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A DELPHI STUDY OF THE PRACTICE OF PUBLIC HEALTH ACTIVITIES BY COMMUNITY PHARMACISTS: IMPLICATION ON NIGERIA HEALTHCARE DEVELOPMENT

OFFU OGOCHUKWU[1], OFFU PETER[2*], OLUIGBO KENNEDY[1], NWOSUMBA VICTOR[2] AND EZEANI EMEFIENA[2]

1: Department of Clinical Pharmacy and Biopharmaceutics, Enugu State University of Science and Technology, Enugu State, Nigeria

2: Department of Political Science, Alex-Ekwueme Federal University, Ndufu-Alike Ebonyi State, Nigeria

***Corresponding Author: Offu Peter: E Mail: peteroffu@gmail.com**

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ABSTRACT

The Nigerian health sector faces huge problem of increasing infectious and non-communicable diseases due to grossly insufficient healthcare facilities, programmes and personnel. Community Pharmacists' public accessibility, timely drug administration and pharmaceutical care are vital in the entire medication procedures. The study advocates urgent multidisciplinary approach to boost public health capacity and delivery system. The aim is to identify feasible Public health activities that could be performed in Community pharmacies and interventions that could mitigate barriers and improve public health practice by Community pharmacists in Nigeria. Three rounds of Delphi study were sequentially carried out. Experts consensus was reached when 70% of the community pharmacist either chose '5' or '4' on the likert scale. A two-tailed significance value of $p < 0.05$ was used. 15-20 Experts participated in each round. Out of the 88 items identified as feasible, consensus was reached on 81 activities and on 18 interventions. The impact of the study was gauged on the implications of Nigeria burgeoning healthcare system and rising public health emergencies across the country. Based on findings and results, the study submits that

Community Pharmacists alongside other medical professionals play critical role in mitigating rising public health emergencies across the country and in the development and advancement of sustainable and affordable healthcare system in Nigeria.

Keywords: Delphi Study, Public Health, Community Pharmacists, Nigeria Healthcare

INTRODUCTION

The economy of Public Health (PH) is expansive and of national interest preparedness. In relation to good Pharmaceutical practice, PH expeditiously promotes and improves quality of life and livelihood **[2]**. In most developing countries of the world, the practice and integration of Public health activities in Community pharmacy practice is fraught with enormous policy and paradigm challenges especially in the area of funding, expertise and interoperability. Conscientious efforts are required to improve and sustain the quality of life of Nigerian peoples, part of which is to determine feasible Public health activities that can be effectively carried out by Community pharmacists to promote longevity, standard education and quality of livelihoods since most fatalities are caused by preventable diseases. According to the World Health Organization (WHO), in Nigeria, males have a life expectancy of 54.7 while females have a life expectancy of 55.7 which is quite unsustainable **[25]**. As such, Policy Reform is vital to cope with the fast changing and challenging socioeconomic outcomes of the people **[15]**.

Furthermore, the practice of Public Health activities by community pharmacists and pharmacy practitioners in Nigeria interrogate several issue-areas – cultural, socioeconomic, ethical, and normative questions **[1-3]**. While Public health provides the policy direction, Community pharmacy practice is the interoperation framework for execution and administration of critical health programmes. As such, the practice of Public Health activities by Community pharmacists is in tandem with the overall vision of Nigeria Health Policy promulgated and reformed to provide and promote healthy living and affordable healthcare for all **[15]**. The practice of public health activities and programmes in community pharmacies is a sustainable policy initiative that provides for the health needs of the present generation while proactively planning and meeting the challenges of the future. It is an integer of many valences.

Based on burgeoning health challenges in Nigeria, the study is therefore aimed at

identifying: (1) Public health activities that are feasible to be carried out by Nigerian community pharmacists; (2) interventions that could mitigate the barriers and improve the practice of public health by community pharmacists. This will provide policy makers and pharmacy regulators with baseline evidence that will enable them to develop an inclusive policy framework for the development and advancement of the practice of public health pharmacy in Nigeria **[1-3, 15]**. The study begins by setting the basic framework for understanding critical issues, interventions and benefits of the practice of public health activities by community pharmacists especially in critical situations.

Public Health Pharmacy

Public Health Pharmacy underscores professional activities performed by pharmacists in the place of work, hospital, community or administrative settings that equip people, communities and nations to take further actions and initiatives that help contain and/or prevent illnesses, damage to their health or improve the general health of present and future generations. There are frontline levels of public health activities in pharmaceutical practice that prevent illnesses, promote and improve general healthy lifestyles such as: Primary prevention activities, for example immunization, Secondary prevention activities like screening for chronic diseases and Tertiary prevention activities like patient counseling and follow-up **[2]**.

