

Has The Recent Upsurge in Traditional Herbal Medicine in Ghanaian Market Been Translated Into the Health of the Ghanaian Public: A Retrospective Cohort Study?

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Abstract: The retrospective cohort study was carried out to determine the impact of increased herbal products on the health of the Ghanaian populace. Newly registered herbal products (NRHP) entering the Ghanaian market from 2003 to 2013 and the vital statistics were analyzed for the said impact. Data outside the said period were excluded. From Chi-square test of independent at 95% CI, P-values for the independent of National Death Rate (CNDR) on Newly Registered Herbal Product (NRHP), Infant Mortality Rate (IMR) on NRHP and Life Expectancy Rate (LER) on NRHP were all greater than 0.05 ($P > 0.05$); ranging from 0.232 to 0.253. The researcher failed to reject the null hypothesis of independent. Hence, we accept that the vital statistics and the number of registered herbal products entering the Ghanaian market are independent. Test of Pearson's two-tailed test of correlation and graphical representation of data showed some relatedness, but it was not statistically significant since the p-values for the Chi square test were all greater than 0.05. The relatedness in the observed trend could be due to other confounding factors affecting our dependent variables (vital statistics) or could be by chance.

Keywords: populace, indigenous, spiritualism, practitioners, phytochemicals, transformation, Herbal, Preliminary.

1. INTRODUCTION

The sky rocketing nature of global unemployment rate in recent years (International Labour Organization, 2015) has gotten much influence on peoples' act and behavior. Many therefore engage themselves in activities not just for the love of doing it, nor for the benefit to the community but just to make a living. Tens of hundreds of immigrants are taking the treacherous trip of crossing the Mediterranean Sea in small furries to Europe amidst the high risk of dying with the sole reason of making better lives in Europe. In Ghana, many are going into private owned businesses like private schools, traveling agents, among others with similar reasons of making better lives. In recent years, there has been an upsurge in traditional herbal medicines and practitioners in the country making it a call for a public health concern. Since new herbal products do not go through the strict rudiments of the 4-phases of clinical trials as in the case of their allopathic counterparts. The question is, has the increase in herbal products and practice gotten any impact on the health of the Ghanaian populace? Or it is just one of the ways people are trying to make a living without much concern about allocative and distributive efficiency, safety and efficacy of the herbal product?

Traditional Medicine (TM) could be defined as, 'the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, used in the maintenance of health, disease prevention, disease diagnosis, improvement or treatment of physical and mental illness,' (WHO, 2015). On the other hand, Herbal Medicine is defined by the University of Maryland Medical Center (2009) as the use of plant's seeds, berries, roots, leaves, barks or flowers

for medicinal purposes. The use of herbs to cure infirmities and diseases is also supported Biblically; 'eat the fruit and use the leaves as medicine', (Ezekiel 47:12c, KJV; Holy Bible). A lot of studies have also been done on medicinal properties of plants; (Lai and Roy 2010, Fernandes et al., 2014), insecticidal properties of edible plants like citrus (Adusei-Mensah et al., 2014). The etiologies of many local medicinal plants in Ghana were unknown until recently, leading to their underutilization in Ghana. There has been a recent surge in professionally trained herbal doctors and herbal products in the Ghanaian market. The change in phase has resulted in the transformation of 'kitchen based' herbal centers to recent automated herbal hospitals and clinics. There has also been a transformation of traditional fetish based herbal doctors who hitherto offer libations and sacrifices prior to administration of the herbs (spiritualism) to the current university trained Herbal Doctors. These signify a drastic transformation in the history of Ghanaian herbal medicine. In addition to these is the acceptability of herbal product by modern Ghanaian populace. The industry which nearly collapse upon the introduction of allopathic medicine by colonial masters has come far. Recent report by World Health Organization (WHO, 2015) showed that about 70% of the total Ghanaian populace relies on Traditional Herbal Medicine (THM) for their health need. There is approximately one traditional medical practitioner for every 400 people in Ghana, compared to one allopathic doctor for every 12 000 people in Ghana (Essegbey and Awuni, 2015). THM is easily accessible and affordable especially to the cut off areas of the rural zones of the country. With over 100 000 traditional herbal medicine practitioners fairly distributed nationwide, THM is not only easily accessible to the public, but also the backbone of the health care delivery system in Ghana (Essegbey and Awuni, 2015). Despite the increased patronage of THM in Ghana, research over the years were centered on medicinal plants (Osei-Djarbeng et al., 2015; Fernandes et al., 2014; Kasali et al., 2014), Phytochemical screening (Asolini et al., 2006; Vijaymen, et al., 2013), comparing phytochemicals of different plant species (Adusei-Mensah et al 2014), comparing extraction methods, usage and toxicity (Ekor 2013), traditional medicine (Ewurama, 2003) among others. But research has been quiet silent on the impact of herbal medicine on the health of the Ghanaian populace. The need to fill the research gap and also to make the findings available to the scientific community, Public health practitioners and policy makers caused the researcher to carry out this piece of research. The main aim for this study is therefore to evaluate whether the upsurge in traditional herbal medicine in Ghana in the last decade has been translated into a recognizable health outcome in the country.

