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• ICCPR
• COVID-19 and the need for a Global Survey on CR
• How the Global Survey was structured
• Results
• Summary of Regional Results
• Implications
ICCPR

GOALS

1. Bring together national CR associations
2. Work towards on-going consensus
3. Promote CR as an essential service
4. Support countries to establish and augment CR
5. Communicate the evidence base for CR
40 member associations + 10 friends
Coronavirus Disease 2019
COVID-19 TIMELINE

31 Dec 2019
- China reported a cluster of cases of pneumonia in people associated with the Huanan Seafood Wholesale Market in Wuhan, Hubei Province.

7 Jan 2020
- Chinese health authorities confirmed that this cluster was associated with a novel coronavirus, 2019-nCoV.

20 Jan 2020
- The first confirmed case of 2019-nCoV infection in the United States was reported.

30 Jan 2020
- A total of 9976 cases had been reported in at least 21 countries.

11 Mar 2020
- WHO declares the coronavirus outbreak a pandemic.

24 Apr 2020
- ICCPR webinar on CR and COVID-19: 9 speakers from 8 different countries presented to 300 participants from 20+ countries; 48% of attendees have had to stop delivery of their CR programs during COVID-19 crisis.
Therefore, the objective of this study was to investigate impacts of COVID-19 on CR delivery around the globe, including impacts on providers and patients.
METHODS

Ethics Approval at York University (Toronto, Canada)

All ICCPR members were contacted and requested to circulate the survey

Data collection from March to June 2020 via online survey REDCap (English).

Survey was translated to Simplified Chinese and disseminated through Sojump in China
• CR programs around the world that offered:
  1. initial assessment,
  2. structured exercise, and
  3. at least one other strategy to control risk factors

• We asked the CR program manager to complete the survey where possible

• Countries were categorized by WHO region
  • 5,756 CR programs in 111/203 countries with CR internationally

• 33 items
• 3 sections
  1. CR program characteristics and impacts of COVID-19
  2. Barriers and facilitators to delivering CR programs virtually, and
  3. COVID-related impacts on staff and patients.
• Forced-choice (e.g., check all that apply)
• Skip-logic (some missing data as n/a)
• Country and date
  • COVID-19 cases at the time of survey completion in each country was extracted from the website
    https://ourworldindata.org/
RESULTS: 1062 RESPONSES

70 (60.3%) of 111 countries in the world with CR

Median number of responding programs per country = 98.0
Q25-75=36.0-108.0
Responses were received from **18.3%** of the CR programs in the world

Ascertained **13** countries have more CR programs since global audit, for a total estimate of **5,813** CR programs globally

**Responses received from all WHO regions**
- African: 10 (40%)
- Americas: 535 (17.3%)
- Eastern Med: 14 (31.8%)
- Europe: 232 (14.1%)
- South-East Asian: 53 (100.0%)
- Western Pacific: 200 (20.5%)

**Location:**
- **392 (37.4%)** CR programs were located in a community hospital
- **364 (34.7%)** located in a referral center, quaternary or tertiary facility, and/or academic center
Enforcement of physical distancing with fines and other means

Travel within their region was restricted

Schools were closed

Hospitals were not doing elective surgeries

All but essential services/businesses were closed

People had to wear masks when physical distancing was not possible

Hospitals were not allowing visitors

Anyone potentially exposed to COVID-19 was under quarantine or self-isolation

Gatherings over a certain number of people were prohibited

COVID-19 RESTRICTIONS
106 (14.4%) programs had suspected or positive COVID-19 patients

Africa: 50%  
Americas: 12.9%  
Eastern Med: 55.6%  
Europe: 20.6%  
South-East Asia: 10.7%  
Western Pacific: 8.0%
RESULTS: SERVICE CONTINUITY

• 367 (49.1%) programs reported they had completely stopped CR delivery
• 203 (27.1%) stopped for a period
  • mean 8.3±2.8 weeks
• 178 (23.8%) programs did not stop