Community Pharmacy Practice

World Health Organization defines a Community Pharmacist as a health professional most accessible to the public; who supplies, administers and sells medicines in accordance with a medical prescription or, when legally permitted, sell without it. Critical functions of community pharmacist according the WHO include patients counselling for prescription and non-prescription drugs, drug information to health professionals, patients and the general public, and participation in health-promotion and educational programmes and, ensuring the quality of the products on demand **[43]**.

Role of Community Pharmacist

It is important to highlight that community pharmacy practice relates to major roles and health activities of a community pharmacist. These include (1) processing of drug prescription which involves the authentication, safety and appropriateness of patients' prescription order, medication history and counselling; (2) Pharmaceutical Care which involves analysis of patient's drug history, clinical advice on patient's

dosage regimen, drug administration, monitoring and evaluation of therapeutic responses, adverse drug reactions and health outcomes; (3) drug use and abuse prevention; (4) Pharmacy formulation involves small-scale manufacture of medicines to meet patients regimen which must demonstrate high ethical imperative in accordance with good and acceptable manufacturing practice and distribution; (5) Pharmacists response to symptoms of minor ailments and capacity to supply non-prescription medicines with advice to consult a medical practitioner if the symptoms persist. (6) They provide vital information, advice and explanations on health problems, drug use and new medicines to other healthcare experts, patients and the general public. (7) Pharmacists facilitate and participate actively in health promotion, educational campaigns and awareness/advocacy programmes on various thematic issues including rational use of drugs, substance abuse/misuse, poison prevention, alcoholism and expanded programme on Immunization, malaria or other disease prevention initiatives. In some cases and countries, pharmacists provide credible geriatric and pediatric drug counselling, supply services and clinical care for house-bound patients and the elderly **[33, 44]**.

Nigeria Health Indices

According to the Nigeria Revised National Health Policy (NRNHP), Nigeria's overall health system performance in 2000 was ranked 187th among the 191 Member States by the World Health Organisation (WHO) **[15]**. In Nigeria, maternal mortality rate (about one death in every one hundred deliveries) is one of the highest in the World **[15]**. Mortality ratio of children under five years is 201 per 1000 live births which means that one out of every five children do not reach the age of five. Nigeria has the lowest immunization rate in Africa and preventable diseases are the topmost cause of death **[30, 44]**. Doctor to patient ratio is one doctor to 6000 patients which is 90 per cent lower than the WHO recommendation of 1 doctor to 600 patients while nurse to patient ratio is 1 to 1,066. As a result, the Pharmacists Council of Nigeria (PCN) outlined public health activities that could be carried out by community pharmacists to improve health conditions and reduce fatality and mortality rates such as health education and health promotion activities **[37]**. Despite the concerted efforts of the Pharmaceutical Council in improving primary and public health activities across the country, many factors impede the advancement and fuller participation of health professionals in such

programmes. They include, planning, cultural barriers, reticence of professionals to actively participate based on policy disincentives and very low conditions of service among others. These factors distort and create discrepancies in levels of professional participation and programme outcomes. For instance, a study in the Enugu State of Nigeria reported poor involvement and participation of Community pharmacists in public health activities **[33]**. A Similar study in Oyo, Western Nigeria indicates low community pharmacists' involvement in non-drug related activities, such as, smoking cessation, safe neighbourhood and use of seat belts **[36]**; while studies in Lagos, Benin and Warri indicate that community pharmacists were highly involved in preventive health activities that relate to hypertension, diabetes and weight reduction but were poorly involved in other areas like immunization, food safety, cancer awareness, oral and mental health **[2]**. These reports demonstrate the critical gap in the health economy of public health and community pharmacy practice. Therefore, improving the involvement and active participation of community pharmacists in public health activities will undoubtedly lead to positive interdisciplinary competence in preventing and finding solutions to public health challenges and pharmaco-medical issues. It will enable the environment for collaborative research and development in healthcare development problems and outcomes. The need to leverage on community pharmacists apparent locality, accessibility, knowledge, experience and expertise is urgent in managing the huge and extremely challenging public and primary healthcare development issues in Nigeria especially as highlighted by the study results.

MATERIALS AND METHODS

Setting

The study was conducted in metropolitan city of Enugu State, South East Nigeria. The State has an estimated population of 3,257,298 **[31]**. As at January 2015, there were 98 Community pharmacists in Enugu metropolis with numerous pharmacy outlets.

