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ABSTRACT:

After 20 years of in-service training in child health, involving many different WHO and UNICEF courses: the Integrated Management of Childhood Illness (IMCI), Infant and Young Child Feeding (IYCF), Severe acute malnutrition (SAM), Early Essential Newborn Care (EENC) and many others, it is time to consider what model of training is efficient and sustainable. Such a training model will need to address the complexities of child health in Papua New Guinea (PNG) in the era of the Sustainable Development Goals (SDG) and provide health workers with a program of continuing professional development (CPD). Efficient models of training will have a common framework and integrate the best of these individual courses, and involve modern information technology to improve efficiency, be easily updatable and enlarge access. Training should be flexible and modular so that it can be delivered as an in-service course, a program of CPD within a hospital, or as self-learning. It should involve the principles of adult learning, enabling health workers to build on their existing knowledge and skills, to learn how to use standard up-to-date texts and technical resources in everyday clinical practice, and to understand where and how to access quality, credible health information. In-service training and CPD should involve and support PNG's schools and colleges of nursing, HEOs and community health worker training, with the Paediatric Society, the School of Medicine and Health Sciences (SMHS) University of PNG, and the National Department of Health (NDoH) taking the lead. A course that integrates the best of the existing WHO and UNICEF courses could form the basis of a post-graduate child health nursing diploma, which could be established in more provinces to address the shortage of paediatric nurses.

Keywords: child health, training, Papua New Guinea, paediatrics, nurses, IMCI, Hospital Care for Children

HISTORY:

In the 1980s and 1990s Papua New Guinea (PNG) was one of the few developing countries to have evidence-based clinical guidelines, in the form of the PNG Standard Treatment Manual for Common Illnesses in Children [1]. This set of

guidelines has been continuously published since the first edition in 1975. PNG also had other treatment guidelines targeted to different settings and health care staff, including Paediatrics for Doctors in PNG [2], and the green manual Child Health for Nurses. The

training approach was mostly a pre-service or undergraduate model, where these texts were used as the basis of the curriculum in schools and colleges of health worker training, and they were the standard references used in the field after graduation. In those years there were limited opportunities for continuing professional development, updates or ongoing training, such that many health workers would be 10 years or more without any retraining or updating.

Background and history of IMCI: globally and in PNG:

In the 1980s the World Health Organization (WHO) had separate “vertical” programs in child health: Acute Respiratory Infection, Diarrhoea, and Malaria for example. Much of the content of these programs was based on research in PNG, the Gambia in West Africa, and other low income tropical countries. In the late 1990s WHO developed the Integrated Management of Childhood Illness program (IMCI) [3]. This was designed to standardise and improve primary health care for children, recognising that while children may have one presenting symptom, those most at risk of dying have more than one disease or problem, for example diarrhoea and malaria, or pneumonia and malnutrition and anaemia. WHO promoted IMCI in developing countries around the world, with strong encouragement for PNG and other Pacific Island countries to adopt it. In PNG, adaptation of IMCI commenced in 1998 by the Paediatric Society

and the National Department of Health (NDoH), in a series of meetings supported by WHO. A 10-step checklist was devised, based on the IMCI algorithms to cover common illnesses, and to be consistent with a previous project in PNG where a checklist was used to assess children presenting to primary care. The training approach of IMCI was to train trainers (often paediatricians), who would then run provincial-level courses, and health workers trained at a provincial level would then return to their districts and train district health staff. In 1999 training of trainers in the IMCI / 10-step checklist was funded by the AusAID Women’s and Children’s Health Project. This achieved good coverage in provincial centres, mostly because of the efforts of several paediatricians who became lead trainers. WHO then supported IMCI intensely in 2 districts, Henganofi and Madang, which became known as the two pilot districts. Here effort was put into including the other components of IMCI, particularly provision of commodities, drugs and equipment. WHO invested a great deal of funds in these 2 districts, far more than feasibly could be expected to be provided by the Health Department to any other districts in an IMCI expansion phase. Initial training was of 5 days duration, but this was later expanded to 10-11 days to be in line with the WHO model.