Objectives to achieve the aim of the study:

- To statistically evaluate the national life expectancy for the last decade
- To statistically evaluate the national mortality and infant mortality rates for the last decade.
- To statistically compare the newly registered herbal products entering the Ghanaian market to the vital statistics.

Significance to Public Health:

This study is believed to educate the Ghanaian populace about the impact of herbal medicine on their health due to huge dependency of the population on herbal products; about 70% (WHO 2015). Herbal products are being sold in buses, trains and major public places in the country, as a result, less effective or toxic mixtures might be detrimental to the health of the general public. Determining the impact of herbal products at the population level is therefore crucial and this paper was birthed based on this principle.

2. BACKGROUND

2.1. Traditional Herbal Medicine, then:

Traditional herbal medical practitioners' use herbs, spiritual beliefs and wisdom in providing health care. Herbal medicines are usually accessible, practically affordable and culturally-acceptable health care modality in many developing and under developed countries. Globally, over 12,000 phytochemicals have been identified and isolated worldwide to be used medicinally to alleviate symptoms, prevent diseases or effectively treat human diseases, (Lai and Roy 2010). There is a general worldwide increase in the use of herbal medicines in healthcare services; 70% and 40% of healthcare services delivered in Ghana and China respectively are herbal medicine based while the percentage of the population which have used herbal medicines at least once in Australia, Canada, USA, Belgium, and France is estimated at 48%, 70%, 42%, 38%, and 75%, respectively (Foster et al., 2000; WHO, 2015, Essegbey and Awuni, 2015).

The use of herbal preparations in Ghana is as old as the traditional communities themselves. It has play important roles in the past where it used to be the golden standard of care until the colonial masters introduced hospitals and allopathic

medicines. Civilization, the introduction of Western clinics and drugs, Christianity and Islamic religions into the country caused many to discontinue the administration of traditional herbal products due to cultural changes. Also, herbal preparations in the early 20th century have been associated with spiritualism until the recent decades. The herbal preparations were usually administered by fetish priest and other traditional leaders after performance of some form of libation, sacrifice or prayer to the ancestors. According to Marian Ewurama Addy (2003), 55.7% of traditional herbal medical practitioners in Ghana treat with herbs, 18.5% combine herbs and spirituality, others 26.3% (those who know how to save lives, those who use indigenous healing methods and finally, the *wanzam* (circumcisor)). Christians, Muslims and other non-traditional believers were therefore cut off from patronizing these herbal preparations. Additionally, the herbal products were prepared in secluded places with equipment and tools which were not of high hygienic standards (Plate 1). Furthermore, section of the public has some misgivings about products of plant medicine (Ghana Ministry of Health, policy guidelines on traditional medicine development, 2005). Moreover, some preparations have crude extracts of about 3 to 10 different plants; a practice which they believe will improve the efficacy and also broaden the spectrum of the product. But basic science explains that, having two or more different functional groups together in the same aqueous solution may react together in the preparation resulting in less efficacious, highly efficacious or a highly poisonous end product; bio-activation, (Moses and McCurie 2010, Boullata 2005). This prevented the educated section of the population from patronizing the herbal products. Also, the concoctions were not attractively packaged. Sometimes, they were in the form of tree backs, leaves or raw roots of plants to be prepared by the patient with unstandardized dosages. In addition, there were no information on safety and side effects on most of the products and finally, a high number of the products entered the market through the back door without being certified by Ghana Food and Drugs Authority.