Study Design

The Delphi method is a scientific qualitative process of evaluating a given subject issue presented to a group of experts in a series of questionnaires rounds to obtain convergence of expert consensus **[22]**. The technique involves select group of experts who anonymously assess rounds of questionnaires and subsequently receive anonymous feedbacks which are aggregated and shared within the group after each round in the form

of a statistical representation for subsequent round of discourse.

According to RAND, the Delphi method seeks informed intuitive judgment of experts through a series of carefully designed and coordinated questionnaires interspersed with information and opinion feedbacks in order to establish a convergence of expert consensus **[21]**. Alexandra Twin argues that the experts' responses shift as rounds are completed based on the information brought forth by other experts participating in the analysis **[41]**. The discourse continues and culminates in a convergence of expert consensus. The Delphi technique was employed in this study to identify feasible public health activities that could be carried out in the community pharmacy and interventions that could help improve these activities in Enugu metropolis. The study consisted of three critical rounds of experts' analysis to establish convergence of expert consensus.

Study Population/sample

In the study, the population of community pharmacies in Enugu metropolis is 98 out of which 20 geostrategically located Community pharmacies were selected based on their years of community pharmacy practice, population density coverage and superintended by fulltime pharmacists with more than ten years of community pharmacy experience (> 10 years), active presence and participation in community pharmacy activities.

Data Collection Method

Three critical questionnaires were designed for the three rounds of the Delphi study, one questionnaire for one round. The questionnaire for the first round consisted of three parts. Part A was demographics, Part B consisted of fifteen issue-areas or headings under which the experts were asked to fill in specific public health activities they consider feasible to be performed in their community pharmacies and in Part C, the participants were asked to list interventions and strategies that could improve Public health activities in community pharmacy practice. The fifteen headings were structured from an instrument used for a similar study in Nigeria and from a Document of the PCN **[37, 3]**. The questionnaire for the second round was formulated based on the responses/feedbacks made by the community pharmacists in round one. This questionnaire was made up of three parts. Part A was demographics; Part B consisted of the fifteen headings listed in the round one questionnaire and under these headings were listed 88 feasible activities as opined by the respondents while Part C was made up of 20 interventions which

constituted the informed opinions of the panel of experts. For the Third round, a questionnaire which was similar to the second questionnaire was formulated and distributed but this questionnaire consisted of only those items for which consensus was not reached in the second round. Part A was demographics, Part B was made up of 4 headings under which there were 7 items (feasible activities) while Part C was made up of 4 items (intervention). Some items were worded negatively to avoid response bias. A high score for negatively worded items were reversed to the corresponding low score and vice versa at the point of analysis.

A likert scale ranging from Strongly Agree=5 to Strongly Disagree=1 was used as a measure of feasibility for each of the specific activities listed in Part B while part C ranged from 'Of very high importance=5' to 'Of very low importance=1'. A score of 3 was regarded as the neutral point between 'strongly agree' and 'strongly disagree'. The score of 3 was also the neutral point 'Of very high importance' and 'Of very low importance'. Where an expert did not choose '5' or '4' on the likert scale, a space was provided for the expert to give reasons for this. The questionnaires were pilot tested using 7 community pharmacists (who had less than 10 years experience) to assess feasibility and possible comprehension problems. Modifications were made to the questionnaire based on the reports from the pilot test.

Data Analysis

The Questionnaire for the first round of Delphi panel was open ended and thus the responses of the community pharmacists were collated and used in the formulation of the questionnaire for the second round of Delphi panel. After the second round, percentages of experts that 'strongly agreed' or 'agreed' to each item were then determined. Consensus was reached for each item if at least 70% of the participants chose '5' or '4' on the likert scale. Only the items for which consensus was not reached were used to form the questionnaire for the third round. This was done to make the questionnaire much easier to fill up. It was also unlikely that the experts would disagree with items for which consensus had earlier been reached. The mean score for each of these items and each expert's score were included in the questionnaire so that the experts can reconsider his/her rating based on the mean score. After final collection of the third round questionnaire, analysis was carried out for only those items for which consensus have been established. Descriptive analysis was performed using

means and percentages. The composite scores were also calculated and were gotten by adding up all the scores of the experts for each item after which their ranks were also determined. Ranks were determined by finding the position of the composite score for each item relative to all other items that reached consensus.

Ethical Consideration

The study was approved by the Ethics Committee of the Enugu State Ministry of Health. All study participants were given prior information on the nature of study while informed consent was duly obtained from respondents. Voluntary participation, anonymity, confidentiality and fundamental rights of participants were duly observed by the researchers.