• Of those that stopped for any amount of time,
  • 363 (30.0%) made no other arrangements to provide patient care,
  • 202 (16.7%) made arrangements as following: home-based CR/ telehealth, online consultations (WeChat, MS Teams, and Zoom), phone or email consultations, and education offered more often via phone, online or via mail to patients.
<table>
<thead>
<tr>
<th>CR PROGRAM ADAPTATIONS</th>
<th>WHO region</th>
<th>Africa</th>
<th>Americas</th>
<th>Eastern Mediterranean</th>
<th>Europe</th>
<th>South-East Asian</th>
<th>Western Pacific</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing some elements offered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 (30.0%)</td>
<td>110 (20.6%)</td>
<td>3 (21.4%)</td>
<td>57 (24.6%)</td>
<td>10 (18.9%)</td>
<td>43 (27.0%)</td>
<td></td>
<td>228 (19.5%)</td>
</tr>
<tr>
<td>Only treating existing patients</td>
<td></td>
<td>2 (33.3%)</td>
<td>100 (41.3%)</td>
<td>4 (57.1%)</td>
<td>51 (46.8%)</td>
<td>14 (63.6%)</td>
<td></td>
<td>202 (17.3%)</td>
</tr>
<tr>
<td>Deferring graduation until post-program assessments can be completed</td>
<td></td>
<td>2 (20.0%)</td>
<td>71 (13.3%)</td>
<td>2 (14.3%)</td>
<td>21 (9.1%)</td>
<td>3 (5.7%)</td>
<td></td>
<td>120 (10.3%)</td>
</tr>
<tr>
<td>Shortening the program duration</td>
<td></td>
<td>3 (30.0%)</td>
<td>46 (8.6%)</td>
<td>1 (7.1%)</td>
<td>18 (7.8%)</td>
<td>4 (7.5%)</td>
<td></td>
<td>95 (8.2%)</td>
</tr>
<tr>
<td>Graduating patients more quickly</td>
<td></td>
<td>2 (20.0%)</td>
<td>57 (10.7%)</td>
<td>1 (7.1%)</td>
<td>7 (3.0%)</td>
<td>2 (3.8%)</td>
<td></td>
<td>85 (7.3%)</td>
</tr>
<tr>
<td>We are adapting all elements to retain service levels</td>
<td></td>
<td>2 (20.0%)</td>
<td>91 (17.0%)</td>
<td>6 (42.9%)</td>
<td>31 (13.4%)</td>
<td>12 (22.6%)</td>
<td></td>
<td>177 (15.1%)</td>
</tr>
</tbody>
</table>
• 202 (42.3%) programs were **only treating existing patients**, while all others that were open were still accepting new patients

• **CR capacity**
  • Median of 20.0 (Q25-27 =10.0-40.0) patients / month pre-COVID
  • Median of 3.0 (Q25-75=0.0-15.0) during COVID.

• **Type of providers delivering CR**
  • In 111 (13.6%) programs had changed
  • In 122 (15.0%) patients have had to interact with a different provider (e.g., mainly one professional interacting with patients – mostly nurses, and access to allied health care providers ceased due to COVID-19).
### CR Components Provided in the Programs, and That Continued to Be Provided During the COVID-19 Pandemic