In 2003 a “young infant checklist” was finalized and incorporated into the 10 day training courses, to address the needs of neonates

which were mostly missed in the original IMCI algorithms. The combined child and young infant IMCI course was run in the two “IMCI pilot districts” supported by WHO, and in West Sepik. In 2002 and 2004 more training was done for “supervisors of IMCI” in Goroka, Madang and Henganofi, and subsequently further 10 day in-service trainings were conducted, this time supported by the Health Sector Improvement Program (HSIP).

By the end of the first decade of IMCI only a few provinces had done their planned district training, and follow-up after training was poor. IMCI training and follow-up supervision was often included in provincial annual activity plans (the plans that are supposed to direct the budget), but these activities often did not happen or only happened in a fragmented way. It is arguable that only Milne Bay Province embedded IMCI into the health culture of the province and conducted IMCI activities consistently, largely due to the commitment of Dr Gilchrist Oswyn.

From the beginning there were many threats to IMCI sustainability. First the duration of training, 10 or 11 days being a long time for health workers to be away from their places of work and families. Second, the resources required to run IMCI training are substantial: a typical course often cost over one hundred thousand Kina. In the AusAID and WHO funded eras, per diems became an expected part of in-service training, and this has partly driven the *overall* training

model in PNG for the last decade and a half. In the first 15 years IMCI was frequently being revised to add or change steps, many revision workshops occurred, and the materials (trainers’ manuals, participants’ manuals, flip-charts) were costly to re-print and to transport to provinces and districts. A brief attempt at making electronic versions of the adapted IMCI materials through a Novartis and WHO funded program called ICATT (IMCI Computerised Adaptation and Training Tool) was never utilised. The WHO IMCI model required IMCI admission record forms for children to be completed at presentation, but these forms were never incorporated into routine Health Department documents. Printing costs were high and although the forms were designed they were never used. The 10-step checklist and the 8-step checklist for young infants were incorporated into the PNG Infant Record Book and the PNG Standard Treatment Manual, both attempts at embedding IMCI in the health culture, but generally health workers wrote in the free-hand sections of the Baby Buk, rather than using the checklists. The WHO model also relied on flipcharts with useful line-drawings of the clinical signs of each step (cough and difficult breathing, dehydration) and the advice to mothers (making oral rehydration solution, for example). These IMCI flipcharts required printing and distribution, and health workers sometimes were reluctant to use them in a clinic because they felt parents might doubt their knowledge or

competence. No consistent budget existed for printing IMCI material, so flipcharts were only sporadically and transiently printed, when a donor took on IMCI as a project to fund. However the materials could rarely be found in health centres. Finally high health worker attrition and new health workers entering the workforce meant that continuity and retention of skill and knowledge of IMCI was limited.

Realising the weaknesses of in-service training in implementation of IMCI, pre-service training of trainers was planned in 2004. Tutors from Lae Nursing School and community health worker schools were trained, and the schools were asked to develop their curricula incorporating IMCI training. Some did this, but there was no evaluation. The School of Medicine and Health Sciences (SMHS) University of PNG (UPNG) covered IMCI in clinical practice at the Children's Outpatient of Port Moresby General Hospital (PMGH), in the hope that medical students would have a working understanding of how nurses and Community Health Workers (CHWs) were being taught to practice child health.

During the first 15 years of IMCI there were attempts at incorporating the third component of IMCI, Family and Community Practices, using the same model of adaptation of WHO technical materials, selection of pilot districts, printing of materials, and training of trainers. There is no evidence of any impact at a community or district level on child health or family outcomes. In that time there were also several community

household surveys funded by WHO. These were large budget surveys, and may have yielded useful information about current household practices, but the surveys were never properly analysed or published.

In the years since 2000 there were several funding proposals drawn up of "full implementation" of IMCI, including coordinators in each province and extensive roll-out of in-service training courses. These proposals had annual budgets of 10s of millions of Kina, at a time when the total budget for Family Health Services branch of the NDoH was a very small fraction of this. These have not gone beyond the stage of written plans.