RESULTS

Delphi Consensus for feasible Public Health Activities

Figure 1 is the Flow Chart illustrating the Delphi round processes from the development of the research instrument, the Questionnaire, selection of panel of experts and the three rounds of Delphi processes.

Table 1 shows that more than three quarters of Community pharmacists in the panel were males. The modal age range was 41-50. Majority of the Community pharmacists have worked for 11-15 years. Minimum degree for most of the participants was Bachelor's Degree in Pharmacy (B. Pharm).

Table 2 shows thirty (30) highest ranked feasible activities (ranking: 1 to 17) for which consensus were reached. The other fifty one feasible activities for which consensus was reached, and that had ranking of 18 to 81 are displayed in the appendix. The items that ranked the highest were educating patients aged 40 years and above on the importance of taking antiplatelets so as to prevent cardiovascular diseases, stocking of medication for the treatment of cancer, educating patients on the use of inhalers, stocking effective and affordable medications for the treatment of osteoporosis, stocking contraceptive drugs and devices, and educating clients on the importance of folic acid supplementation.

Table 3 shows the convergence of expert consensus on Eighteen (18) interventions after all the rounds were completed. Sixteen (16) interventions reached consensus after the second round while consensus was established on Two (2) interventions after the third round. The interventions that had the highest composite scores were: collaboration with other healthcare professionals, recognition by Ministry of Health, inclusion of practical public health training in pharmacy undergraduate curriculum, need

for academic pharmacists to conduct more research in public health pharmacy, and setting up Departments of Public Health Pharmacy in schools and faculties of pharmacy.

Formulation of Questionnaire	**Questionnaire was developed from two published documents:** **-a published study on community pharmacists and public health (Adje)** **- a publication by the PCN**
The first Delphi Round	**Participants** **-20 experts were selected based on years of experience and active participation in community pharmacy practice.** **- 15 community pharmacists completed the questionnaire** **- Response rate: 75%** **Questionnaire** **Part A: Demographics** **Part B: 15 headings: Participants were asked to list feasible public health activities.** **Part C: Participants were asked to list interventions**
The second Delphi Round	**Participants** **-15 community pharmacists participated** **- Response Rate: 100%** **Questionnaire** **Part A: Demographics** **Part B: A total of 88 items (feasible public health activities) were listed by the pharmacists under the 15 headings. A 5-likert scale was used to assess experts' response.** **Part C: 20 interventions were listed by the community pharmacists. A 5-likert scale was used to assess the experts' response.**
The third Delphi Round	**Participants** **-15 community pharmacists participated in the study** **- Response rate- 100%** **Questionnaire** **Part A: Demographics** **Part B: A total of 8 items (feasible public health activities for which consensus was not reached for in the second round) were listed by the pharmacists under their corresponding 4 headings. A 5-likert scale was used.** **Part C: 4 interventions for which consensus was not reached for in the second round were listed by the community pharmacists. A 5-likert scale was used to assess response of the participants.**

Figure 1: Flow Chart illustrating the Delphi round processes

Table 1: Demographics of Respondents for the Delphi Study

Characteristics		Frequency (%)
Sex	Male	12 (80.0)
	Female	3 (20.0)
Age(years)	21-30	0 (0)
	31-40	0 (0)
	41-50	8 (53.3)
	51-60	5 (33.3)
	>60	2 (13.3)
Years of Practice	1-5 years	0 (0)
	6-10 years	0(0)
	11-15 years	8(53.3)
	16-20 years	5(33.3)
	>20 years	2(13.3)
Qualification of pharmacist	Graduate degree	8(53.3)
	Postgraduate degree	7(46.6)

