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MANPOWER, EQUIPMENT AND MATERIAL RESOURCES ADEQUACY FOR PROVIDING PRIMARY EYE CARE (PEC) SERVICES, IN PRIMARY HEALTHCARE FACILITIES IN RIVERS STATE

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Abstract

Background: The provision of primary eye care services is essential for the prevention and control of ocular morbidities as well as contribute in producing a healthy workforce. This study was thus aimed at assessing the manpower, equipment and material resources adequacy for providing Primary Eye Care (PEC) services, in primary healthcare (PHC) facilities in Rivers State, Nigeria. **methods:** This study utilized the descriptive, cross-sectional design and was conducted in 83 PHC facilities in Rivers State, Nigeria. Data was collected using adapted manpower, equipment and materials checklists. Evaluation was done using PHC standards to identify the adequacy of the assessed resources. Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 23 **Results:** The largest proportion of the PHC facilities were found to have one doctor 40 (48.2%), no optometrist 75 (90.4%), one nurse 22 (26.5%), one community health officer (CHO) 28 (33.7%), three community health extension workers (CHEW) 21 (25.3%), and one records officer 36 (43.4%) working in them. Also, only 8 optometrists were found to be providing PEC services in the PHC facilities. Assessing the adequacy of the various cadres of workers, revealed inadequacies affecting all cadres, with nurses (80%) and doctors (40%) having the highest proportion of inadequacies. An assessment of the adequacy of the equipment and materials using a 50% cut-off for categorization of availability into "adequate" and "inadequate" showed that most facilities 67 (81.0%) experienced inadequacies as they did not have a number of these equipment and materials. **Conclusion:** The manpower, equipment and material resources were found to be inadequate. Task shifting, where primary healthcare workers are trained in the management of simple ocular diseases while the specialists attend to more serious ocular conditions, and the even distribution of equipment and materials needed to provide PEC services are recommended.

Keywords: Primary eye care (PEC), equipment, manpower, material resources, Primary Health Care (PHC)

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Introduction

In order for improved labour productivity to be achievable in any society, the health of the population must be ensured, and it has been described as directly related to the extent of investments made into healthcare. This is obvious in situations where problems of low life expectancy and ill-health have been blamed for as much as 50% of the marked difference in economic growth between developed and developing countries worldwide.[1] Healthcare expenditures largely require government inputs in conducting expanded and far-reaching interventions that have a positive influence on the nation's health and well-being.[1] Whenever government expenditure on healthcare declines or becomes inadequate, it is capable of generating ripple effects of poor healthcare delivery, including the ineffective delivery of eye care services.[2–5] Vision has also been connected to a country's ability to achieve socio-economic development and productivity, thus making eye care services available to a populace should be considered as an important action.[6]

Universal Eye Health Coverage guarantees that everyone has access to essential visual health services—promotive, preventive, curative, and rehabilitative—that are of adequate quality to be effective, while also making sure that individuals do not face financial difficulties when paying for these services.[7] Providing eye care services that are easily accessible and affordable ensures that a large proportion of the populace receive the needed care for ocular health and wellbeing.[8] In Nigeria, there is still a dire need for eye care services considering reports of preventable ocular abnormalities in the country[6,9], including 6.9% in a Nigerian systematic study[10], 28.9% in Delta State[11], and 81.7% in Obio-Akpor, Rivers State.[2] These were also reported to mostly occur in rural areas when compared with the urban.[12] In Rivers State, common ocular morbidities have been reported to include blindness (13%), glaucoma (14%), refractive errors (13%) and presbyopia (13%).[13,14] Nigeria is reported to be far from achieving universal eye health, considering that up to 35% of the population primarily use traditional and alternative medicines and procedures for their eye care, with inadvertent worsening outcomes.[6,15]

The World Health Organization (WHO) advises a distribution ratio for eye care professionals of 1 ophthalmologist or optometrist for every 250,000 people, and 1 ophthalmic technician for every 100,000 people. Also, it was prescribed that there needs to be an adequate provision of infrastructure, equipment, equipment maintenance, supplies, and technology in order to provide quality eye care services to a populace.[3] Various barriers affecting the provision and utilization of these services have however been reported to include poor access to services, consumables inadequacy,[16] insufficient manpower,[6] and the inadequacy of technical and infrastructural resources to provide these services.[3,4] Others have been reported to include direct and indirect costs of care,[12] poor knowledge of visual morbidities as well as not knowing where to receive appropriate visual healthcare, among others.[2–4] Although most eye care services are provided at secondary and tertiary levels of the health system, the initial access to these services continues to pose a barrier to tackling issues related to visual impairment.. In addition, a maldistribution of the available workforce for eye care in favour of urban areas; and the persistence of care at the higher levels and not beginning at the first point of care stills poses a problem and requires urgent attention.[6,17]