2.1.1; Traditional Herbal Medicine, Now:

World Health Organization (WHO) is currently promoting not only the practice of African Traditional Medicine (ATM) but also the integration of ATM and the Western Medical systems to serve the people better'', (Osuji, 2012). The introduction of the BSc programme in herbal medicine in Kwame Nkrumah University of Science and Technology in Ghana in the past few years has produced professionally trained Herbal Doctors; a move which is believed to have helped transform the industry. The transformation is what I call; the new phase of Ghana's traditional herbal medicine. The paradigm shift has succeeded in clearing the doubt of many non-traditional worshipers who hitherto was heading to the notion that the use of herbal medicines is comparable to idol worshiping. The new phase has also succeeded in rising the standard of the herbal products to the extent that they are accepted internationally, prescribed by physicians to patients and are also accepted and sold in pharmaceutical shops in the country.

Angel Herbal clinic and products for menstrual pains and diabetes, Mercy cream and soap for skin diseases, Tasly Herbal Plant Medicine, Dwamena Herbal Clinic, Chocho cream and soap for skin problems among others are just a tip of the iceberg of some of the award winning products in the Ghanaian market, (ghanayello.com; 2015). Despite the wave after wave of improvement in terms of professionals, quality, packaging and factory settings, the problem of toxicity (Bandaranayake, 2006), un-certification, ineffectiveness and fake products are still very prominent, (Ekor 2013).

2.2. Health status in Ghana; then and now:

Health is defined by World Health Organization (WHO) as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. A population's health status is measured through mortality and/or morbidity. The state of health of Ghanaians in general has witnessed some marginal increase in some sectors over the last decade. Some milestones have been achieved in some sections while other parts have had woeful performance. Population/Doctor Ratio in the last decades worsened: 17489/1 for national average and Population/Nurse Ratio worsened: 2598/1 for national average (ITDP EU's report 2005). Infant and under 5 mortality rates got better; Infant Mortality Rate (IMR) per 1,000 live births was 71 in 2006 and 50 in 2008 while Under 5 Mortality Rate (U5MR) per 1,000 was 111 and 80 for 2006 and 2008 respectively, (The Health Sector in Ghana, facts and figures 2010). National prevalence of hypertension among outpatients to public hospitals either than the teaching hospitals increased from 2.8 in 2006 to 3.5 in the 3rd quarter of 2010 (The health Sector in Ghana, 2010 facts and figures). Diabetes prevalence rate among the outpatients of public hospitals either than teaching hospital worsened from 0.5 in 2006 to 0.8 in 2010, (Ministry of Health Ghana, Holistic Assessment of the Health Sector Programme of Work 2013, Ghana). Injuries and poisoning in the same period according to the same report got better from 2.3 in 2006 to 1.6 in 2010.

Globally, recent UNICEF report shows that, Ghana's crude death rate has gone down to 7.37 and stands at 117th position (World fact book, 2014). Life expectancy Rate (LER) has also improved significantly. LER for Ghana in 1970 was 49.3

Years, 56.8 in 1990 and 60.6 in 2010 (world fact book, 2014, UNICEF). Currently, Ghana's LER is at the 37th position globally with LER of 65.8. The success of the improved national health, can it be partly be attributed to the increased usage of traditional herbal medicine?

2.3. Ghana Food and Drugs Authority:

The Food and Drugs Authority (FDA) formerly called the Food and Drugs Board (FDB) was established in 1997. It is the National Regulatory Authority mandated by the public Health Act, 2012 (Act 851) to regulate food, drugs, food supplements, herbal and homeopathic medicines, veterinary medicines, cosmetics, medical devices, household chemical substances, tobacco and tobacco products. FDA is the main authority charged to ensure ethical stands in foods and drugs in the country from production or importation through registration to the final consumer, (Food and Drugs Authority, 2014).

