*Review Article*

# Impact of COVID-19 Pandemic on Medical Education: Challenges and Opportunities for Medical educators in South Asia

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**Abstract**

Coronavirus disease-19 (COVID-19) is an acute highly infectious disease primarily involving the respiratory system. The World Health Organization (WHO) declared COVID-19 a global pandemic on March 11, 2020. No proven efficacious drug and no vaccine are available so far for treatment or prophylaxis of COVID-19. Social distancing has been one of the major measures adopted to prevent spread of the disease. Educational institutions have been shut down all over the world for the safety of both students and communities. Social distancing measures hamper students from assembling in learning labs, lecture halls, or small-group rooms and interacting in person.

The major response to the pandemic has been to try to move both teaching-learning and assessment online. Schools have also tried to move clinical learning and teaching communication skills online using standardized patients and facilitators. Online education and assessment are not without their challenges, more so in South Asia. Online teaching learning has been a challenge for both faculty members and students, in varying extent. With online learning environments, supervision and support by the teacher may be less and students should have well developed self-regulated learning skills.

These challenges have also offered several opportunities, some general to educators, some relatively specific to medical educators, some global in perspective and some local ones. The pandemic offers both educators and students the insight into: how health problems particularly infectious diseases can affect human life and livelihood; and understanding how people respond to it. The pandemic has forced changes in education methods, modality and process, which though may demand extra effort initially, provides teacher, faculty and facilitator the impetus to keep pace with current trends in technology. It has offered an opportunity to move to online learning and interaction and use virtual platforms for e-conference, webinars, podcasts, e-class/ e-lectures etc. Pandemic has brought very rapid changes in educational approaches in South Asia, which otherwise would have taken 5-10 years under normal circumstances.

**Key words: COVID-19, Challenges, Medical education, Opportunities, South Asia**

## Introduction

COVID-19 is an acute highly infectious disease primarily involving the respiratory system caused by coronavirus SARS-CoV-2. It was first reported in Wuhan, Hubei province of China, in December 2019.[1] World Health Organization (WHO) declared COVID-19 a global pandemic on March 11, 2020.[2]

COVID-19 is affecting 213 countries and territories around the world and 2 international

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conveyances. On June 25, 2020 more than 9 million new cases and more than 0.473 million deaths have been reported globally while more than 833 thousand new cases and more than 21 thousand deaths have been reported in the eight countries of South Asia.[3]

The United Nations Educational and Scientific Organization (UNESCO) in mid-April reported 192 countries had closed all schools and universities, affecting more than 90 percent of the world's learners: almost 1.6 billion children and young people.[4] Health profession education across the world has been experiencing a major disruptive change as a result of the COVID-19 pandemic.[5]

At this point of time, only non-pharmacological interventions and infection control and prevention measures, such as: social distancing and self-isolation are the possible and workable approaches to contain the COVID-19 infection, hence, opening health professions education for face-to-face learning may not be a viable option, especially in South Asia where number of cases has been increasing.[3]

This article focuses on the impact, challenges and opportunities of COVID-19 on health profession education with a primary focus on South Asia.

**Impact**

The emergence and rapid spread of COVID-19 is creating major strains on health systems and economies**.** During this time, focus has been on how to contain the COVID-19 pandemic. The measures adopted to slow the spread have disrupted health professions' education. Students may acquire the virus during the course of training and may potentially spread the virus even when asymptomatic. This is why educational institutions were shutdown both for safety of students and communities.[6,7,8] Social distancing measures impede students from assembling in learning labs, lecture halls, or small-group rooms.[9] Due to closure of institutions, both laboratory learning in labs and clinical learning is affected. Also, students' core and elective clinical postings have been cancelled or deferred. Ultimately assessment and academic progress may be delayed.[7] Students have missed the chance to learn about practical response in this pandemic.[6] Some of the medical students feel that they have been sidelined in the fight against COVID-19.[10]

Faiq S et al mentioned that medical schools are indeed training the future 'essential personnel' and must help prepare students to address the next pandemic. Students can learn from the mistakes that we may make during the current pandemic and how to avoid similar situations down the line.[11] As conferences all over the world have been postponed, many medical students have also lost the opportunity for personal development through conference presentations and deliberations.[12] Community posting of the students have also been deferred; they are missing the opportunity to learn healthcare in the community.