A key approach to however improve access to these services and strengthen eye healthcare service delivery at all levels of care is the integration of eye care into primary health care (PHC) to provide primary eye care (PEC) services.[6,8,18] Though a viable option for promoting eye care service delivery, in order for PEC to be achievable, there is the need to address certain identified problems. These include difficulties in community sensitization and advocacies, inadequate infrastructure and mobile equipment, lacking eye care manpower, as well as shortages of consumables and necessary funding to provide these services.[12,15] In Nigeria, national minimum standard requirements for resources to provide healthcare services at the PHC facilities has been provided and can be a useful guide by healthcare stakeholders when setting-up PEC services in the country[19] In Rivers

State, Nigeria, there are scant published studies evaluating the status of equipment, manpower and material resources necessary for the provision of PEC services in PHC facilities. Considering that ocular morbidities are still a source of public health concern in the State[2,13,14,20], and the need to achieve Universal Eye Health Coverage, as well as the potential of using the evidence generated in this study to improve PEC service delivery in the State, there was the need to conduct this study.

This study thus aimed at assessing the manpower, equipment and material resources adequacy for providing PEC services, in primary healthcare facilities in Rivers State, Nigeria.

Methodology

This study utilized a descriptive, cross-sectional design to assess the adequacy of manpower, equipment and material resources for providing PEC services, in primary healthcare facilities in Rivers State. It was conducted at 83 Model PHC facilities and Comprehensive PHC facilities located in the 23 LGAs of Rivers State, Nigeria. Responses on the available resources for the provision of PEC services at the PHC facilities were provided by the facility heads of the respective PHC facilities.

The instrument for collection of data was an adapted checklist which was used to obtain the number of healthcare personnel providing services at the facilities. This was then assessed and compared with the national minimum standard requirements for manpower at PHC facilities. This was used to determine if the number of personnel was adequate or not. Equipment and materials required for the provision of PEC services were also assessed for availability using a 35-item checklist. A 50% cut-off was then used to categorize the level of availability into "adequate" and "inadequate".

Ethics Approval was obtained for this study from the Health Research Ethics Committee of the Rivers State Hospital Management Board (Approval number: RSHMB/RSHREC/2024/012). Permission to carry out the evaluation was obtained from the Executive Secretary and Director Planning, Research and Statistics of the Rivers State Primary Health Care Management Board (RSPHCMB) as well as the Medical-Officers-of-Health of the selected PHC facilities in Rivers State. Informed consent was also obtained from each respondent before conducting the surveys. Also, the data collection tools were anonymised to ensure protection of the privacy of respondents and confidentiality of their responses. Data was also collected electronically and safely stored in a secure server of the Kobo toolbox Open-Source Mobile Data Collection platform. Data was cleaned, collated and analyzed on a Microsoft Excel spreadsheet, expressed as frequencies/percentages and Mean ±S.D, and was presented on tables and charts.

Results

Sociodemographic Characteristics

Altogether, 83 PHC facilities were assessed for the adequacy of manpower, equipment and tools that were available for the provision of PEC services. In these facilities, the facility heads provided responses regarding the assessment, and it was found that they were mostly females 54 (65.1%), aged between 40 and 49 years (mean age: 45.4±5.5 years) 54 (65.1%), earned more than 3000 naira daily 47 (56.6%) and were married 76 (91.6%). All of them had also received tertiary education (Table 1).

