

ORIGINAL ARTICLE

Human resource development for Vision 2020 in developing countries: a change from absolute numbers

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PURPOSE. *To critically review the numbers, distribution, staff mix, and productivity of eye care workers (ECW) in Kwara State, north central Nigeria.*

METHODS. *A cross-sectional descriptive survey of all ECW identified from all eye care facilities in July 2008 was carried out using a structured questionnaire. Output data on cataract surgery of each institution were also collected and data analyzed using SPSS 16.*

RESULTS. *A total of 157 ECW comprising 8 ophthalmologists, 4 diplomates, 16 residents training ophthalmologists, 96 mid-level ophthalmic personnel (67 ophthalmic nurses, 3 optometrists, and 26 others), and 33 administrative and supporting staff were available to a population of 2.37 million. Ophthalmologist to population ratio was 1:300,000, optometrist 1:790,000, and ophthalmic nurses 1:35,000. Eighty percent of ECW and institutions are located in the state capital. There were no orthoptists, low vision specialists, counselors, or cataract finders, while optometrists, managers, and primary ECW were inadequate. The staff mix was 1 surgeon to 12 other ECW and an average of 182 cataract surgeries per surgeon per year.*

CONCLUSIONS. *Emphasis should shift to team building and ensuring available workers perform optimally rather than meeting the absolute numbers of some cadre, which does not guarantee improved output. Issues of equitable distribution, appropriate staff mix, filling identified gaps in human resources, and addressing poor service uptake should be the focus to reach the goals of Vision 2020: The Right to Sight.*

KEY WORDS. *Human resources, Staff mix, Vision 2020*

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INTRODUCTION

Access to eye care is limited in developing countries where the burden of blindness is highest despite international efforts to achieve vision for all by 2020. Trained manpower, which is the costliest and most important element in any health delivery system, is a major factor (1-3).

Emphasis in Africa had been on increasing the absolute number particularly of ophthalmologists as shown by the

standard for minimum providers to population ratio recommended by World Health Organization (Global Initiatives for the Prevention of Avoidable Blindness, vol 61, Geneva; WHO/PBL/97; 1996; pp 22-30). Only recently are issues of identification gaps and team building being emphasized (4, 5). In places where numbers have improved in developing countries, the output required to achieving Vision 2020 goals remains poor. An ophthalmologist needs a team of other health workers to effectively deliver eye care; a mo-

del in India provides a ratio of 1 ophthalmologist to 25-28 eye care workers (ECW) for the same populace resulting in efficiency and high productivity (6). These workers must be placed near the populace they are to serve and in appropriate mix to function optimally. The present emphasis on national average may not provide functional information at institutional or regional levels. Detailed figures of serving ECW in many regions are also not available and estimates are often used. Evaluation of ECW in Kwara State located in the north central geopolitical zone of Nigeria with a population of 2.37 million (national population data 2006) was carried out. The work aimed to critically review current status of eye health workers in context of numbers, distribution, mix, and productivity in a resource-limited economy. It is believed that appropriate attention to findings would enhance eye health service and reduce avoidable blindness not only in the state but in similar societies.

MATERIALS AND METHODS

Design

A descriptive cross-sectional study of ECW was performed in 2008. Health maps of the state eye care facilities were obtained from the State Ministry of Health. This was supplemented by information from contact groups such as the identified hospitals and ECW identifying any known hospitals in their surroundings as there were some service providers not registered.

Settings and data source

Kwara State is one of the 36 states of Nigeria, located in the north central zone with a population of 2.37 million (2006, population census figure). The population of urban to rural dwellers is 30:70 and the people are predominantly farmers and civil servants. The staff list on payroll for at least 6 months in 2007 was taken as service provider for the year and this was collated from all institutions.

Eye care workforce in this study is taken as any individual who directly or indirectly provides promotional, preventive, or protective eye care services (4). Specific ECW cadres are as defined below.

Ophthalmologist: A registered medical doctor with 4-6 years training in medical and surgical ophthalmology.

Diplomate: A registered medical doctor with 18 months training in ophthalmology to provide cataract and glaucoma surgeries in secondary and primary level of care.

Cataract surgeon: An ophthalmologist or diplomate excluding resident doctors undergoing training.

Ophthalmic nurse: A general nurse with an additional year of training in ophthalmic nursing trained to screen, diagnose, and treat basic eye conditions, and support the ophthalmologist in patient care.

Optometrist: A professional with 4-year university training in refraction and low vision management after secondary education.

Refractionist: An ECW with 6-week training in basic refraction, not presently recognized by the government.

Project manager: A person trained in management and administration with specific emphasis on eye care service delivery.

General nurse: A nurse trained in basic nursing and midwifery, who works and receives on-the-job training in ophthalmic nursing.

Primary health care worker: A community health worker with on-the-job training in treating minor ocular disorders and referral of cases.

Primary ECW: A community health worker placed at the primary level of care with short training of 1 week on health education, treatment of minor ocular disorders, and referral of cases.

Mid-level ophthalmic personnel (MLOP) (7): Optometrists, ophthalmic and general nurses, refractionists, project managers, and equipment technicians.