2.4. The Impact of Ghanaian Traditional Herbal Medicine on Healthcare:

Drugs are estimated to constitute 60 - 80 % of the cost of health care in Ghana, (Ministry of Health, 2004). Although widely believed to be easily accessible to many Ghanaians, labeling of the constituent herbs as well as the active ingredients of local herbal medicines remain poor, (Ministry of Health, 2004).

Over the decades, Ghana has made significant progress in promoting traditional medicine as a viable healthcare option. The drawback to this dream being fully accomplished is the traditional nature of the sector which makes it difficult to align to policy and good practice (GMP), Essegbey and Awuni, 2015. In Ghana, about 70 percent of the population sees traditional medicine as a desirable means of treating problems that Western medicine cannot adequately remedy, Essegbey and Awuni, 2015.



Picture 1. CSIR Research Scientist with a traditional herbal practitioner during an interview. In Ghana, around 70 percent of the population sees traditional medicine as a desirable and necessary means of treating problems that Western medicine cannot adequately remedy. Source; Council of Scientific and Industrial Research (CSIR), Accra, Ghana (Photo: CSIR).

2.5 Some success stories of Traditional Herbal medicine in Ghana:

A survey by Marian Ewurama Addy (2003), revealed one incidence in Ghana where a 35-year-old top position civil service man with grade-2-madness received healing from a Traditional medical practitioner in a Village near Takoradi, Ghana. The man's sickness, according to Ewurama (2003) had defiled all management by allopathic medicine and psychiatric interventions.

One of the frontiers in modern herbal Medicine in Ghana is the award winning multinational Herbalist, Dr. Amin Bonsu. Dr. Amin Bonsu is the founder of Amin Scientific Herbal Clinic which has branches in Ghana, Cote d'Ivoire, Nigeria and Burkina Faso and provides Phytotherapy, Homeopathy, Naturopathy and Osteopathy services to patients. Amin Scientific Herbal has chalked a lot of success in healthcare in Ghana in particular and Africa as a whole by providing safe and effective alternative medicines. Amin Scientific Herbal has successfully treated various forms of male and female infertility problems, prostate cancer and hyperplasia. Cardiovascular disease, hypertension, acute renal failure, arthritis, lumbago, lower back pains, multiple sclerosis etc with speedy recovery, (Abdulai, 2013).

2.6. Measurement of Health Outcomes:

Health Outcome measurement helps to predict which patient(s) will benefit most from a particular intervention and to document whether the patient improves after the intervention is provided. The outcome measurement could be disability and quality of life (morbidity), or the Mortality and life expectancy which are the two basic measures of population health, (CDC, 2010). Mortality rate according to dictionary of Epidemiology is a measure of the number of deaths (in general, or due to a specific cause) in a particular population, scaled to the size of that population, per unit of time. Mortality rate is typically expressed in units of deaths per 1,000 individuals per year'. As of 2014 the global crude death rate was 7.89 per 1,000 (from 8.37 per 1,000 in 2009) according to the current CIA World Fact book report. Ghana on the other hand has a crude death rate of 7.37 which is remarkable and stands at 117th position (World fact book, 2014). In this study, statistics of IMR, NDR and LER were used to determine the health status of the Ghanaian population during the said period.

3. METHODOLOGY

The study was carried out using secondary data from Ghana Ministry of Health (The Health Sector of Ghana, facts and figures, 2010), Food and Drugs Authority and Ghana Statistical Services and World Health Organization covering 2003 to 2013. The obtained data was statistically analyzed for correlation and dependency using excels' spreadsheet and SPSS platform.

3.1. Data, inclusion and exclusion criterial:

Measures of national life expectancy and mortality rates (crude and classified) for the last decade (2003-2013) were included in the study. Life expectancy and mortality records before 2003 and after 2013 were excluded from the study. Different sources of documents were consulted for the data. There is therefore the possibility of non-uniformity in the data since different institutions and researchers may calculate and report information differently.

