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Review

Status of infection prevention and control (IPC) as per the WHO standardised Infection Prevention and Control Assessment Framework (IPCAF) tool: existing evidence and its implication

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SUMMARY

Healthcare settings have a high prevalence of infectious agents. This narrative review examines the existing evidence regarding infection prevention and control (IPC) using the WHO Infection Prevention and Control Assessment Framework (IPCAF) tool in healthcare facilities. A total of 13 full length papers from Africa, Asia and Europe were considered for this review. The findings showed that there are discrepancies in the IPCAF values from insufficient to advanced level. The current review shows an advanced IPCAF level in middle income and high income countries. Low income countries showed a lower IPCAF score. There is a need to enhance the IPC capacity building and to supply infection prevention resources to prevent healthcare associated infection (HAI) with a focus on low income countries.

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Introduction

Healthcare settings are working environments with a high prevalence of infectious agents [1]. On average at any given time the prevalence of healthcare associated infections (HAI) ranges from 7% of patients in developed and 10% in developing countries. Death from HAI is estimated to occur in about 10% of affected patients [2].

Safeguarding the health, safety and well-being of healthcare workers lowers the costs of occupational harm (estimated at up to 2% of health spending) and contributes to minimising patient harm (estimated at up to 12% of health spending) [3]. Strengthening infection prevention and control (IPC) provides effective solutions to reduce the risk of infection and antimicrobial resistance in healthcare settings [4–6].

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Most countries have IPC programmes and guidelines, but many less have invested adequate resources and translated them into implementation and monitoring, particularly in low-income countries [4,6]. As a result, no country can claim to be free from HAI [6]. The World Health Organization (WHO) introduced Infection Prevention and Control Assessment Framework (IPCAF) an effective tool for IPC improvement in healthcare facilities [7,8]. However, there exists a lack of synthesised evidence on the IPCAF status of healthcare facilities. The review examines the existing evidence regarding IPCAF in healthcare facilities. The findings may identify targets for evidence-based intervention, policy consideration and possible research direction in the future.

Methods

Search strategy

A search of articles were made in online databases such as PubMed, Web of Science and Google Scholar with a key words "IPCAF", "WHO" and "Assessment".

Inclusion and exclusion criteria

Ful length peer-reviewed articles showing IPC using the WHO IPCAF tool and written in English were considered for this review. A total of 13 papers from Africa (n=2), Asia (n=8) and Europe (n=2) fulfilling the inclusion criteria were included in this review. On top of this, one paper done at global level dealing the IPC using the WHO IPCAF was also considered in the current review.

Definitions

The Infection Prevention and Control (IPC) Assessment Framework (IPCAF) tool is divided into eight sections reflecting the eight WHO IPC core components (CC). These are IPC programme (CC1); IPC guidelines(CC2); IPC education and training(CC3); Health care-associated infection (HAI) surveillance(CC4); Multimodal strategies for implementation of

IPC interventions(CC5); Monitoring/audit of IPC practices and feedback(CC6); Workload, staffing and bed occupancy(CC7); Built environment, materials and equipment for IPC at the facility level (CC8). Each core component weighs 100 points giving a total of 800 points. The IPC level of the facility is classified into categories based on the average weight score. Inadequate IPC level (0–200); Basic IPC level (201–400); Intermediate IPC level (401–600); and Advanced IPC level (601–800) as stated elsewhere [7].

Data analysis

The main findings of reviewed articles were analysed presented using descriptive statistics including a table summary with statements, a bar graph and line graphs.

Results

The search identified that there have been very few studies of IPC status in healthcare facilities using the WHO IPCAF standard tool. Most of the studies were done in Asia. Sample size varied from 5 healthcare facilities in Pakistan to 736 healthcare facilities in Germany. Figure 1 shows the Median IPCAF scores of the countries. IPC level varied from insufficient to advanced level. Table 1 summarises the IPCAF scores by country. The median IPCAF score varies from 117.5 (Inadequate IPC level) in Pakistan to 690 (Advanced IPC level) in Germany. The median and mean IPC score components is shown in Figure 2.

Discussion

A global IPC study covering 81 countries of six WHO regions reported that IPCAF level varied with income level. It found a 'basic IPC level' in low-income countries compared with lower-middle-income countries which were found to be at an 'intermediate IPC level'. Low-income countries had 'low IPC level' showing a long way to go to achieving standard IPC practice [9]. The WHO also reported similar findings in a global infection prevention and control assessment report released in 2022 [6].