Table 2: Feasible Public Health Activities by expert consensus

No	Activity		Mean	SA/A (%)	Round	C.S	Rank
1.	Cardiovascular disease prevention	i.Vasoprin for patients ≥ 40 years	4.82	100	2	53	1
		ii. Blood pressure measurement	4.73	100	2	52	7
		iii. Stock effective/affordable meds	4.73	100	2	52	7
2	Diabetes Screening and Management	i.Glucose checks	4.64	90.9	2	51	17
		ii.Patient education	4.73	100	2	52	7
		iii. Referral	4.73	100	2	52	7
		iv. Lifestyle advice	4.64	100	2	51	17
		v. Stock effective/affordable meds.	4.64	100	2	51	17
3	Obesity/Weight management	i. Weight checks	4.64	100	2	51	17
4	Osteoporosis Risk assessment/Prevention	i. Stock effective/affordable meds	4.73	100	2	52	7
5	Cancer Diagnosis and Prevention	i. Referral	4.64	100	2	51	17
		ii. Stocking medications	4.82	100	2	53	1
6	Asthma prevention and management	i. Education on risk factors/triggers.	4.72	100	2	52	7
		ii.Education on inhaler use	4.82	100	2	53	1
		iii. Medication adherence	4.64	90.9	2	51	17
		iv. Stocking effective/affordable meds	4.82	100	2	53	1
7	Contraception/Sexual Health (including STIs)	i. Referral to the hospital.	4.64	100	2	51	17
		ii. Stock contraceptive drugs/ devices.	4.82	100	2	53	1
8	Folic acid and Pregnancy	i. Recommend Folic acid supplement	4.64	100	2	51	17
		ii. Client education	4.82	100	2	53	1
		iii. Education on IPTM	4.64	100	2	51	17
		iv. Stocking of drugs	4.64	90.9	2	51	17
9	Substance Misuse	i. Patient education.	4.73	100	2	52	7
10	Drug abuse and misuse	i. Awareness of drug abuse/misuse	4.73	100	2	52	7
11	Immunization*		*	*	*	*	*
12	Oral Health	i. Client Education	4.64	90.9	2	51	17
		ii. Stocking items that promote OH	4.73	100	2	52	7
13	Lifestyle Advice	i.Promote healthy eating habit	4.64	100	2	51	17
		ii. Alcohol education	4.64	100	2	51	17
14	Infectious Diseases	i. Treatment	4.64	100	2	51	17
15	Depression/Mental Health	i. Referral	4.73	100	2	52	7

***All items had ranking of 21 – 81, SA/A-Percentage of experts who Strongly Agreed or Agreed on an item, C.S-Composite Score**

Table 3: Interventions that established Expert Consensus

No.	Intervention	Mean	5/4 (%)	Round	C. S	Rank
1.	Frequent/thorough regulation by PCN.	4.27	90.9	2	47	4
2.	Provision of framework by Government.	4.5	100	2	41	18
3.	Provision of necessary equipments/ tools by Government.	3.82	72.7	2	42	17
4.	Structural space in Community Pharmacy	4	80.8	2	44	16
5.	Use of visual aids in educating patients.	4.18	80.8	2	46	11
6.	Community Pharmacies should act as drug information centres.	4.55	90.9	2	50	6
7.	Regular and free community outreaches.	4.09	80.8	2	45	14
8.	Collaboration with other health care professionals.	4.73	100	3	52	1
9.	Recognition of Community Pharmacy as public health centres.	4.45	90.9	2	49	7
10.	Collaboration between community pharmacists and general practitioners/physicians.	4.18	80.8	2	46	11
11.	Inclusion of practical training in MCPD courses.	4.09	80.8	2	45	14
12.	Community Pharmacists should strive to carry out public health activities.	4.45	90.91	3	49	7
13.	Recognition by Ministry of Health.	4.64	100	2	51	2
14.	Closure of the open drug market	4.18	80.8	2	46	11
15.	Inclusion of practical public health training in pharmacy undergraduate curricula.	4.64	100	2	51	2
16.	Training by pharmacists from developed countries.	4.27	90.9	2	47	4
17.	Academic pharmacists should carry out more research on public health pharmacy.	4.64	100	2	51	2
18.	Setting up departments of Public Health Pharmacy in our schools of pharmacy	4.64	90.9	2	51	2

5/4- percentage of experts that agreed that an intervention was 'of very high importance' or 'of high importance'

DISCUSSION

The Study established convergence of expert consensus on 81 activities out of the 88 listed feasible activities. The experts established consensus on all the items at the end of the second round. Pharmacists who participated in this study agreed that it was feasible for community pharmacists to carry out cardiovascular disease prevention activities and diabetes screening and prevention activities such as, offering lifestyle advice to patients with cardiovascular diseases, diabetes and obesity; managing patients with diabetes, hypertension and obesity in their community pharmacies. This finding has been supported by pharmacist-led programme that were carried out in community pharmacies in other countries **[1, 9, 20, 27]**.

Unlike the findings of the current study in which Community pharmacists did not agree that it was feasible for them to determine a client's level of risk to osteoporosis, studies carried out in Thailand and the United States showed this activity could be carried out by community pharmacists **[30, 10]**. The

participants in the current study reported that they lacked the requisite skills and equipment to carry out the necessary tests and as a result did not agree on the feasibility of carrying out osteoporosis risk assessment. The participants also reported that the Dual-Energy X-ray Absorptiometry (DEXA) and Ultrasound Bone Densitometer, which is the equipment for determining one's risk to osteoporosis was not affordable. Nevertheless, training Nigerian community pharmacists on how to use the Osteoporosis Self-Assessment Tool for Asians (OSTA) which is easy to use and inexpensive, will improve their active participation in this activity **[10]**. The OSTA makes use of the age and weight of the client to determine a risk index. This risk index is what places a person on high, intermediate or a low risk category.