<table>
<thead>
<tr>
<th>Component</th>
<th>Offered and Continue to be Offered</th>
<th>Offered, but Not During COVID-19</th>
<th>Never Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Assessment</td>
<td>371 (45.3%)</td>
<td>390 (47.6%)</td>
<td>58 (7.1%)</td>
</tr>
<tr>
<td>Individual Consultation</td>
<td>356 (44.0%)</td>
<td>335 (41.4%)</td>
<td>118 (14.6%)</td>
</tr>
<tr>
<td>Exercise Stress Test</td>
<td>144 (18.3%)</td>
<td>288 (36.5%)</td>
<td>357 (45.2%)</td>
</tr>
<tr>
<td>Other Functional Test</td>
<td>166 (20.9%)</td>
<td>438 (55.2%)</td>
<td>189 (23.8%)</td>
</tr>
<tr>
<td>Exercise Prescription</td>
<td>375 (46.0%)</td>
<td>386 (47.3%)</td>
<td>55 (6.7%)</td>
</tr>
<tr>
<td>Supervised Exercise Training</td>
<td>208 (25.5%)</td>
<td>521 (63.9%)</td>
<td>86 (10.6%)</td>
</tr>
<tr>
<td>Resistance Training</td>
<td>224 (27.9%)</td>
<td>480 (59.8%)</td>
<td>99 (12.3%)</td>
</tr>
<tr>
<td>Patient Education</td>
<td>445 (54.4%)</td>
<td>331 (40.5%)</td>
<td>42 (5.1%)</td>
</tr>
<tr>
<td>RF Management</td>
<td>436 (54.6%)</td>
<td>320 (40.1%)</td>
<td>42 (5.3%)</td>
</tr>
<tr>
<td>Meds Prescription</td>
<td>271 (33.9%)</td>
<td>250 (31.3%)</td>
<td>278 (34.8%)</td>
</tr>
<tr>
<td>Nutrition Counseling</td>
<td>352 (43.4%)</td>
<td>377 (46.5%)</td>
<td>82 (10.1%)</td>
</tr>
<tr>
<td>Component</td>
<td>Offered</td>
<td>Not Offered</td>
<td>Never Offered</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------</td>
<td>-------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Psychological Counseling</td>
<td>298 (37.3%)</td>
<td>301 (37.7%)</td>
<td>199 (24.9%)</td>
</tr>
<tr>
<td>Tobacco Cessation</td>
<td>199 (25.1%)</td>
<td>344 (43.3%)</td>
<td>251 (31.6%)</td>
</tr>
<tr>
<td>Sexual Counseling</td>
<td>134 (17.2%)</td>
<td>219 (28.2%)</td>
<td>424 (54.6%)</td>
</tr>
<tr>
<td>Vocational Counseling</td>
<td>166 (21.3%)</td>
<td>238 (30.6%)</td>
<td>374 (48.1%)</td>
</tr>
<tr>
<td>Relaxation Techniques</td>
<td>260 (32.6%)</td>
<td>370 (46.4%)</td>
<td>168 (21.1%)</td>
</tr>
<tr>
<td>Alternative Exercise Modes</td>
<td>94 (12.1%)</td>
<td>174 (22.4%)</td>
<td>508 (65.5%)</td>
</tr>
<tr>
<td>Inclusion of Family</td>
<td>179 (22.5%)</td>
<td>465 (58.6%)</td>
<td>150 (18.9%)</td>
</tr>
<tr>
<td>Final Assessment</td>
<td>245 (30.4%)</td>
<td>449 (55.7%)</td>
<td>112 (13.9%)</td>
</tr>
<tr>
<td>Comm’n with PCP</td>
<td>322 (40.5%)</td>
<td>342 (43.0%)</td>
<td>132 (16.6%)</td>
</tr>
<tr>
<td>Follow-up</td>
<td>198 (25.3%)</td>
<td>294 (37.5%)</td>
<td>292 (37.2%)</td>
</tr>
<tr>
<td>Maintenance Prog</td>
<td>147 (18.7%)</td>
<td>404 (51.3%)</td>
<td>236 (30.0%)</td>
</tr>
<tr>
<td></td>
<td>Yes, before COVID-19</td>
<td>Yes, during COVID-19</td>
<td>No</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----------------------</td>
<td>-----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Reimbursement of alternative models</td>
<td>102 (12.7%)</td>
<td>67 (8.3%)</td>
<td>636 (79.0%)</td>
</tr>
<tr>
<td>Alternative models offered</td>
<td>150 (18.5%)</td>
<td>172 (21.2%)</td>
<td>488 (60.2%)</td>
</tr>
<tr>
<td>Proportion of patients served in remote model</td>
<td>16.5±24.5%</td>
<td>69.0±37.2%</td>
<td>n/a</td>
</tr>
<tr>
<td>Perceive program has sufficient capacity to meet need/demand for remote delivery</td>
<td>142 (49.1%)</td>
<td>155 (54.0%)</td>
<td>121 (42.2%)</td>
</tr>
</tbody>
</table>
## Alternative/Remote Delivery of CR Due to COVID

<table>
<thead>
<tr>
<th>Forms of Communication</th>
<th>Yes, before COVID-19</th>
<th>Yes, during COVID-19</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone</td>
<td>178 (62.2%)</td>
<td>96 (33.6%)</td>
<td>12 (4.2%)</td>
</tr>
<tr>
<td>Email</td>
<td>128 (46.9%)</td>
<td>88 (32.2%)</td>
<td>57 (20.9%)</td>
</tr>
<tr>
<td>Internet webpage</td>
<td>104 (38.4%)</td>
<td>99 (36.5%)</td>
<td>68 (25.1%)</td>
</tr>
<tr>
<td>Text messages</td>
<td>93 (34.8%)</td>
<td>42 (15.7%)</td>
<td>132 (49.4%)</td>
</tr>
<tr>
<td>Smartphone app</td>
<td>52 (20.6%)</td>
<td>67 (26.6%)</td>
<td>133 (52.8%)</td>
</tr>
<tr>
<td>Webcam / videoconference</td>
<td>37 (14.2%)</td>
<td>105 (40.4%)</td>
<td>118 (45.4%)</td>
</tr>
<tr>
<td>(e.g. education sessions)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>14 (15.6%)</td>
<td>6 (6.7%)</td>
<td>70 (77.8%)</td>
</tr>
</tbody>
</table>
Barriers to delivering CR remotely