Table 1: Sociodemographic details of respondents

Variables	Frequency (n=83)	Percentage (%)
Sex		
Male	29	34.9
Female	54	65.1
Age category (years)		
30-39	11	13.3
40-49	54	65.1
50-59	17	20.5
60-69	1	1.2
Mean age: 45.4±5.5 years		
Income		
<500	3	3.6
500-1000	7	8.4
1001-2000	9	10.8
2001-3000	17	20.5
>3000	47	56.6
Marital status		
Single	5	6.0
Married	76	91.6
Widow	2	2.4
Level of education received		
Primary	0	0.0
Secondary	0	0.0
Tertiary	83	100.0

Manpower available for the provision of PEC services

Regarding the manpower working at the health facilities, it was identified that the largest proportion of the facilities had one doctor 40 (48.2%), no optometrist 75 (90.4%), one nurse 22 (26.5%), one community health officer (CHO) 28 (33.7%) and one records officer 36 (43.4%) working in the facility. In

addition, the largest proportion of the facilities had three community health extension workers (CHEW) 21 (25.3%) working in them.

Also, only 8 optometrists were found to be providing PEC services in the PHC facilities located in the 23 LGAs of Rivers State. It was also not encouraging to find out that 33 (39.8%), 75 (90.4%), 18 (21.7%), 23 (27.7%), 2 (2.4%), and 4 (4.8%) of the facilities did not have any doctor, optometrist, nurse, CHO, CHEW, nor records officer respectively working in them. These results portray the gross inadequacy in the required workforce necessary for the provision of PEC services in all the LGAs of Rivers State (Figure 1).

Assessment of the adequacy of the various cadres of workers using the national minimum standard requirements for manpower at PHC facilities, revealed inadequacies affecting all cadres, with nurses (80%) and doctors (40%) having the highest numbers of inadequacies. No provision was however made for optometrists in the national minimum standard requirements; thus, no judgement of inadequacy/adequacy could be made (Figure 2).

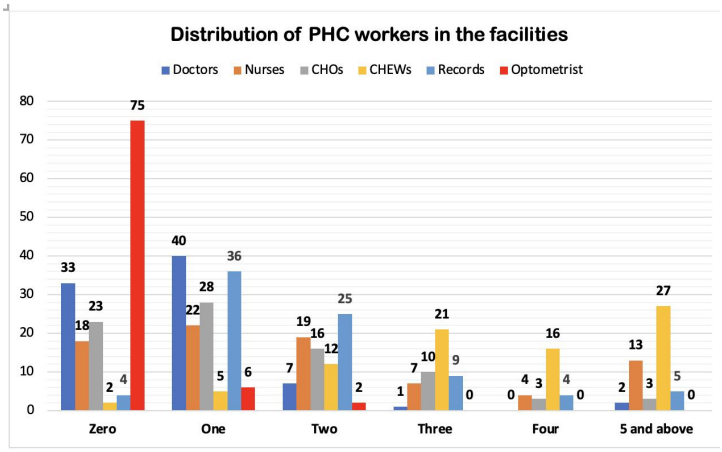

Figure 1: Distribution of the PHC workers in the various PHC facilities

Equipment and tools available for the provision of PEC services

Assessment of the 35-item necessary equipment and tools available for the provision of PEC services revealed that only 24 (28.9%) of the facilities had illuminated vision charts (near & distance), 18 (21.7%) had Snellen & Near Vision Charts as well as National Primary Eye Care Guidelines for providing PEC services, and only 12 (14.5%) of the facilities had a direct Ophthalmoscope (Table 2).

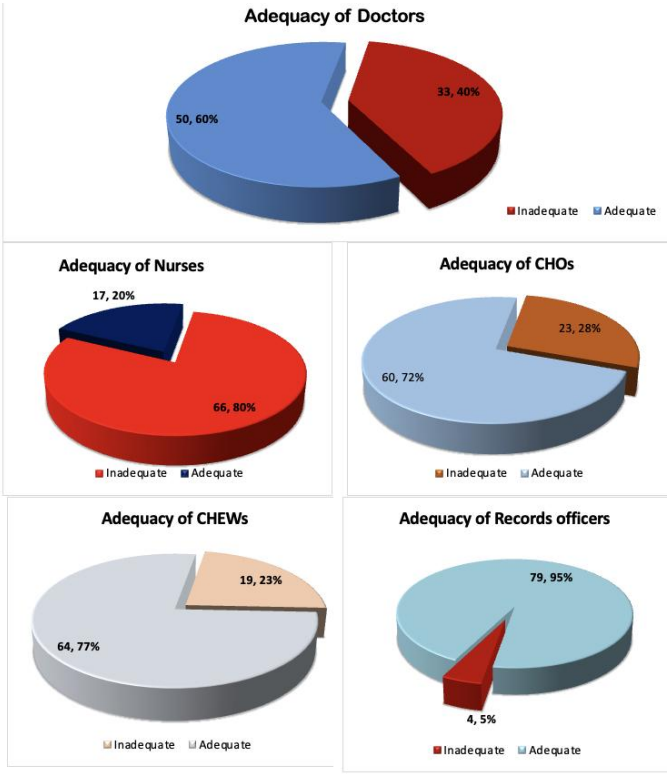

Figure 2: Charts showing the adequacy of healthcare personnel to provide PEC services