The experience of IMCI in other countries:

In one way or another more than 100 countries introduced IMCI since the 1990s. The initial evaluations in the first 2 countries, Tanzania and Uganda showed promising results, with improvements in health worker practices after training, including assessment, classification and referral of sick children according to the IMCI algorithms [4]. Multiple studies followed of health worker performance after training, and a systematic review and meta-analysis concluded that IMCI-trained health workers were more likely to classify illness correctly, and that where the baseline performance was low, health workers after IMCI training showed greater improvements in prescribing medications, vaccinating children, counselling families on

nutrition and administering oral therapies. WHO designed a multi-country evaluation of IMCI, which included countries in each WHO region which were considered likely to succeed in the 3 IMCI components and achieve a mortality reduction [4].

In both Tanzania and Bangladesh, part of the multi-country evaluation, there was a decline in mortality in the IMCI areas compared to the control areas, but the differences were not statistically significant [4]. A recent meta-analysis of 4 studies assessing the effectiveness of IMCI concluded that the use of IMCI may lead to fewer deaths among children from birth to 5 years of age, but the finding was of low certainty. The meta-analysis also concluded that IMCI had little or no effect on the number of children suffering from stunting or wasting, or the number of children receiving vaccines [5]. Some authors speculated that the reasons for the lack of definite effect on mortality are related to the primary diseases that IMCI targeted not being the major causes of mortality in the countries in which it was implemented, and that IMCI guidelines are meant for the provision of local (primary) care of children with less severe diseases, but that referral to good quality hospital care is needed for those who are severely ill. If the facilities children are referred to be ill equipped, or staff not adequately skilled in managing complex or severe cases, then the primary care strategy will not be effective in reducing deaths. Therefore a focus on the

quality of referral care is important, and WHO's Hospital Care for Children program was developed (described below).

In some countries lack of adherence to IMCI guidelines was an issue, and the time it took for health workers to carry out the IMCI approach in busy clinics was a disincentive. There were few countries which implemented the community component of IMCI, [4] so no effect seen on care seeking. Although many countries reported implementation of IMCI in more than 75% of health facilities, the population coverage was low. The 11-day training courses were costly, and after an initial burst of training activity during which a large number of health care workers were trained, budgetary and other constraints led to a decrease in the number of courses [4]. The turnover of staff meant that coverage was low, and because of the costs and logistics, training new health workers was often not feasible. In many countries there was a lack of investment of government funds, which resulted in IMCI being donor driven, and the lack of coordination between WHO and UNICEF was highlighted. The Health System component was not implemented; there was a lack of essential drugs in many countries, a lack of supervision and low community awareness [6]. Because of the limitation of the duration of training (11 days), many countries ran shorter courses of 5-7 days. Some, including Afghanistan, [7] and Rwanda [8] reported favourable results. A meta-analysis of these studies however concluded that the 11-

day training was more effective in improving the appropriate administration of oral antibiotics and ORS than shortened training, although the difference was small, and no harder outcomes were reported [9]. The experience of PNG with IMCI is therefore mirrored in other countries.

Other courses in PNG:

In the last 15 years WHO and UNICEF has also promoted many other courses. These include “Infant and Young Child Feeding”(IYCF), [10] “Early Essential Newborn Care” (EENC), [11] and “Severe Acute Malnutrition” (SAM) [12]. There have been additional in-service courses in neonatal resuscitation, anti-retroviral therapy (ART) prescribing, prevention of parent to child transmission of HIV (PPTCT), and child TB. A WHO in-service training course was even conducted in some provinces when vitamin A was introduced.