- Patients do not have the technology to connect with program staff remotely
- Lack of equipment/program resources for secure and private remote delivery
- Not enough funding
- Not enough staff
- Patients’ risk is too high for unsupervised exercise/safety concerns
- Too inefficient
- Staff need training
What respondents perceive they would need to overcome these barriers

- time to research and develop the model
- secure/private means for staff to communicate with patients electronically;
- equipment to communicate remotely with patients
- facilities / space
- home equipment to loan patients
- cheap and reliable wireless technology to monitor for adverse events remotely
- reliable and low-cost high-speed internet access for staff and patients
- a dedicated multidisciplinary team
- physician champions
- administrative staff to facilitate scheduling of virtual sessions
- a structured, evidence-based home-based CR program software platform or smartphone app
- technology support staff (with time) to train patients and staff to use the remote technology and equipment, and also for database management support
- ability to have at least one safe in-person session with each patient to ensure safety and education
- financial resources as well as reimbursement of remote model
- patient as well as provider awareness of availability of the remote model (including referrals) to increase their capacity to deliver home-based/remote CR services to patients.
## IMPACT ON CR STAFF

### Occupational Impacts on CR Staff by World Health Organization Region

<table>
<thead>
<tr>
<th>Impact</th>
<th>Africa</th>
<th>Americas</th>
<th>Eastern Mediterranean</th>
<th>Europe</th>
<th>South-East Asia</th>
<th>Western Pacific</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-deployed</td>
<td>4 (40.0%)</td>
<td>203 (37.9%)</td>
<td>7 (50.0%)</td>
<td>87 (37.5%)</td>
<td>5 (9.4%)</td>
<td>41 (25.6%)</td>
<td>353 (30.2%)</td>
</tr>
<tr>
<td>Reduced hours</td>
<td>4 (40.0%)</td>
<td>163 (30.5%)</td>
<td>4 (28.6%)</td>
<td>16 (6.9%)</td>
<td>4 (7.5%)</td>
<td>21 (13.5%)</td>
<td>215 (18.5%)</td>
</tr>
<tr>
<td>Some staff have had to practice somewhat outside their scope</td>
<td>3 (30.0%)</td>
<td>80 (15.0%)</td>
<td>7 (50.0%)</td>
<td>41 (17.7%)</td>
<td>4 (7.5%)</td>
<td>21 (13.5%)</td>
<td>159 (13.7%)</td>
</tr>
<tr>
<td>Laid off temporarily</td>
<td>1 (10.0%)</td>
<td>96 (17.9%)</td>
<td>4 (28.6%)</td>
<td>21 (9.1%)</td>
<td>4 (7.5%)</td>
<td>12 (7.8%)</td>
<td>138 (11.9%)</td>
</tr>
<tr>
<td>Pay reductions</td>
<td>3 (30.0%)</td>
<td>36 (6.7%)</td>
<td>4 (28.6%)</td>
<td>10 (4.3%)</td>
<td>5 (9.4%)</td>
<td>13 (8.2%)</td>
<td>71 (6.1%)</td>
</tr>
<tr>
<td>Permanently let go</td>
<td>1 (10.0%)</td>
<td>14 (2.6%)</td>
<td>0 (0.0%)</td>
<td>6 (2.6%)</td>
<td>1 (1.9%)</td>
<td>2 (1.0%)</td>
<td>24 (2.1%)</td>
</tr>
<tr>
<td>Other</td>
<td>0 (0.0%)</td>
<td>24 (4.5%)</td>
<td>0 (0.0%)</td>
<td>8 (3.4%)</td>
<td>2 (3.8%)</td>
<td>9 (6.0%)</td>
<td>43 (3.7%)</td>
</tr>
</tbody>
</table>
PSYCHOSOCIAL IMPACT ON CR STAFF

- Yes, I am feeling anxious at times: 22.5%
- Yes, I have been very worried about exposing my family to COVID-19: 20.4%
- Yes, I have been really worried about some of my patients: 19.7%
- Yes, I am feeling isolated and lonely at times: 11.4%
- Yes, I have been having trouble sleeping at night: 11.1%
- Yes, I have found the workload to be really high to transition from delivering face-to-face services: 9.7%
- Yes, I need to provide childcare during business hours or I need to take care of ill/older family members: 9.0%
- Yes, I am feeling depressed or hopeless at times: 6.4%
- Yes, I have had to or tried to stay away from my home for fear of spreading COVID-19: 3.1%
- Yes, I am feeling other feelings: 2.4%
- No, I have been coping alright: 22.8%
- I have been using this time to catch up on things and do some learning: 20%
- Not applicable as we are not providing service during COVID-19 or have had no COVID-19 restrictions: 8.4%
GLMM accounting for country as a higher-order variable, revealed degree of perceived risk was associated with country stringency index (p=0.01), but not number of cases (p=0.80).
Patients reservations and concerns regarding COVID-19:

