667, and 29.398 respectively, while the computed Health-Livelihood Limitation contributions to multidimensional poverty was 56.69%, where health constituted a Lion's share of the multidimensional poverty weights (DC). Also, the deprivation counts of the health-limited households was found significantly higher than their health non-limited counterparts, and also found highly significant.

Furthermore, the result of the analyses on the influence of health-livelihood limitation on output level showed that the daily output of the health non-limited farm holders is significantly higher than the health-limited category by 268.91%, wherein, daily output suffers a cumulative average of about 38.4 crates shortages per day, in association with health, been a limiting factor to livelihood, which also amounts to $2800.941 monthly/ production unit, when monetized, using the current exchange rate of 1700 NGN/ $, and significant at 5% probabilistic level. Finally, result of the multiple regression analyses on the factors determining health-livelihood limitations, where 6, out of 12 hypothesized variables were significantly validated, showed that; Marital status positively influenced the magnitude of health-limitation to livelihood with a coefficient of 0.0486037, and was found significant at 5% probability level, while access to electricity infrastructure positively influence the magnitude of health-limitation to livelihood with a coefficient of 0.074171, at 5% probability level.

Similarly, housing status was found to positively determine the magnitude of health-limitation to livelihood, with a coefficient of 0.0203181, and was significant at 1% probability level, alongside primary occupation, with a coefficient of 0.0479382, at 5% probability level, while Cooperative membership was found to negatively, and mostly determines the magnitude of health-limitation to livelihood, with a coefficient of -0.0612016, and significant at 1% probability level. To close, farm income was found to negatively determine the magnitude of health-limitation to livelihood, with a coefficient of -0.0143325, and highly significant at 1% probability level. We therefore accept the highlighted alternative hypotheses for the respective four objectives. Also, the immense contributions of the study towards bridging empirical quantitative research studies gaps in health economics is apparent, by its analytical presentations of empirical emerging facts on trending health economics data, and its implications among farming households.

It hereby recommends that although, 'health' is a public commodity stock at the individual unit, it is however notable that its wellbeing, or its malfunctioning largely affects the existence, availability, or performance of other public- commonwealth commodities, and optimising it consequentially hinges on individualistic manageability capability functionalities. Also, with the colossal health access- wellbeing interplay as unraveled herewith, it is therefore vital to ensure that only competent health workers are recruited in to the workforce, and efforts should be made towards providing enterprise specific health orientations/ trainings among stakeholders to enhance success rates of public health education services. Similarly, there is need for collective- public appropriation towards prioritising meeting health care needs beyond its effective demands in order to sustain an increasingly productive workforce, all rationalities been equal.

This is well achievable when the beneficiaries coverage of health services such as the National Health Insurance Scheme (NHIS) amongst others become expanded, to provide services not limited to palliatives, but such that includes preventive, and curative. Similarly, access to quality health services where advanced technologies are used for diagnosis, and therapies should be cost effective, such that costs imposes a commensurately effective service rendering, to further increase demands and access to quality health, where health-limited livelihood-wellbeing becomes well mitigated. To close, it is necessary for future studies to incorporate the "Health Limiting Theory" variables in the measurement, analyses, or assessment of health, and wellbeing among targeted populations, since this study included a few health variables, as constrained by available data. This will further enhance policymaking.

Informed consent

Written & Oral informed consent was obtained from individual participants included in the study.

Conflicts of interests

The authors declare that there are no conflicts of interests.

Ethical approval

The ethical guidelines for Human Subjects are followed in the study.

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Data and materials availability

All data associated with this study are present in the paper.

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