An assessment of the adequacy of this 35-item equipment and tools required for the provision of PEC services at the PHC facilities using a 50% cut-off for categorization of availability into "adequate" and "inadequate" showed that most facilities 67 (81.0%) experienced inadequacies. (See Figure 3). Facilities within the Rivers South senatorial district had the highest levels of inadequacies 18 (94.7%), when compared with the proportion of adequacy, while facilities within the Rivers East senatorial district had the highest levels of adequacy overall, 13 (30.2%) (Figure 4).

Tables 3 and 4 also show the least 20 and best 20 performing facilities with respect to adequacy of equipment and tools to provide PEC services.

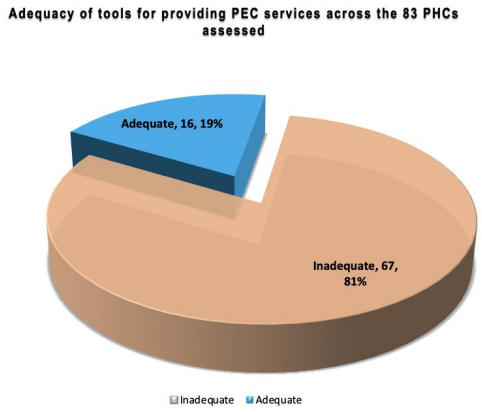

Figure 3: Adequacy of tools to provide PEC services in Rivers State

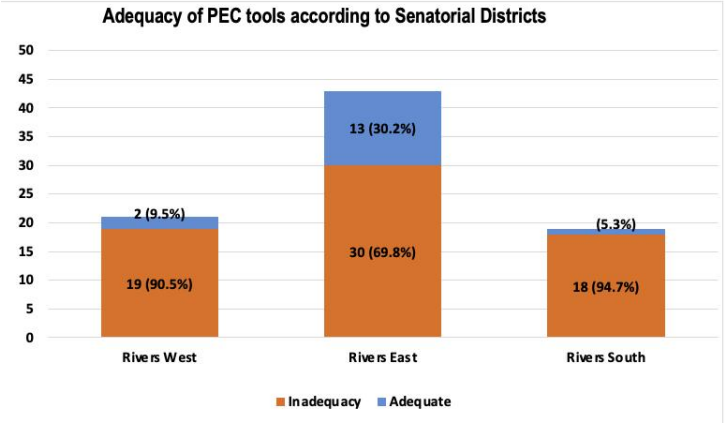

Figure 4: Level of adequacy of USS tools categorized by senatorial districts

Table 2: List of PHC facilities having required equipment and tools for the provision of PEC services

s/n	Which of the following do you have in this facility?	Number of facilities (n=83)	%
1.	Covered stainless steel tray with sterile cottons/swabs/gloves	45	54.2
2.	Cotton wool	42	50.6
3.	Cotton bud	33	39.8
4.	A pair of scissors	32	38.6
5.	Gauze roll	31	37.3
6.	Access to electronic learning material; can be developed by reviewing various existing models from the institution/ NGOs.	29	34.9
7.	Torch (with batteries)	26	31.3
8.	Illuminated Vision chart (near & distance)	24	28.9
9.	Vision Screening card for 6/18 vision, measuring tape (6 metre), recording format, reading module, referral cards.	23	27.7
10.	Masking tape	23	27.7
11.	Data entry - mechanism (e.g. Registers/tablets/PCs)	21	25.3
12.	Measuring tape	20	24.1
13.	Trial set	19	22.9
14.	IEC materials (Flipcharts, Posters & Brochures for common eye conditions)	18	21.7
15.	Snellen & Near Vision Charts	18	21.7
16.	National Primary Eye Care Guidelines	18	21.7
17.	Eye glasses	15	18.1
18.	Twine	15	18.1
19.	Tonometer (Schiotz)	14	16.9
20.	Foreign body spud and needle	14	16.9
21.	Cardboard paper	14	16.9
22.	Lid speculum	13	15.7
23.	Trial frame (adult and child)	13	15.7
24.	Epilation forceps	13	15.7
25.	Direct Ophthalmoscope	12	14.5
26.	Furnishing & fixtures	12	14.5
27.	Non-contact tonometer	12	14.5
28.	Illuminated Vision Testing Drum	11	13.3
29.	Slit lamp (optional)	11	13.3
30.	Non-mydriatic fundus camera	11	13.3
31.	Auto refraction meter	11	13.3
32.	Epilation forceps	11	13.3
33.	Plane mirror for retinoscopy	10	12
34.	Streak Retinoscope	10	12
35.	Magnifying loupe / Binomag	10	12