- Whether they need to change their exercise prescriptions: 28.7
- How to follow a heart-healthy diet: 28.4
- About their mental well-being: 28.2
- About how to use technology to interact with the program: 27.9
- Questions about medications: 26.9
- About having to stop their exercise: 25.7
- About how to safely receive CR care without COVID-19 exposure: 21.4
- About their risk of death from COVID-19 due to pre-existing CVD: 21.2
- Staff had to let them know they closed down their program temporarily: 19.6
273 (36.8%) reported that their institution had a policy regarding the circumstances under which regular services could resume.
LIMITATIONS

• Convenience sample: bias towards programs that are still open and have staff available to answer the survey

• Response rate was lower in the Americas and Europe, so generalizability to those regions is more questionable

• The reliability and validity of the survey is unknown
  • Programs may have responded in a socially-desirable manner, although survey was confidential

• Since the survey was mainly completed in English, some concepts could have been misunderstood by respondents for whom English was not their first language.
WHAT HAVE WE LEARNED FROM THIS STUDY?
• Impact of COVID-19 goes beyond the disease and infection risk:
  • Effects CR availability, structure, delivery format, and components; and,
  • the mental health of providers and patients receiving it

• COVID-19 has been responsible for the closure of close to 4400 CR programs worldwide
  • In programs that remain open:
    • Key risk-reducing components have stopped being delivered in more than 60% of the programs that remained open, including supervised exercise training

• New patients were not accepted in almost half of programs, with a reduction of 75% in their monthly capacity
- Safe resumption of CR services:
  - American and British CR Associations have published recommendations on resuming face-to-face CR services, which include external and internal (patient, staff, and program) considerations
  - Most of these were also identified as paramount in our study

- Over 60% of programs did not offer any remote model of CR delivery

- How to offer remote model?
  - Home-based models of CR have similar effects in improving clinical outcomes and quality of life in cardiac patients compared to center-based models
  - Not reimbursed
  - Programs face many barriers, including development of the remote model, as well as the associated policies, and acquiring and learning the new technologies to support this.
For safety, some in-person contact at the beginning of the CR program was advocated, following screening and with PPE.

Programs are then using different functional capacity testing to inform exercise prescription and different means to monitor exercise.

Loan patients equipment for remote monitoring of risk factors?

Most CR components could then be safely delivered through remote means, with the use chiefly of webcam/videoconferencing where resources and supports exist.

A significant drop in amount of patient education was concerning

- Free online, evidence-based resource: [https://www.healtheuniversity.ca/en/cardiaccollege/Pages/default.aspx](https://www.healtheuniversity.ca/en/cardiaccollege/Pages/default.aspx)
• Psychological well-being of healthcare workers: impact of COVID-19 can be substantial and long-lasting

• Although about a fifth of respondents in this study reported they have been coping “alright” with COVID-19, many are experiencing:
  • anxiety, fear of exposing family, loneliness, difficulty sleeping, and stress due to higher workloads
  • Over a third felt the need to work despite perceived risk, due to fear of losing their job or pay (and one in five had no sick pay).

• Approximately a third of CR program respondents had been re-deployed.
COVID-19 SURVEY OF CR PROGRAMS GLOBALLY

GLOBAL SURVEY OF CARDIOVASCULAR REHABILITATION PROGRAMS: COVID-19 IMPACT

ICCPK’s survey of CR programs globally has now closed. We received approximately 1100−5753 program responses from 75/111 countries with CR. Thank you to all the programs who participated.

Resources identified by programs are collated below (you are welcome to email us with new resources to add as they become available at globalcardiacrehab@gmail.com).

We are now analysing the data, and look forward to sharing learnings with the CR community in due course. We hope to work together to mitigate COVID-19 impacts identified in ways we can.

COVID-19 RESOURCES (resources will be added regularly)

https://globalcardiacrehab.com/COVID-19
ICCPR email contact: globalcardiacrehab@gmail.com

Acknowledgements: Drs. Karam Turk-Adawi and Marta Supervia