Another course developed in PNG was the “Hospital Care for Children” course. This is based on the WHO Pocketbook of Hospital Care for Children and the PNG Standard Treatment manual, [1, 13] and the course materials are available on-line:

www.pngpaediatricsociety.org/hospital-care-for-children-training-modules. It is a 4-5 day training course, modular so that it could be done as once a week lectures. Although it incorporates IMCI concepts, including syndromic diagnoses, it goes further to teach about how to care for severe illness, comorbidities, and provides updates on

newer interventions. It teaches the different stages of management relevant to all seriously ill children: triage and emergency care, history and examination, laboratory investigations, diagnosis and differential diagnoses, monitoring and supportive care, discharge planning and follow-up. The course has incorporated new innovations: for example new TB diagnostics and treatment regimens, criteria for diagnosing HIV, oxygen therapy, neonatal resuscitation, essential newborn care and resuscitation, care of low birth weight babies, severe malnutrition management, recognition of rheumatic fever and managing chronic childhood illnesses. It focuses on what health workers need to know to improve the quality of care for children, and is appropriate for all children managed as inpatients and those who need continuing care for chronic illnesses in the community. The course was piloted in Kimbe in 2013, and conducted in all highlands provinces from 2013-2016. The course includes adult learning concepts, practical skills training, clinical updates of changes to Standard Treatment and new guidelines to build on what health workers already know. This course was developed in PNG and Solomon Islands, and has been adopted and translated into many languages and used in other Pacific Island nations, Asia (Lao, Indonesia, Vietnam), Eastern Europe (Kazakhstan, Uzbekistan), and various countries in Africa.

www.hospitalcareforchildren.org

Changes in the health sector and in child health:

Since the 1990s PNG has undergone extensive changes in the health and other sectors: devolution of responsibility for health services from National to Provincial and progressively to District level administrations, a major contraction of resources for health coordination and technical leadership at a national level, and a substantial increase in population. Furthermore paediatrics has become much more complex. Since the 1990s there are new conditions, and complications of old diseases: HIV, chloroquine resistant malaria, multi-drug resistant TB, antibiotic resistant newborn sepsis, a renewed focus on newborn health, adolescent health, disability, chronic diseases, child abuse and protection. New therapies have been introduced since 2000, including fixed dose combination TB treatment, artemisinin-based combination therapy for malaria, anti-retroviral drug therapy for HIV, and new diagnostics and technology including pulse oximetry, rapid diagnostic tests for malaria, vitamin A and Zinc, new conjugate vaccines, and oxygen concentrators. New comprehensive programs for HIV, including prevention of parent to child transmission of HIV, HIV early infant diagnosis and early ART have added to the information needed by child health workers in this century. Some of these new technologies have come at the expense of older initiatives; the loss of basic microbiological diagnostics including blood culture facilities at

regional hospitals for example. These new initiatives have been added to address new problems or better address existing problems, and they have been mostly for the good. They add substantially to the complexity of what health workers caring for children need to learn and practice.

The current dilemma:

So after nearly 2 decades since IMCI and these many other courses were introduced it is timely to review health worker training from an overall perspective. IMCI in its current form has not achieved the coverage or impact that was hoped for in 2000, and is unsustainable with the current model of prolonged in-service courses being supported every 3-5 years by a different external donor. Each new training course addresses a gap, but carries opportunity costs. Standard Treatment, for example, may be weaker because of the emphasis on IMCI. Arguably the focus on in-service training courses has detracted from building stronger institutions of training, nursing colleges and CHW schools. Enormous resources have been spent on IMCI and other in-service training courses by external agencies and by the Health Department, whereas only a fraction of bilateral donor or UN partner resources have been invested into the fragile health education sector and health training colleges are grossly underfunded. Many CHW schools have annual budgets that are far less than what it costs to run a single IMCI in-

service training course. And it is not just money, but energy and effort that is syphoned. Whilst specialists have been involved in IMCI and other in-service courses, they have, in general, had a lesser input into teaching in their province's CHW or nursing schools.

The future: keep it simple and efficient:

Health workers, nurses, HEOs, CHWs and doctors all need continuing professional development (CPD). This is important for morale and competency. A good program of CPD also helps health workers network and share ideas. They need to stay up to date and informed of policy and guideline changes. And ongoing education needs to reach a national scale, so that health workers in remote areas are as informed as their sisters and brothers in capital cities. The number of nurses in PNG needs to increase to meet demand and match rates of attrition, and because of the increased complexity of child health, the number of Child Health Nursing courses need to increase to teach such specialty nursing. While we should not lose the best of the courses and programs run in the last 2 decades, we should make education more efficient, updatable, relevant to current policy and guidelines, and involve rather than detract from health training institutions.