4. RESULTS

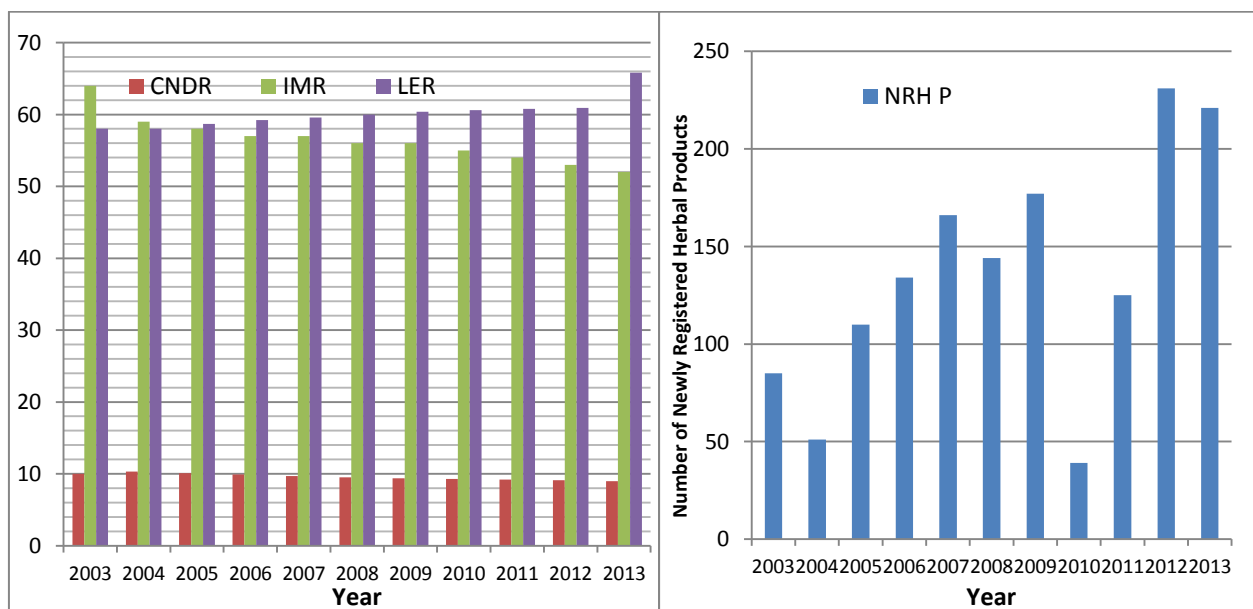


Figure 1(a and b); Bar chart for the Number of Newly Registered Herbal Products (NRHP), National Death Rate (Crude) per 1000 population (CNDR), Infant Mortality Rate (IMR) per 1000 population and Life Expectancy Rate (LER) respectively for Ghana from 2003 to 2013. There is a general decrease in national death rate (crude) and infant mortality rate for the said period. There is also a trend of increasing life expectancy for the said period; a positive sign of health improvement. In the same period, there was a rapid increase in the number of newly registered herbal products into the Ghanaian market. There was however a sharp decrease in 2010 and then a sharp increase again through to 2013.