All over the world, COVID-19 has forced management and faculty to examine all elements of the medical program.[13] The COVID-19 situation has been evolving rapidly both globally and locally. Medical schools, with their clinical partners' knowledge and input, should vigilantly assess their local situation constantly to make determinations about their medical students' participation in direct patient contact activities.[14]

**Response and Challenges**

**Institutional response:**

*Moving online:* The major response to the pandemic has been to try to move both teaching-learning and assessment online. Medical schools in many developed nations were better prepared for the challenge as they had invested in learning management systems, lecture recording and delivery software, and flipped classrooms.[6] They found it easier to shift most of the basic sciences curriculum online. Various proprietary software like Zoom, Microsoft teams and GoToMeeting are widely available. These combine visual, auditory and text formats allowing online presentations, video playback, online chat features and also enable participants to directly ask questions and interact with the facilitator and other students. Small group activities like problem-based learning sessions, case-based discussions convene online. A common trend among students during the preclinical years in the United States is to rely on outside resources for preparing for the United States Medical Licensing Exam (USMLE) step 1 and to watch prerecorded class lectures at twice the speed.[12] Attendance at didactic lectures is poor. However, the loss of in person collaborative learning experiences primarily in small groups and of immediate in-person feedback from peers and preceptors may be problematic.

*Moving clinical teaching to the virtual space:* Schools have also cancelled clinical postings due to reasons ranging from reducing student exposure to the virus, social distancing rules and lack of adequate personal protective equipment. Schools have tried to move the clinical and communication skills learning online using standardized patients and facilitators.[15] At the National University of Singapore, elective rotations were replaced with non-clinical options with an initial two weeks of e-lectures followed by project work.[16] Proprietary virtual patient education software is also available to students and preceptors.

Among other innovations which are being tried by medical schools are having students video record an interview with a family member acting as a patient and forwarding the same to a faculty member for providing formative feedback. There are challenges in teaching physical examination skills online to students. Some schools have tried watching online physical examination videos in a group with an introduction by the preceptor followed by a critical discussion. Some of these innovations may be published in the near future.

*Assessment:* The other major challenge is of assessment during times of university closures. The capability to take exams online is built into various learning management systems. The system can also analyze student responses and provide feedback. The issue of cheating during online exams has received a lot of attention. Remote live proctors and biometrics-based proctoring are among the two main approaches to ensure exam integrity.[17] Remote live proctoring is provided by companies like ProctorU and a human proctor watches student using a webcam while they are taking exams on their computers. Biometrics-based proctoring is offered by ProctorTrack where an automated system monitors student via the webcam and suspicious behavior is flagged using students' eye, face, and knuckle movements and activities in the surrounding environment and this can be reviewed later by a human. Some of these soft-

wares were being used by schools even before the pandemic.

The other approach, schools have been considering is the use of open-book exams which test higher order cognitive skills coupled with an integrity declaration by the student and use of plagiarism detection software for submitted assignments.

Objective structured clinical examinations (OSCE) are widely used to test clinical competence. A high-stakes OSCE was conducted recently at the National University of Singapore (NUS) using a blended approach of on-site and online strategies.[18] The key principles applied throughout were strict infection control and personal hygiene, segregation of all participant groups according to predetermined characteristics, social distancing, zoom-facilitated briefings, Wi-Fi enabled data gathering and the avoidance of large gatherings. Packaged meals were eaten at individual stations and open buffets avoided.

OSCE testing communication skills can be conducted fully online. The use of videos demonstrating a particular physical examination or a procedure followed by a structured oral examination about the same is also being considered. Structured viva-voce as a method of examination is also gaining favor. Electronic-portfolios (e-portfolios) have been recommended as a means of assessment for online courses.[19] E-portfolios can be used for end of course assessment. They can also support and direct student learning and regular feedback can be provided by a mentor. In a competency-based curriculum, e-portfolios can provide evidence of achieving a particular competency.

**Challenges**

Online education and assessment are not without their challenges. Having briefly examined how schools have tried to respond to the pandemic, let us now examine some of the important challenges with special reference to the South Asian setting.