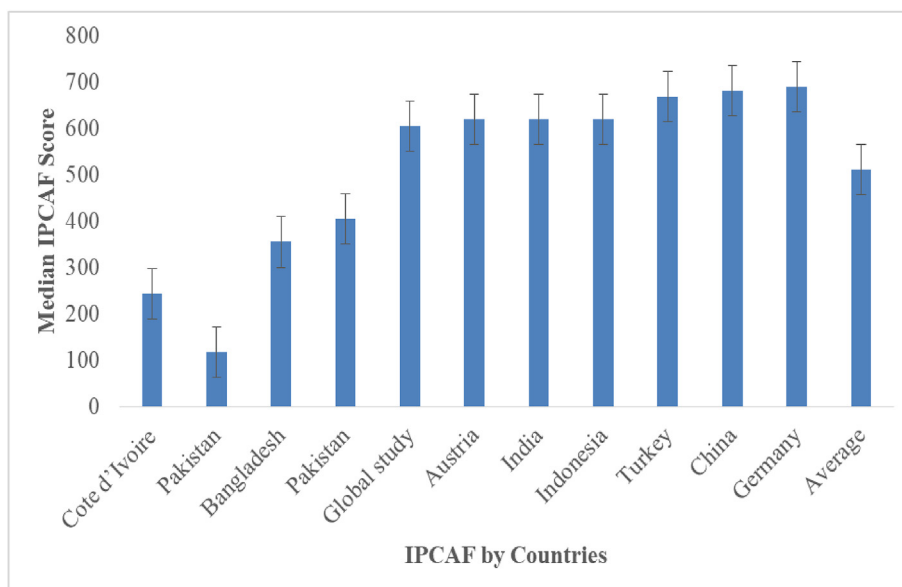


Figure 1. Median IPCAF score of the countries.

Table I
Summary of IPCAF scores by country

No	Country	Sample size	Main findings	Reference	Remark
1	Global	4440	<ul style="list-style-type: none"> • Median IPCAF score = 605 out of 800 • Low income median IPCAF score = 385 out of 800 • Low middle income countries median IPCAF score = 500 out of 800 • Public facilities median IPCAF score = 515 • IPC facility implementation varies across income levels 	[9]	-Africa, -Eastern Mediterranean -Europe -Americas -South East Asia -Western Pacific
2	Ghana	56	<ul style="list-style-type: none"> • 8 (14.3%) facilities had <i>Advanced</i> IPC level • 18 (32.1%) facilities had <i>Intermediate</i> IPC level • 23 (41.1%) facilities had <i>Basic</i> IPC level • 7 (12.5%) facilities had <i>Inadequate</i> IPC level • Government owned facilities performed better in terms of IPC preparedness as compared to privately owned facilities 	[10]	Africa
3	Cote d'Ivoire	30	<ul style="list-style-type: none"> • Median IPCAF score = 242.5 out of 800 • 5 (17%) facilities had <i>Intermediate</i> IPC level • 10 (33%) facilities had <i>Basic</i> IPC level • 15 (50%) facilities had <i>Inadequate</i> IPC level 	[11]	Africa
4	India	32	<ul style="list-style-type: none"> • Median IPCAF score = 620 out of 800 • 13% hospitals had <i>Basic</i> IPC level • 28% hospitals had <i>Intermediate</i> IPC level • 59% hospitals had <i>Advanced</i> IPC level • None of the hospitals fell under the <i>inadequate</i> IPC level 	[12]	Asia
5	Indonesia	355	<ul style="list-style-type: none"> • Median IPCAF score = 620 out of 800 • 56.9% of hospitals had <i>Advanced</i> IPC level • 35.8% of hospitals had <i>Intermediate</i> IPC level • 7.0% of hospitals had <i>Basic</i> IPC level • 0.3% of hospitals had <i>Inadequate</i> IPC level 	[13]	Asia
6	Turkey	68	<ul style="list-style-type: none"> • Median IPCAF score = 668 out of 800 • 50 (73.5%) HCFs had <i>Advanced</i> IPC level • 16 (23.5%) had <i>Intermediate</i> IPC level 	[14]	Asia
7	Bangladesh	11	<ul style="list-style-type: none"> • Median IPCAF score = 355 out of 800 • 73% of hospitals had <i>Basic</i> IPC level • 18% of hospitals had <i>Intermediate</i> IPC level 	[15]	Asia
8	Pakistan	12	<ul style="list-style-type: none"> • Median IPCAF score = 405 out of 800 • One facility (8.3%) had <i>Inadequate</i> IPC level • 5 (41.6%) facilities had <i>Basic</i> IPC level • 5 (41.6%) facilities had <i>Intermediate</i> IPC level • One (8.3%) hospital had <i>Advanced</i> IPC level 	[16]	Asia
9	Pakistan	5	<ul style="list-style-type: none"> • Median IPCAF score = 117.5 out of 800 • With the exception of central sterile services unit at one hospital, departments at all hospitals failed to meet 50% of required IPC standards. 	[17]	Asia
10	China	222	<ul style="list-style-type: none"> • Median IPCAF score = 682 out of 800 • The score varies between hospital types 	[18]	Asia
11	Japan	59	<ul style="list-style-type: none"> • 31 (55.3%) facilities had <i>Advanced</i> IPC level • 21 (37.5%) hospital had <i>Intermediate</i> IPC level 	[19]	Asia
12	Austria	65	<ul style="list-style-type: none"> • Median IPCAF score = 620 out of 800 • 38 (58.4%) facilities had an <i>Advanced</i> IPC level 	[20]	Europe
13	Germany	736	<ul style="list-style-type: none"> • Median IPCAF score = 690 out of 800 • Three (0.4%) hospitals had <i>Basic</i> IPC level • 111 (15.1%) hospitals had <i>Intermediate</i> IPC level • 622 (84.5%) hospitals had <i>Advanced</i> IPC level 	[21]	Europe