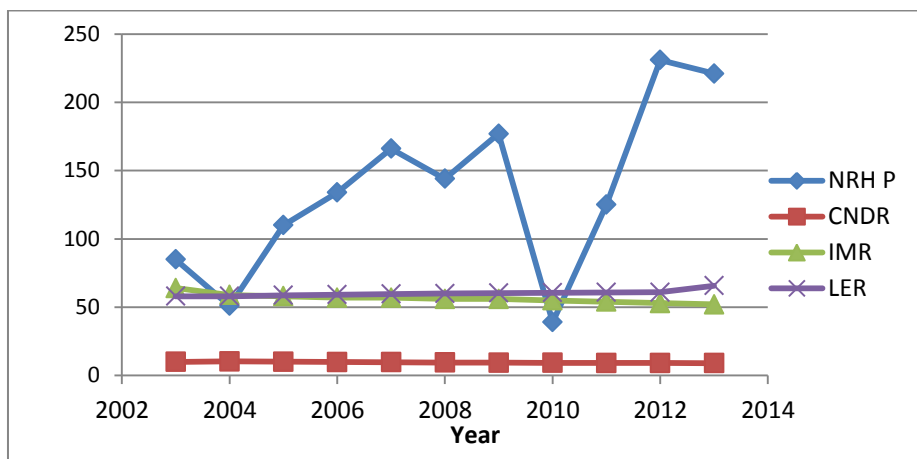


Figure 2; The graph shows the number of Newly Registered Herbal Product (NRHP) per year, Crude National Death Rate (CNDR) per 1000 population per year estimated at midyear, Infant Mortality Rate (IMR) per 1000 live births per year estimated at mid-year and Life Expectancy Rate from 2003 to 2013. There is a gentle decrease in crude death rate and infant mortality rate in the last decade. Life expectancy increase gradually between year 2003 and 2012, but receives a steep increase in year 2012 and 2013. There is a steep increase in NRHP from 2004 to 2007, sharp decrease in 2010 and then a steep increase from 2010 to 2012 and levels at 2013.

Table 1: SPSS version17 output for Contingency Chi Square Test of Independence of CNDR, IMR and LER on NRHP

	P-Values	Correlation Coefficient
NRHP vrs CNDR	0.232	-0.604*
NRHP vrs IMR	0.253	-0.582
NRHP vrs LER	0.242	0.619*

The independent test was used to evaluate whether the observed trend in the graphs above is really as a results of the dependency of the vital statistics on the newly registered herbal product or by chance by testing the null hypothesis of independent at 95% CI (0.05 CV). The P-values are all greater than 0.05.

Table 2: SPSS version 17 output for Pearson 2-tailed correlation test of CNDR, IMR and LER on NRHP.

Correlations

		NRHP	CNDR/1000	IMR/1000	LER/1000
NRHP	Pearson Correlation	1	-.604*	-.582	.619*
	Sig. (2-tailed)		.049	.060	.042
	N	11	11	11	11
CNDR/1000	Pearson Correlation	-.604*	1	.823**	-.816**
	Sig. (2-tailed)	.049		.002	.002
	N	11	11	11	11
IMR/1000	Pearson Correlation	-.582	.823**	1	-.784**
	Sig. (2-tailed)	.060	.002		.004
	N	11	11	11	11
LER/1000	Pearson Correlation	.619*	-.816**	-.784**	1
	Sig. (2-tailed)	.042	.002	.004	
	N	11	11	11	11

*. Correlation is significant at the 0.05 level (2-tailed). Inverse correlation between LER and NDR as well as between LER and IMR for the said period.

5. DISCUSSION

Health as a multidimensional state is influenced by many factors including physical, psychological, mental and environmental factors. It is therefore tackled at the national level by many strategies and programmes. Ghana has National Health Insurance Scheme which has chalked many successes over the years and could in a way also affect the observed results partly as a confounding. But according to World Health's report, 2015, over 70 percent of the Ghanaian population relies on Traditional herbal Medicine for its health care needs. This presupposes that an improvement in the health of the populace amidst other factors could be partly attributed to the increased patronage on these herbal products.

There is a general increase in health at the national level; Life Expectancy used to be 49.3 in 1970 and 56.8 1990 with a gain of 7.5 years in two decades. But from **Figure 1 (a and b)**, there was a LER of 58 years during the start of the past decade and ended in 65.8years with a huge increase of 7.8 years in just the past decade. The crude death rate was 10.0 in 2003 and 9.0 in 2013 from **Figure 2**. There was a steady drop in Infant mortality rate from 59 to 52 (7% points) during the same period, **Figure 1 and 2**. The drastic decrease in the IMR could be partly due to increase usage in herbal medicine by mothers during antenatal and post-natal period. It could also be due to increased accessibility to health care facilities like herbal clinics, free premium for pregnant women to the national health insurance in Ghana. There is also a general increase in life expectancy nationwide from 2003 to 2013 as seen in **Figures 1 and 2**.