*Faculty challenges in shifting from face-to-face to online teaching:* Many of these challenges have been highlighted in recent articles in the literature. Not all faculty members will be familiar with the technology used to deliver sessions online. Transitioning to online learning requires substantial extra work from faculty members and they have to cope with an uncertain and challenging environment. Four main roles have been articulated for the teacher in an electronic environment. These are pedagogical, managerial, social and technical.[20] Faculty development is required for the faculty members to be effective in these roles. Faculty development must be followed by a post-implementation follow-up to address any observed gaps. Faculty members working from home have to cope with added family and social responsibilities. Not all faculty may have access to a stable internet at home, especially in South Asia. There may be shortage of laptops, computers and other IT equipment and existing resources may have to be shared among family members due to work from home and study from home policies.[21] In some parts of South Asia, there may not be enough physical space in the house and a quiet environment to record presentations and to carry out synchronous interactions.

*Student challenges in shifting to online learning:* Many teachers consider students to be

digital natives and assume they will face no challenges in adapting to online learning. This may however, not be true. Students in online learning environments are learning under less direct contact and supervision than in the face-to-face setting. These students require greater effort to be motivated and stay engaged with the curriculum.[22] Providing fora for interaction with other students and with the facilitator/ resource persons is important. There are also guidelines for producing videos for online learning ranging from limiting video length, reducing the cognitive load, providing clear guidance and instructions to students, establishing forums for communication, embedding quizzes throughout the module and using assignments where suitable.

With online learning environments, supervision and support by the teacher may be less and students should have well developed self-regulated learning skills. This may be a challenge in South Asia like in many other developing regions as previous education and even education in medical school do not emphasize these set of skills.[23] Student skill in effort regulation, goal setting, self-monitoring, time management and help seeking behavior are not well developed. The mental health of both faculty members and students should be supported during this period of crisis and uncertainty.

*Issues of internet access and technology:* In many parts of South Asia like other developing countries, there are problems of internet bandwidth and lack of a reliable electricity supply. Many students may lack a computer or a laptop and access the internet using their smart phones. Due to work from home edicts and school closures, they may have to share devices with other family members.[21] Asynchronous methods of content delivery and of communication are to be preferred. Podcasts with or without the use of downloadable videos have proved an effective method in many developing countries.[24] Asynchronous discussion fora through e-mails, discussion boards and social media may be more useful in this setting.

*Issues of assessment:* Assessment of knowledge and especially of skills is particularly challenging in an online environment. Standard assessment formats used in medical colleges, like: multiple choice questions (MCQs), short answer questions (SAQs) and objective structured clinical examination (OSCEs) may need to be re-imagined.[25] Greater emphasis on formative assessment and feedback and embedding these into the learning activities is important. Students learning on their own should be provided with a clear road map of where they are, the road ahead and their strengths and weaknesses. Other methods like structured viva-voce, e-portfolios, virtual patients have been mentioned previously. Clearly defined entrustable professional activities (EPAs) and methods to assess their attainment online should be developed. Students should be provided access to multiple practice assessments, especially of new formats like OSCEs and viva-voce conducted online so that they become familiar with the process and their anxiety reduces.

*International students:* Many medical colleges in South Asia have a good number of international students. For these students, travel back home is not possible during the current

crisis and the college administration has a special obligation to provide food, accommodation and ensure personal safety of these students.[21] Due to prolonging of the academic year, some of these students may also be in financial difficulties. Emotional, financial and psychological support for these students may be necessary.

*Support services from the medical colleges:* The institutions should establish a task force consisting of members from various departments and with different expertise to plan and deal with the crisis. Clear and transparent communication is important. Support to deal with stress and possible mental health issues among students and faculty should be available. Hostels and residencies should remain open for students who need them. International students require special support. Students should be well-informed about changes to teaching-learning and assessment and a flexible approach to student progress is recommended. The institution should also create and implement a plan to recruit and educate future students and develop an online admission process.[21]

**Opportunities**

The COVID-19 pandemic has immense and far reaching impact in all areas including medical education which our capacity, resources and reality in South Asia are not presently in a position to solve and cope. The responses and endeavors in this part of world, especially in Nepal are acutely interwoven with challenges keeping the forced need, demand and magnitude of the adverse impact. Every problem and challenge, however, comes with opportunity. It depends upon us, how we stakeholders respond: whether we accept defeat or rise above the challenge to convert it into an opportunity. This pandemic has offered us some opportunities which are general to all and some others which are relatively specific to medical educators,[13] and some are global and some local.