Administrative staff: Secretaries and typists.

Supporting staff: Drivers, security, messengers, and cleaners.

Number of cataract surgeries was used to assess productivity as the commonest surgery performed and with availability of suggested number of surgeries per surgeon per year by the World Health Organization (WHO). This not the only function carried out by the ECW.

Exclusion criteria included non-permanent staff (interns, persons on compulsory 1-year postgraduation National Youth service, ophthalmic nurses in training) and Ivermectin community distributors.

Ethical approval was obtained from the ethical review committee of the University of Ilorin Teaching Hospital. Permission was also obtained from the head of each service center. Informed consent was obtained from individual participants in the study.

TABLE I - DISTRIBUTION OF THE EYE CARE WORKERS IN KWARA STATE, NIGERIA

Cadre	Hospital			Total
	Private	Tertiary	State	
Ophthalmologists	1	6	1	8
Diplomates	0	0	4	4
Resident doctors	0	16	0	16
Optometrists	1	1	1	3
Refractionists	0	0	6	6
Eye care managers	1	0	1	2
Ophthalmic nurses	0	16	51	67
Others ^a	15	22	14	51
Total (%)	18 (11.47)	61 (38.85)	78 (49.68)	157 (100.00)

^a General nurses, record officers, administrative staff, equipment technicians, primary health care, primary eye care, cleaners/messengers, drivers, security.

TABLE II - RATIO OF EYE CARE WORKERS CADRE TO POPULATION

Cadre	Number	Ratio of cadre to population of 2.37 million
Ophthalmologists	8	1:300,000
Cataract surgeons ^a	12	1:200,000
Optometrists	3	1:790,000
Ophthalmic nurses	67	1:35,000

^a Ophthalmologists + diplomates.

The field investigators comprised 1 ophthalmologist, 2 trainee ophthalmologists, and 3 research assistants. The research team held briefings twice before the study for familiarization with the study aims and objectives. One-day training was carried out on the use of the questionnaires and pilot study done at University of Ilorin Teaching Hospital institution and staff. The questionnaires were adjusted as found necessary and the field work was carried out in July 2008.

This study was heralded by initial advocacy letters, visits, and telephone calls to all the identified institutions. A pre-tested questionnaire was then administered to available ECW. Questionnaires were posted or e-mailed to identify workers who had traveled or were on annual leave to improve coverage. There were no records of transfer or retirement at the time of doing the survey. The analysis of quantitative data was carried out using SPSS 16.

RESULTS

A total of 157 ECW were in Kwara State actively involved in the delivery of eye care service (Tab. I). There were 27 (17.20%) men and 130 (82.80%) women with age range of 23-62 years, mean age 40.37, SD 8.67 years. Ratio of cadre to population is shown in Tab. II. The human resource target for Kwara State up until 2020 using WHO guidelines is shown in Tab. III.

The ECW cadres of orthoptists, low vision specialists, counselors, and cataract finders were not available in the state and their functions were carried out by available ECW.

Distribution

The workers were from 14 hospitals and clinics, comprising 2 centers under the tertiary hospital, 8 surgical centers under the State, and 4 private surgical centers. Half of the workers are employed by the State government.

Eighty percent of the workers (126 of the 157) work and reside in the state capital. Of the 14 service points, half were in the state capital and constituted 75% of the hospitals with permanent and residential staff. Only 2 out of the 7 hospitals outside the state capital have residential staff. The remaining centers were fairly spread across the state and covered by workers on visits. All the ophthalmologists and 2 of the diplomates reside and work in the state capital while the other 2 diplomates reside about 60 km away from the state capital.

TABLE III - VISION 2020 HUMAN RESOURCES TARGETS FOR KWARA STATE, NIGERIA

	Working	Year 2007 (need)	Year 2010 (need)	Year 2020 (need)
Population (millions)	2.44	2.44	2.678	3.63
Ophthalmologists	8	5 (+3)	12 (-4)	16 (-8)
Cataract surgeons	12	5 (+7)	12 (0)	16 (-4)
Ophthalmic nurses	67	10 (+57)	26 (+41)	70 (-3)
Optometrists	3	8 (-5)	26 (-23)	70 (-63)
Managers	2	2 (-1)	5 (-3)	5 (-3)

- = Deficit based on 2007 figures; + = surplus based on 2007 figures.

TABLE IV - OUTPUT DATA FOR CATARACT SURGERY IN 2007

Items	Tertiary	State	Private
No. of new cases	4780	—	1200
No. of review cases	11,300	39,000	2300
No. of cataract surgeries	282	1850	59
Surgeries per surgeon	47	237	47 ^a

^a A total of 47 surgeries by ophthalmologists in private hospitals, 12 surgeries additionally by ophthalmologists in government hospitals.

Staff mix

The staff mix in the tertiary hospitals was 1 surgeon to 10 other team members, while the State had 1 surgeon to 15 other team members. There is an average of 1 ophthalmologist to 3 nurses in the tertiary center and 1 to 10 in the state service hospitals.