In terms of post-graduate training it would be possible to incorporate the best components of the training courses (Hospital Care for Children,

IMCI, IYCF, EENC, SAM, EPI, and more) into a single post-graduate child health nursing course. This could provide a balanced, practical curriculum. This has been done in Solomon Islands, and the first cohort of 17 paediatric nurses is soon to graduate from the Solomon Islands National University.

In terms of Child Health CPD perhaps we can begin by proposing some principles for discussion:

- A CPD education package would need to get support from all agencies so that there is consistency and coordination.
- It would have to be efficient, i.e. not taking health workers away from their work for overly-extended periods of time, not requiring a lot of printed teaching materials. Maximum duration of 4-5 days, but be able to spread as regular CPD over weeks, and be done as self-learning.
- There should be a common framework (e.g. the Hospital Care for Children) which would properly incorporate the best of other course teaching (IMCI, IYCF, BFHI, EENC) and up-to-date local information on guidelines and policy.
- It should also include the components of the Child Health Plan 2009-2020, for example adolescent health, disability and child protection, issues that the pre-service nursing courses do not have

time to cover. It should be linked with epidemiology and disease surveillance, so that changes in disease patterns are reflected in the training.

- It should be flexible: it would need to be updated as new guidelines and policies are developed. The Hospital Care for Children program, for example, has incorporated recent changes, including new vaccines and vaccine schedule changes, use of new malaria and TB diagnostics, increased emphasis on chronic illnesses in children, the change to Option B plus for maternal HIV, and child protection. It is not healthy if training programs are stuck in basic clinical algorithms a decade old, or if it takes a year of workshops and meetings to update them every time there is a change in policy. So the platform for this education material needs to be modern and flexible, that is not printed material.
- It should follow principles of adult learning, and be practical. I have seen that many experienced nurses attend IMCI courses, but they know all these basics which they learnt in nursing school. However what they benefit from is extending their knowledge, applying their knowledge, learning new guidelines and policies. They were often treated in IMCI as basic learners, but the nurses

who work in health centres and provincial and rural hospitals have a lot of knowledge which can be built on. Teaching them the same things, packaged in the same algorithms is an opportunity lost.

- It should involve the use of information technology (IT), not rely on printed materials, such as special trainers or participants manuals, which just are used for training then not again. It should however involve the distribution and teaching on standard texts like Standard Treatment and Hospital Care for Children, so that health workers understand how to use such guidelines in everyday clinical practice. Receiving a standard text at a training course is a good way of dissemination, and endorses the text as a valuable tool, and encourages routine use. A training course cannot teach a health worker everything in a text (every disease, every treatment), but it can teach how to use it to manage a patient.

Training materials can be on CDs or USB data storage devices, and such materials can be used by participants for self-learning. Training materials should be modular and flexible, packaged so they can be used just as effectively to teach staff for an hour or 2 each week, or for self-learning, or used in a formal pre-service

nursing course, as it is for a 5 day in-service training course. Materials can be housed on the Internet, such as on the Paediatric Society of PNG web-site and kept up-to-date more efficiently. New technology is becoming easier to access and use; many nurses, students and doctors own smart-phones and get health information from online sources. There is WhatsApp, Skype and other methods of communication that can be used as a part of CPD. There is still a perception that IT is difficult, but it is getting much easier, and almost all PNG teaching institutions have IT facilities, even if rudimentary.

After 20 years it is time to rethink the many in-service courses that have been conducted in PNG, to make them more efficient and provide health workers with effective CPD. It is a positive step to learn from all that has been achieved and the things that have failed in the last 20 years, in PNG and elsewhere, and to move Child Health education forward for the current and future generations of health workers.

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