*Reminder of the truth:* This pandemic has compelled us to realize the universal truths of our vulnerability and the need of holistic healthy life. It has, in a way brought us to a state where we, especially intellectuals are self-motivated to introspect about ourselves, our attributes,[26] our aims and personal life. It actually is leading us to a point to where many teachings, philosophies and religions could not lead us. This in a true sense will help us grow; personally, socially, professionally and spiritually. A family, a society, country and the whole world is a unit and all has to remain free from the infection. If others get infected, we are also bound to get infected. This acute awareness of concern for others and collaboration with others for a common cause, will give us better life if we learn from the present situation. Though realized for decades, it has again intensely demonstrated the applicability of 'bio-psycho-social'' model of health. The biological factor, i.e. infection with coronavirus is spread by social contact, a social factor and is associated, from the beginning to the end, with the psyche or mind state or effect.[27]

*Educational opportunity in health sciences:* This extraordinarily stressful situation with remarkable impact on medical/ health science education may be turned into an opportunity. It has provided us many issues to observe, comprehend, study, incorporate and share. It has led us in an infection prone part of the world, South Asia [South-East Asia region (SEAR) of

the WHO], to the need for reviewing and revising various aspects of our curriculum. The curriculum obviously needs to emphasize- 'to enable health workforce to face, handle or tackle future epidemic or pandemic',[11] its content-emphasis on bio-psycho-social model of health and bioethical issues intricate with health problems, like: infection epidemic. Firsthand experience of facing the pandemic offers both educators and students the insight into: how health problems can affect human life and the world; the understanding of health, behavior, problem and disorders get revisited or redefined by the contexts. For example; frequent washing, previously understood as a pathological behavior, is now viewed as normal unless associated with other pathological dimensions and current health problem and situation is potentially creating risk for other problems, e.g. digital abuse and addiction.

*Pragmatic opportunity for health professional:* In our endeavors to work flexibly balancing clinical and academic demands for clinical faculties for example, have strengthened and renewed friendships bringing some joy. Our common problem in the SEAR is that the health sector is not given its due share in the budget and during this COVID-19 pandemic, governments are forced to mobilize budget and resource into health. When health gets its due share; health science/ medical education should get its due share. There are lots of areas in medical education acutely brought into attention; in Nepal especially, medical education agitation raised by Dr. Govind KC brought the commercialization of medical education into focus. We educators of health sciences need to advocate for its due share so that lacunae can be addressed during this period. For example, current state demands for social distancing and for distance learning requires that online learning facilities and opportunities should be enhanced for educators and learners. The appropriate strategy is to use all possible delivery modes with infrastructure and to use online tools assuring lesson plans, videos, tutorial and other resources available for students and teachers, e.g. podcasts and other resources which require less data usage. This may facilitate working with telecommunication companies for zero-rate policies for teaching learning purpose and materials. Medical institutes have been prompted now to search for judicious use of the strategies, like: social networks, Whatsapp or SMS to communicate effectively with its stakeholders like parents, students and teachers.

*Opportunity for growth in medical education:* Forced need to change education method, modality and process during this pandemic, though may demand extra effort initially, provides teacher, faculty and facilitator impetus to keep pace with current trends in technology, e.g. digital gadgets, programs and software, modified forms of media with audiovisual aids. It is offering us the opportunity to go through various forms of learning experiences, moving to online e.g. e-conference, webinars, podcasts, e-class/ e-lectures etc.[6,24]