To test for the degree of dependency, a 2-tailed correlation analysis was carried out between CNDR and NRHP, IMR and NRHP and finally LER on NRHP. A moderate negative correlation (inverse correlation) of -0.604 was found between CNDR and NRHP. The other correlation coefficients were also of moderate strength; -0.582 between IMR and NRHP and a positive correlation of 0.654 between LER on NRHP. There was also a correlation between the national death rate and the year (2003-2013) and infant mortality rate (**Table 2**). On the other hand, a negative correlation was observed between infant mortality rate and life expectancy rate as well as between national death rate and life expectancy rate, (**table 2**). Improvement in measures of health output (decrease CNDR, decrease in IMR and increase in LER) are signs of improved health and a positive impact from the increased numbers of herbal product in Ghana market.

A descriptive Pearson's Chi square of independent test was used to evaluate the dependency of the vital statistics on the values of the newly registered herbal product in the Ghanaian market. It was also used to determine whether the observed relations from both the graph and the correlation tests were statistically significant. A hypothesis of independent was generated for this test. Our Null Hypothesis (**H0**) states that the vital statistics and the newly registered herbal products are independent (unique and not related). Our Alternative Hypothesis (**H1**) states that the vital statistics and the newly registered herbal products (NRHP) are dependent (related). At 95% CI, the P-values for the independent test of CNDR on NRHP, IMR on NRHP and CNDR on NRHP were all > 0.05; **0.232, 0.253** and **0.242** respectively. As a result, there is not enough evidence to reject the Null Hypothesis (**H0**), and hence, we accept **H0**. Failure to reject the null hypothesis of independent means that the observed changes in the vital statistics might not be related (ie they are independent) to the increased number of registered herbal products in the Ghanaian market, **Table 1**. The Chi square test of independent results shows that the seemingly related findings from the preliminary test (**Figure 2, Table 2**) could be by chance and were not statistically significant. This is because the p-values were all greater than 0.05.

This shows that the observed improvement in the health outcome in the last decade; reduction in national crude death rate (NCDR), decrease in infant mortality rate (IMR) and increase in life expectancy rate (LER) might not be largely due to the increased number of herbal products entering the Ghanaian market (NRHP), **Appendix 1**. But it might be due to other confounding factors such as national health insurance programme, HIV Aids awareness programme, health promotion, polio and tuberculosis vaccination etc.

6. CONCLUSION

The measures of health for the last decade show reduction in national death rate, reduction in Infant mortality rate and an increase in life expectancy rate for the last decade (**Figure 2**). The finding from the correlation and test in **Table 2** showed an improvement in the health in the last decade along with a drastic increase in the number of registered herbal products entering the Ghanaian market in the same period. But statistically, the observed relationship was not significant; it could therefore be due to chance. In conclusion, the researcher cannot attribute the observed trend entirely due to the exponential increase in traditional herbal medicine in the country. Nevertheless, the exponential increase in herbal product may partly have contributed to the observed trend but other confounding factors like national health insurance scheme among others might have also contributed.

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Authors Contribution(s):

Frank Adusei-Mensah (PhD student); Came out with the topic as part of his studies, gathered the data and compiled the manuscript.

Ivy Eyiah Inkum (Statistician); She carried out all the statistical analysis as far as this paper is concerned.

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APPENDIX - A

VITAL STATISTICS:

year	Newly R. P	NDR/1000	IMR/1000	LER/1000
2003	85	10.0	64	58.0
2004	51	10.3	59	58.0
2005	110	10.1	58	58.7
2006	134	9.9	57	59.2
2007	166	9.7	57	59.6
2008	144	9.5	56	60.0
2009	177	9.4	56	60.4
2010	39	9.3	55	60.6
2011	125	9.2	54	60.8
2012	231	9.1	53	60.9
2013	221	9.0	52	65.8

NB: All rates for NDR and IMR are expressed as per 1000 population. The table shows the data for National death Rate (NDR), Infant Mortality Rate (IMR) and Life Expectancy rate (LER) for 2004 – 2013 for Ghana. LER; 1970 was 49.3 and 1990 LER is 56.8 UNICEF.