In the same vein, cancer diagnosis and prevention activities, such as, education on breast self examination and colorectal cancer referral programme have been shown to be carried out by Community pharmacists **[16, 24]**. Findings of the current study also reveal that it was feasible for Community pharmacists to educate clients on the risk factors of Asthma, the use of inhalers and how to improve patient's adherence to Asthma medication which was similar to findings obtained from another study **[6]**. Also, the feasibility of community pharmacists to stock contraceptives, provide sexual health counseling/education and treat STIs as agreed by experts in this study, was corroborated by findings of other studies **[4, 38]**.

However, experts in this study did not agree that carrying out routine checks on pregnant women was feasible because they do not have the necessary expertise and equipment to carry out routine checks on pregnant women. This finding is supported by a study carried out in four cities in Nigeria which revealed that Community pharmacists were not trained on pregnancy related issues such as antenatal care, and use of misoprostol. The same study also proved that Community pharmacists can improve on maternal services when trained to do so **[13]**.

With regard to substance misuse related activities, the experts agreed that it was feasible to carry out activities such as smoking cessation and sale of ethical/prescription medicines. This was corroborated by findings of other studies **[2, 14, 32]**. On the other hand, the experts in this study did not agree on the feasibility of carrying out needle exchange programme because of their inability to control substance abuse patients when they become violent in

their pharmacies. Nevertheless, studies carried out in England and Scotland have shown that community pharmacists can carry out needle exchange programme successfully **[7, 26]**.

Similar to the finding of the current study, several studies have shown that it is feasible for Nigerian community pharmacists to administer tetanus toxoid vaccine **[34, 2]**. Contrary to the finding of this study, other research works carried out in Scotland, England and the United States showed that it was feasible for community pharmacists to administer flu vaccines, pneumococcal, Measles, Mumps and Rubella (MMR) and Polio vaccines **[17, 19, 23, 42]**. There was also no convergence of expert consensus on the feasibility of carrying out pneumococcal, MMR and polio vaccination because the law does not allow Community pharmacists to administer injections in Nigeria. They also felt that for this activity to be practised in community pharmacies in Nigeria, the activity must be carried out in collaboration with nurses and/or as permitted by the law. Studies on mental health care have also shown that it was feasible and effective for community pharmacists to identify and refer persons with mental illnesses to the appropriate health facility **[39]**. Hence, in order to improve Nigerian community pharmacists' involvement in those activities for which the experts agreed to be feasible, certain strategies/interventions have to be put in place to ensure interoperability.

Training is a very important intervention for the improvement of public health activities by Community pharmacists as shown by the findings of other studies **[5, 6, 11, 18, 20, 40]**. In Nigeria, Public health training could be delivered through the Mandatory Continuing Professional Development (MCPD) programme organized by the Pharmacist Council of Nigeria (PCN), the body in charge of regulating Pharmacy practice in the country. Pharmacists of greater than 5 years in practice are mandated to undertake the courses as part of their licensure requirement. The courses taken under the MCPD programme should include practical training aimed at improving the involvement of community pharmacists in public health activities. A study carried out in Nigeria showed that Community pharmacists' involvement in offering educational services improved significantly after undergoing training **[2]**. In addition, the training of Pharmacy undergraduates should include practical training in public health. This will better equip all Pharmacy graduates with the skills to carry out Public health activities.

Recognition of Community pharmacists as Public health practitioners will require the combined effort of Pharmacy practice administrators, Academic pharmacists and Community pharmacists to evolve policies supported by evidence and which shows positive impact on pharmacy-based Public health activities. This will aid Pharmacists to be formally classified as professionals within the public health workforce and their role in public health recognized by public health agencies. In Nigeria, there are a lot of health agencies or organizations that operate without the services of a pharmacist and pharmacists' involvement in immunization has been reported to be low **[40]**. Examples of health programmes conducted by some of these organizations include Free Maternal and Child Health (FMCH) and the Expanded Programme on Immunization (EPI) for pregnant women and children less than five (5) years of age. The programme is intended to reduce the burden of maternal and child mortality/ morbidity in Nigeria. The EPI is aimed at improving the health of children by eradicating killer diseases through immunization of children who are two years old or less **[35]**. Community pharmacists being drug experts can contribute to immunization activities especially in the areas of patient education, refrigeration and storage of the vaccines, drug inventory (to avoid stock outs) and provision of space for immunization activities. This will increase immunization coverage since community pharmacies are accessible, convenient and have longer office hours than most health centres. It will also significantly reduce vaccine stock out while improving vaccine storage at the health centres which constitutes the major challenge of routine immunization in Nigeria **[35]**. Other factors include remuneration, collaboration with physicians and other healthcare professionals, provision of adequate space and involvement of Community pharmacists in specific Public health activities **[9, 27]**.