This pandemic is teaching us to keep ourselves and our students engaged in various activities, including psychosocial and life skills to make medical education holistic. Nepal Unit of UNESCO Chair in Bioethics witnessed this with the overwhelming countrywide participation in an essay competition organized to foster informal way of learning ethical issues during

the lockdown. Our students and residents need to be encouraged to learn cooking, washing, hygiene methods, noble infection control measures and social/ collegial skills which are somehow forgotten during other times though important and can be done without much cost. Current state has forced education authorities and stakeholders to think, reschedule and modify time tables of educational activities and topics as per local need and situation, for example, the topics and teaching learning activities not requiring direct patient exposure can be covered during the lockdown and those requiring direct social/ physical exposure can be modified to ensure maximum social/ physical distancing, and if possible rescheduled for the time when infection/ pandemic is possibly under control in the near future.[16] We have been motivated to think about possible modes of assessments/ examinations.[25] It is in a way new experience or opportunity to learn and update about new needs and modes of assessments.[17] Medical educators are also provided with various arenas for research; COVID-19 research is being encouraged in many ways, for example, Nepal Health Research Council and Institutional Research Committees including that of BPKIHS have adopted online fast track ethical approval process during this lockdown period. We got various new and revised modes and guidelines for providing our health service to the clients.[28]

Medical professionals and students should prove capable of taking care of self and others.[29,30] Our continued efforts will prove ourselves to be medical educator/ professionals strengthened in this pandemic by consciously going through such educational experiences; reflecting critically on them and modifying ourselves as required.

**Conclusion**

The significance of medical education and the need for change is being acknowledged both in public and private medical schools in recent years in South Asia. Medical educators have initiated the process of transforming education and improving quality prior to the COVID-19 outbreak. The COVID-19 pandemic has however, changed the landscape of medical education. The situation has forced medical educationists to think 'out of the box' and act innovatively using digital technology. The pandemic presented various challenges like challenges to faculty in shifting from face-to-face to online teaching, challenges to students in shifting to online learning, challenges in conducting assessment, challenges in accessing internet and using technology, challenges to institution in organizing online teaching learning activities during lock down. It is said that challenges bring opportunities. COVID-19 may also bring opportunities. The pandemic has forced and motivated us to transform education method, modality and process, which may demand greater effort initially, but provides teacher, faculty and facilitator impetus to keep pace with current trends in technology, e.g. digital gadgets, programs and software, modified forms of media with innovative audiovisual aids. This is a new experience or opportunity to learn, understand and update about new needs and new modes of delivery of medical education for all stakeholders involved and may also have long-lasting impact on healthcare.

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**References**

1. WHO I Novel Coronavirus (2019-nCoV). Situation report-1, 21 January 2020. [Internet] WHO World Health Organization [Cited April 22, 2020] Available at: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4.
2. WHO I Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. [Internet] WHO World Health Organization [Cited April 27, 2020] Available at: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020.
3. COVID-19 coronavirus pandemic Accessed on- May 01, 2020. https://www.world ometers. info/ coronavirus/
4. The COVID-19 cost of school closure blog by Psacharopoulos G Patrinos H, Collis V, Vegas E. Available at: https://www.brookings.edu/blog/education-plus-development/2020/04/29/the-covid-19-cost-of-school-closures/ Accessed on- May 12, 2020.
5. Goh P, Sandars J. A vision of the use of technology in medical education after the COVID-19 pandemic MedEdPublish. https://doi.org/10.15694/mep.2020.000049. 1.
6. Rose S. Medical Student Education in the Time of COVID-19. JAMA online March 31, 2020: E1-E2.
7. Ahmed H, Allaf M, Elghazaly H. COVID-19 and medical Education. Lancet Infect Dis online 23, 2020. https://doi.org/10.1016/S1473-3099(20)30226-7.
8. Sandhu P, de Wolf M. The impact of COVID-19 on the undergraduate medical curriculum. Medical Education Online 2020; 25: 1764740. Available at-https://doi.org/10.1080/10872981.2020.1764740.
9. Del Rio C, Malani PN. 2019 Novel coronavirus- important information for clinicians. JAMA online February 5, 2020. doi:10. 1001/jama.2020.1490.
10. Medical students feel sidelined in fight against COVID-19: We want to help. Available at: https://crosscut.com/2020/03/medical-students-feel-sidelined-fight-against-covid-19-we-want-help. Accessed on- May 15, 2020.
11. Faiq S, Sekhon HK, Jain S. The long-term effects of COVID-19 on medical education. Education April 2020. Available at: https://www.kevinmd.com/blog/2020/04/the-long-term-effects-of-covid-19-on-medical-education.html Accessed on May 11, 2020