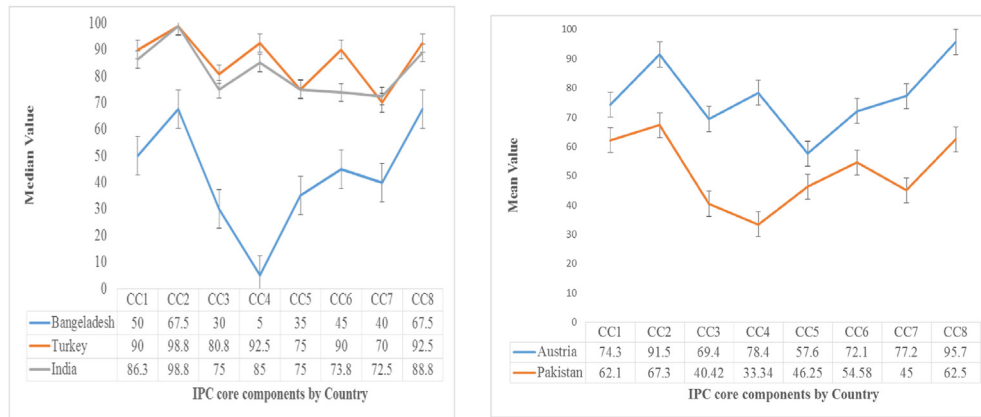


Figure 2. Median and mean IPC core components by country.

The WHO report is aggregate data focusing on the main findings presented at continent level. The data analysis in this review was specific and performed at country level considering the 8 IPC core components. This may help in deeper understanding of the IPC variations among countries. Income and political commitment have implications for the effective implementation of IPC programmes.

The median IPCAF score varies from 'inadequate IPC level' in Pakistan [17] to an advanced level obtained from Germany, Turkey, India, Austria, and Indonesia. In addition, a difference exists within the eight core components [12–14,18,20,21]. The IPCAF of each core component showed a low mean value in Pakistan [16] compared with Austria [20] as shown in Figure 2. This disparity in IPC level might be a proxy indicator of the difference in income and the level of attention given to IPC programmes.

A higher median IPC score was recorded in Turkey and India [12,14] compared with Bangladesh [22] in each of the IPCAF core components. The higher score obtained from Turkey may be due to the higher income level and more attention given to IPC. In India, the assessment was done after the initiation of health care-associated infection (HAI) programmes which may have positively affected the IPC practice in healthcare facilities. Bangladesh shows a lower result probably reflecting the lower income level and other factors.

There are limited studies regarding IPCAF assessment from Africa. There are two published study conducted in Ghana and Cote d'Ivoire showing insufficient IPC level [10,11]. Further research is needed from Africa regarding the IPC status of healthcare facilities and their challenges, based on the standardised WHO IPCAF assessment tool.

The overall message of this review is that IPC is an issue both in high-income and low-income countries. Moreover, the IPC practice was reported as inadequate in low-income countries. The global COVID -19 pandemic that may have helped to direct attention to IPC practices and may have had an impact on the findings. As a result, the current situation may be different compared with the situation prior to the COVID-19 pandemic.

Conclusions

The current review shows IPC is a global problem with the worst status reported from low-income countries. There are discrepancies in the eight IPC core components both in low-

income and high-income countries. Increasing IPC capacity and the provision of IPC resources, coupled with occupational health and safety training to prevent HAI is recommended with a focus on low-income countries. Research on the prevalence of HAI is also recommended to measure the impact of increased IPC resources.

Conflict of interest

The author declares no conflict of interest.

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Ethical approval

Not required.

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