Significantly, experts could not establish consensus on two interventions; namely, recognition of Community pharmacies as referral centres and the elimination of patent drug dealers. Recognition of Community pharmacies as referral centres was not agreed upon because the experts believed that Community pharmacists were already performing this role. They did not also agree on the elimination of patent drug dealers because they felt that these patent drug vendors helped to reduce the prevalence of diseases in the rural areas where they are concentrated. The finding identified feasible Public health activities that could be carried

out by Community pharmacists and interventions that could be focused on those areas to improve the practice. This will help Pharmacy regulators, the government and policy makers to know what resources/interventions to apply in order to improve Community pharmacists' activities in these feasible areas.

Implication on Nigeria's Healthcare Development

Community pharmacists exert critical roles in the health economy of Nigeria. The cost implication of their locality, versatility and availability in the management of health outcomes cannot be underestimated. Nigeria is a multilingual, multiethnic and multinational state intricately bonded by communal norms and cleavages. Community pharmacists are the primary point of contact for most of Nigeria's ailing public. It is estimated that one out of every five Nigerian and/or African visit Community pharmacy first for medical related issues before going to the hospital if symptoms persist. This is comparatively high index. In fact, hospitals are perceived by most people as place of last resort. The implication is that early detection and medical management of disease conditions are not only of high socioeconomic values but largely proactive and life-saving. On aggregate, Community pharmacists, as primary healthcare givers, save great lot of common masses resources on early detection and treatment of symptoms of disease conditions which could have deteriorated and incurred more fatality and morbidity multiplier costs. Such huge financial savings are directly or indirectly reinvested into the economy with multiplier effects on livelihood earnings and longevity.

The WHO in the new dispensation strongly encourages inter-collegial and interdisciplinary approach to healthcare development. Public and Primary health institutions, Ministries, Academia (Schools and Faculties) of Public Health, Medical and Pharmaceutical Sciences are encouraged to adapt programme practices and shared practical experiences in designing curricula reforms for training of graduates and experts in Public Health pharmacy **[33]**. The need for collaboration among health and medical practitioners in the management and control of health conditions is expeditious especially in the sub Saharan Africa where health indices are critical and especially in the post Covid-19 Global health programmes. Research collaboration based on knowledge and experience on the feasible and non feasible public health activities is good practice with immense socioeconomic benefits. There is also need to intensify

studies that promote interdisciplinary collaboration and cooperation especially in medical diversity. This is proven by the W.H.O. global health practices to mitigate global public health emergency posed by ravaging Covid-19 pandemic. This could lead to pilot implementation studies to monitor and evaluate identified feasible activities and effective interventions to be performed in collaboration with community pharmacists.

There is urgent need for overhaul of Nigeria health policy to give legitimacy and capacity to Community pharmacy practice especially in the new interdisciplinary direction of Public health. The Health policy of Nigeria has obvious limitations that impinge on quality and extent a Community pharmacist can intervene or participate in public and primary health activities. This calls for review and convergence of health policy frameworks to facilitate the enactment of appropriate Health Act that will empower and promote inclusiveness in medical diversity especially in the practice of Public health in community pharmacies and as proactive measure to check the somewhat recurring incidence of biohazardous diseases, e.g. Covid-19, which occur as public health emergencies, crisis or pandemic **[1, 15, 43, 44]**.