Table 3: 20 least performing facilities (having the highest levels of inadequacies of USS tools)

	Performance score (%)	Name of Facility	LGA of Facility
1	0.0	Ulakwo MPHC	Etche
2	0.0	Egwi MPHC	Etche
3	0.0	MPHC Akinima	Ahoada West
4	0.0	Obuama MPHC	Degema
5	0.0	MPHC Anyungubiri	Okrika
6	0.0	MPHC Obrikom	Ogba–Egbema–Ndoni
7	0.0	CHC Degema	Degema
8	0.0	MPHC Omoku	Ogba–Egbema–Ndoni
9	0.0	Ayama health centre	Abua–Odual
10	2.9	MPHC Ahoada	Ahoada East
11	2.9	MPHC Mirinwanyi	Oyigbo
12	2.9	Tombia MPHC	Degema
13	2.9	MPHC IHUAJE	Ahoada East
14	2.9	MPHC Ogbema	Abua–Odual
15	2.9	MPHC Ikodi-Engenni	Ahoada West
16	2.9	Sama MPHC	Asari-Toru
17	2.9	Akwa MPHC	Etche
18	2.9	Buguma MPHC	Asari-Toru
19	2.9	MPHC Nchia	Eleme
20	5.7	MPHC Woji	Obio-Akpor

Table 4: The best 20 performing facilities (having the highest levels of adequacy of USS tools)

	Performance (%)	Name of Facility	LGA of Facility
1	44.3	MPHC Eneka	Obio-Akpor
2	45.7	MPHC Amadi Ama	Port Harcourt
3	45.7	MPHC Ozuoba	Obio-Akpor
4	48.6	NGO MPHCC	Andoni
5	50.0	MPHC Rumuigbo	Obio-Akpor
6	50.0	MPHC Rumuolumeni	Obio-Akpor
7	54.3	MPHC Mgbuoshimini	Obio-Akpor
8	57.1	MPHC Umuagbia	Oyigbo
9	60.0	Finima Model Health Centre, Bonny	Bonny
10	77.1	MPHC Rumuokwurusi	Obio-Akpor
11	80.0	PHC Rumuji	Emohua
12	97.1	MPHC Omagwa	Ikwerre
13	97.1	MPHC Igwuruta	Ikwerre
14	97.1	MPHC Orugbum	Port Harcourt
15	97.1	MPHC Rukpoku	Obio-Akpor
16	100.0	MPHC Aluu	Ikwerre
17	100.0	MPHC Churchill	Port Harcourt
18	100.0	MPHC Elekahia	Port Harcourt
19	100.0	MPHC Mgbundukwu	Port Harcourt
20	100.0	MPHC Ihugbogo	Ahoada East

Discussion

This study identified that there were inadequacies in the manpower, equipment and material resources required to provide PEC services in Rivers State. Regarding the manpower working at the health facilities, it was identified that the largest proportion of the facilities had one doctor, no optometrist, one nurse, one CHO, three CHEWs, and one records officer working in them. Assessment of the adequacy of the various cadres of workers using the national minimum standard requirements for manpower at PHC facilities revealed inadequacies affecting all these assessed healthcare manpower cadres; however, nurses were the most affected. No provision was made for optometrists in the national minimum standard requirements; thus, no judgement of inadequacy/adequacy could be made using these requirements. However, it was identified that only eight optometrists provided PEC services in the 83 PHC facilities located in all the local government areas of Rivers State. The state had an estimated population of seven million as at the year 2016,[21] and comparing this with the recommended standard of 1:250,000 ophthalmologists and optometrists, this number of optometrists is grossly inadequate to serve the Rivers State populace.[3] This finding of inadequacies in the healthcare manpower to provide PEC services has also been reported by other studies,[3,15,22] and has been established as a potential factor limiting the availability of these services for those who need them[6,22]

In addition to these, it was also identified in this study that there were facilities that did not have any doctor, nurse, CHO, CHEW, nor records officer working in them, with the highest number of them lacking nurses.