Productivity

The cataract surgical rate (2007) for the state was 898 while number of cataract surgeries per surgeon per year was 182. The figures were 370 for surgeons working for the state and 47 for surgeons in tertiary and private hospitals (Tab. IV). Other parameters on productivity are shown in Table IV. All cataract surgeons perform surgeries.

DISCUSSION

Human resources are a major input in any eye care program aimed at reducing avoidable blindness and deserve a critical review. The role of adequate human resources for

the prevention of avoidable blindness especially from cataract has been described and underscored (1, 4, 6-10). With an increasing and aging population, demand for eye care will continue to rise. There should therefore be preparedness to meet this increasing challenge, not only in provision of adequate human resources, a component not in ready supply, but within a framework that ensures effective service delivery among the available ones.

This study looked at human resources available for services in a resource-limited state in Nigeria. The numbers of cataract surgeons are adequate and with excess ophthalmic nurses for the present population going by the WHO suggestions. This is a departure from the general low numbers of surgeons in Africa, put at less than 1 per million population (6). However, this did not translate to adequate output, as seen in the cataract surgical rate (CSR) of 898, although higher than the quoted 300 for Nigeria. There is an inadequate number of optometrists, while some important cadres of ECW including orthoptists, low vision specialists, counselors, and cataract finders and ophthalmic assistance were absent in the State. Each cadre of eye care team has a defined role and absence or inadequacy of a cadre would affect optimal care delivery. For instance,

absence of cataract finders and counselors could be partly responsible for the low surgical output as none of the service points were found to have a waiting list. Ophthalmologists spend time giving counseling, a function that can be done by counselors at minimal cost and effectively.

This study also identified an inadequate staff mix, with the ratio of ophthalmologists to other team members below that described for optimal level of service. The problem is compounded in some centers where the functional numbers of cadre differ from the absolute numbers as some ophthalmic trained personnel were deployed to care for nonophthalmic patients and others carry out mainly administrative functions. Employment, deployment, and job description was found not to be under the control of the managers of eye care facilities. The health administrators in all inclusive care settings should be encouraged through advocacy to deploy ophthalmic trained staff where their training will be put to optimal use while identified gaps should be filled.

The need for training centers for mid-level ophthalmic personnel has been highlighted (7). It should not be taken for granted, however, that once these cadres are available, they will translate to improved productivity (11-13). Career pathway, recognition, motivation, and supervision as well as articulated curriculum and skills should be spelled out. In this study, a greater proportion of workers were under government employment, in contrast to findings in India, where the private setup supplies the highest numbers of ECW (14). Presently, remuneration is not related to output in government service; this is counterproductive. Reward for effective service delivery should be put in place and could enhance performance.

The maldistribution of the workers in this study is a major issue, as also reported by Eze in Eastern Nigeria and in other studies (4, 13, 15). The patients live far away from the service points and are not coming forward to take up service in adequate numbers. There are probably more barriers to uptake of service besides distance; however, distance is a major factor identified in various studies (16-18). The presence of ophthalmic diplomats helped provide service to places away from the state capital, as half of the category of these surgeons work outside the state capital; this is as anticipated when this cadre was established in Anglophone West Africa countries (1). The period of time this cadre will be willing to work in remote areas is unclear. Provision of basic amenities, such as power, water, good roads, monetary incentives, as well as sitting functional

service/training institutions in rural places, may encourage personnel to work in such areas. This would address some of the findings of low motivation, inadequacy of health facilities and medications, and primitive living conditions as part of the reasons skilled health workers fail to work in the rural and remote regions of Nigeria (19).

The primary and secondary level of care should be strengthened while mobile services and outreach centers could be used to improve access as immediate measures. The low number of surgeries per surgeon per year particularly in the tertiary institutions where residency training is ongoing is inadequate, with lower than 243 found in Eastern Africa (20). Other functions expected of ECW in the teaching hospital, such as teaching and research, single service point usually cited at state capital, as well as the complex functional structures, may be responsible for low output. The major distinguishing factors of the high cataract output center vs the low output center are multiple fairly well-distributed functional service facilities, low cost, commitment to reduction of avoidable blindness, support by a non-governmental organizations (NGO), and pursuit of set targets. Collaboration of centers with low and high output will ensure adequate exposure of trainee ophthalmologists, improve skills of all surgeons, and improve service delivery, as is already being done in Kwara State. Eye service points perform more than cataract surgery; however, in view of the contribution of cataract to blindness in developing countries, there should be a target of cataract operations per year per surgeon, as earlier suggested by trainee resident doctors (21) and as in India with a target of at least 700 cataract operations. Other possible reasons elicited as barriers to improving CSR from the eye care providers' perspectives are cost, distance to service points, and complex bureaucratic hospital procedures, details of which are beyond the scope of this article.

In conclusion, there is more to the optimal human resource component of Vision 2020 than meeting the absolute number of cadres like ophthalmologists and nurses to population ratio. Low output in some places in Africa can no longer be primarily attributable to inadequate human resources. Emphasis should shift to team building, equitable distribution, and effective ECW.

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