Health security in Nigeria is relatively poor and drastically affects National Core Health Indicator Reports and overall Human Development Index (HDI). Rural-urban health indices are most disaggregated and affected by the near dearth of practicable, citizen-focused health policy amidst speedily deteriorating infrastructural health facilities. The National Action Plan for Health Security (NAPHS) is a proactive, targeted and comprehensive multi-sectoral strategy that integrates multiple work plans including REDISSE (Regional Disease Surveillance Systems Enhancement), NCDC (Nigeria Center for Disease Control) Strategy Plan, AMR (Antimicrobial resistance) Action Plan, and immunizations plans to tackle major gaps identified by the Joint External Evaluation (2017) and Performance of Veterinary Services (2010) and assessments et cetera **[28]**. The implications of health insecurity are high mortality and fatality rates and undue pressure on scarce health resources of the peoples and nation. In some instances health experts and facilities are incapable of managing and controlling health conditions and outcomes. This leads to high increase in preventable mortality rates especially among the incapacitated, elderly, women and children among other socioeconomic risk factors and outcomes. As

a result, Nigeria Health Insurance Scheme **[20]** most times malfunction and are unable to cope with the burgeoning health demands especially in the area of timely drug procurement and administration. The NAPHS is an "overarching" plan used to create linkages and monitor progress of major health security initiatives to avoid health emergencies **[29]**.

The result of the study identified and established expert consensus on 81 feasible Public Health activities, that is, 81 critical areas of mutual collaboration between Public Health and Community Pharmacy practice out of 88 feasible areas. The indication is about 92% feasibility while it also identified and established curve of expert convergence on 18 interventions out of 20 which is about 90%. The overall implication is that a lot of Public Health activities and programmes could be effectively delivered directly or in collaboration with Community Pharmacists. This is critical to Nigeria national development and should be expeditiously reformed.

In view of the critical outcomes of the identified barriers to efficient and effective Public health pharmaceutical practice, it is cogent to determine practical approaches and scientific solutions to combating the multivariate primary and secondary factors that inhibit the practice of sustainable public health activities in rural-urban community pharmacies **[33]**. This could be achieved through well articulated, defined and proactive health policy framework that galvanizes not only the identified eighty-one feasible public health activities and eighteen interventions but seek ways and means necessary to legitimize, optimize and accredit them into specialties and public practices.

Importantly, Nigeria health budget for decades is grossly inadequate to its burgeoning ailing population. More worrisome is the fact that what is often budgeted is a far cry from what is eventually provided at the end of the fiscal cycle. Public expenditure on health is less than $8 per capita, compared to the $34 recommended internationally **[15]**. Poor budgetary allocation and provision directly affect health outcomes, living standards and security of lives. Health is a primary index of sustainability supported and enabled by strong economy. For instance, 2018 budget of the Ministry of Health was N340.46bn, or 4% of the federal government budget which is extremely poor **[8]**. There is need to increase the health budget to minimum of 30% of the overall budget provision. This will enhance both capacity and capability of health personnel and professionals to cope

with the rising trend of health challenges. This follows the fact that health is wealth, the healthier the population, the wealthier the economy. The implication is that Nigerian nation is as wealthy as its healthy population. Community pharmacists and healthcare givers contribute significantly in this direction, providing timely and efficient services to patients based on availability of health facilities and good condition of service.

The implication of Community Pharmacists participation in Public Health activities on Nigeria national healthcare development is huge. Apart from health benefits, its socioeconomic, cultural and overall national impact is multivariate. Therefore, having identified feasible Public health activities that could be carried out in community pharmacies, there is a need for all health professionals to synergize efforts, increase pharmaco-medical vigilance and research or capacity building to combat the rising trend of communicable and non communicable diseases especially in an era of rising threat of Biohazards, genetically modified or simulated disease conditions and unnatural causes ravaging the world. Such synergy and interoperation capability against medical abuses should be replicated across diverse and mutually reinforcing disciplines for aggregate national development and improved (Gross Domestic Product) GDP per sector/capita contribution.

CONCLUSION

In sum, the study of Public health activities in Community pharmacies in Enugu metropolis is very significant to the whole of government solutions to health security, medical diversity and public health emergencies. It clearly defines the inadequacies, interventions and gaps between Public health and Community Pharmacy practice. Based on critical findings of the study which argue for collaborative relationship between Community pharmacists and Public health practitioners in the fight against medical and public health emergencies, the study concludes that some public health activities are feasible to be performed in community pharmacies and by community pharmacists. However, major reforms are vital to ensure medical diversity and effective collaboration; to legitimize the identified public health activities practicable in community pharmacies and to minimize the incidence of public health crisis and ensure containment of fatalities and socioeconomic risks. Therefore, the need for collegiality, interoperability and interdis-ciplinary approach to security of lives is supreme and should be upheld and facilitated

by medical professionals. As evidenced by findings and results, the study submits that Community Pharmacists alongside other medical professionals play critical role in mitigating rising public health emergencies across the country and in the development and advancement of sustainable and affordable healthcare system in Nigeria. Policy reform is needed to enhance and boost inter-medical research and collegiality.

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