These results portray the gross inadequacy in the required workforce necessary for the provision of PEC services in all the LGAs of Rivers State[3,15] It is however essential to note that some facilities also exceeded these minimum guidelines in the number of these healthcare manpower, considering that a comparable number of these facilities had five or more of these healthcare manpower cadres working in them. This is an evidence of an unevenly distributed appropriation of healthcare manpower to provide PEC services in the State, and has been reported by other authors as well.[15,16] Insufficient healthcare manpower to provide PEC services has significant implications for public health, economic growth, and quality of life.[2–5] With inadequate staffing, many individuals may experience delayed or missed diagnoses of eye conditions, leading to preventable vision loss or blindness, which can severely impair daily functioning and productivity.[3,20] This can increase the burden on families and caregivers, and reduce workforce participation, impacting economic growth and development. Moreover, the strain on available healthcare providers can lead to burnout and reduced quality of care, exacerbating health disparities.[17] In addition, this inadequacy is capable of spurring persons to resort to the use of non-conventional forms of care including the use of herbal mixtures, self-care and so on,[6,15] especially when they have to travel long distances to access care.[16]

Assessment of the equipment and tools available for the provision of PEC services in this study also revealed that most of the PHC facilities experienced inadequacies in the necessary resources needed to provide PEC services in Rivers State. Also, an uneven distribution of facilities having adequate proportion of these resources was identified across the different senatorial districts. This finding is corroborated by the findings of other authors who reported the inadequacies in necessary equipment and other resources to provide PEC services[16] The lack of sufficient equipment and materials for primary eye care services significantly hampers the ability to diagnose and treat eye conditions effectively, leading to adverse health and socioeconomic consequences.[16,23,24] Without the necessary tools, healthcare providers are unable to perform essential procedures like vision tests, glaucoma screenings, or refractions, resulting in undiagnosed or mismanaged conditions that can progress to severe vision impairment or blindness.[23] This not only diminishes the quality of life for affected individuals but also places additional strain on families and healthcare systems as untreated conditions lead to increased dependence and healthcare needs.[3] Moreover, the economic impact is profound, as vision loss can reduce productivity.[3,20] Also, an uneven distribution of PEC services especially affecting rural areas can increase the risk of untreated eye conditions in these areas, leading to problems of preventable blindness and visual impairment.[16,24]

Conclusion

This study thus concludes that the manpower, equipment and material resources necessary for the provision of PEC services in PHC facilities in Rivers State was inadequate. It is recommended that:

- Agencies of government in River State and all other concerned stakeholders of PEC services should always ensure the even distribution of all resources necessary for the provision of these services to the Rivers State populace. This can be achieved by integrating PEC services into PHC in Rivers State, immediate provision of basic resources (infrastructure, manpower, logistics and so on) required to effectively provide PEC services, as well as providing in-service training of PHC workers on quality healthcare service delivery.
- Considering the prevailing shortages in healthcare manpower to adequately provide PEC services, primary healthcare workers can be deployed and trained in the management of simple ocular diseases such as red eyes, conjunctivitis among others (using their standing orders). This ensures that the available eye care specialists are able to attend to more serious ocular conditions requiring specialist care. Other areas of training could include basic PEC involves mainly eye health promotion, identification of persons needing specialist eye-care and prompt referral of these persons.
- Considering shortages in equipment and material resources to provide PEC services, required materials can be locally sourced. An example is using gauze and cotton wool to produce eye pads. Research can also be sponsored to identify other materials essential for PEC service delivery which can be sourced locally.

Authors Contribution

All authors were involved in Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Resources, Supervision, Validation, Visualization, Original Draft, as well as Review & Editing.

Conflict of Interest

The authors declare no conflict of interest.

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