12. Ferrel MN, Ryan JJ. The Impact of COVID-19 on Medical Education. Cureus March 31 2020; 12(3): e7492. DOI 10.7759/ cureus.7492
13. Torda AJ, Valen G, Perkovic V. The impact of COVID-19 pandemic on medical education. The Medical Journal of Australia, Preprint. 14 May 2020
14. Menon A, Klein E J, Kollars K, Kleinhenz ALW. Medical Students Are Not Essential Workers: Examining Institutional Responsibility During the COVID-19 Pandemic. Academic Medicine. A Head of Print. 10.1097/ACM.0000000000003478
15. Sudhir M, Mascarenhas S, Isaac J, Alfroukh J, Rahman SA. Adapting to the need of the hour: communication skills simulation session using an online platform during COVID-19'. MedEdPublish 2020;9:85. https://doi.org/10.15694/mep.2020.000085.1
16. Samarasekera D, Goh D, Yeo S, Ngiam N, Marion MA, Mei ML et al. Response and Lessons Learnt Managing the COVID-19 Crisis by School of Medicine, National University of Singapore. MedEdPublish 2020; 9: 92. https://doi.org/10.15694/ mep.2020.000092.1
17. Mitra S, Gofman MI. Towards greater integrity in online exams. Emergent research forum papers. Twenty- second Americas Conference on Information Systems, San Diego, 2016. Available from: https://pdfs.semanticscholar.org/c4c9/186a7685dd8a944453ad6481b3880aca4caa.pdf
18. Boursicot K, Kemp S, Ong T, Wijaya L, Goh SH, Freeman K et al. Conducting a high-stakes OSCE in a COVID-19 environment. MedEdPublish 2020; 9: 54. https://doi.org/10.15694/mep.2020.000054.1
19. Mason R, Pegler C, Weller M. E-portfolios an assessment tool for online courses. British Journal of Educational Technology 2004; 35: 717-27.
20. Kwon K, Park SJ, Shin S, Chang CY. Effects of different types of instructor comments in online discussions. Distance Education *2019;* 40: 226-242. https:// doi.org/10.1080/01587919.2019.1602469.
21. Sahu P. Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. Cureus 2020; 12: e7541. DOI 10.7759/cureus.7541.
22. Taha M, Abdalla M, Wadi M, Khalafalla H. Curriculum delivery in Medical Education during an emergency: A guide based on the responses to the COVID-19 pandemic. MedEdPublish 2020; 9: 69. https://doi.org/10.15694/mep.2020.000069.1.
23. Cecilio-Fernandes D, Parisi M, Santos T, Sandars J. The COVID-19 pandemic and the challenge of using technology for medical education in low and middle-income countries. MedEdPublis*h* 2020; 9: 74. https://doi.org/10.15694/mep.2020.000074.1.
24. Hurst EJ. Podcasting in Medical Education and Health Care. Journal of Hospital Librarianship. 2019; 19: 214-226. https://doi.org/10.1080/15323269.2019.1628564.
25. Abzwari S. Rethinking Assessment in Medical Education in the time of COVID-19. MedEdPublish 2020; 9: 80.

https://doi.org/10.15694/mep.2020.000080.1.

26. Shakya DR, Maskey R. Future doctors of Nepal: a study of the attributes. Health Renaissance. 2012; 10(3): 192-7.
27. Galea S, Merchant RM and Lurie N. The mental health consequences of COVID-19 and Physical distancing. JAMA Internal Medicine. 2020; 28(8): 666-675. Doi: 10.1001/jamainternmed. 2020. 1562.
28. Shakya DR. Problems shared in Psychiatry help-line of a Teaching hospital in eastern Nepal during COVID-19 Pandemic Lockdown. Insights in Depress Anxiety. 2020; 4: 037-039.
29. Shakya DR. Self care among Health professionals. J BPKIHS 2019; 2(1): 1-3.
30. Shakya DR. Health of our Future Health Professionals. J BPKIHS 2019; 2(2): 1-3.