



VIDEO VIGNETS...

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Add-on video-based e-learning: Effect on Mental Status Examination skills in 5th year medical students – an educational RCT

[28/2-2023]

Introduction

For several years, there has been a debate between psychiatrists and general practitioners about whether patients with psychiatric disorders are overlooked in general practice. It has also been suggested, that the delay in the relevant medical and / or psychotherapeutic treatment of mental illness is sometimes due to the fact, that doctors in other specialties are not skilled enough to recognize the signs of mental illness. At the same time, 460,000 Danes are prescribed antidepressants. At the population level, it is difficult to determine where the true level of mild-moderate psychiatric disorders lies. However, for each patient, it is necessary that a correct psychiatric diagnosis is made that leads to the right treatment. Hence, it is important that all physicians have a good basic knowledge of the appearance of psychiatric disorders, and that they can

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describe and interpret the patients' performance during consultation, and assess whether the patient needs treatment.

Medical students' learning during their clinical attachment in psychiatry is undermined by increasing class sizes, limited time-frame of the clinical rotation, shortage of psychiatrist in the inpatient wards, and reduction in inpatient beds [1-4]. The result is fewer patient encounters and diminished bedside teaching [5]. This is highly problematic, since the basic concepts of psychiatry are complicated and hard to understand [6-8] and the acquisition of psychiatric skills in most medical schools rests on apprenticeship and bedside principles. Videos have proven successful for medical skills acquisition [9-11] where they i.e. break down procedures into understandable pieces or make it possible to watch closely for signs and symptoms [12, 13].

Writing up the Mental Status Examination (MSE), i.e. analyzing patient appearance and behavior and describing it in psychiatric terminology, is one of the key elements the clerkship student must learn during the clinical course in psychiatry. We have recently developed an e-library comprising video vignettes of authentic patient interviews, as a supplement to the bedside training during the clinical placement in psychiatry [14-17]. The main purpose of the e-library is to improve the students' MSE skills, and a preliminary comparison between students having access to the video e-library during clinical rotation and students having standard clinical rotation, indicated that it serves that purpose (see details of the initial trial in appendix 1) [17]. The MSE is primarily a tool used in patient journals to aid communications between clinicians, but it is also used in medico-legal documents [18] and it is a significant part of patient examination [19]. Hence, it is most important to ensure a consistent teaching/learning of MSE.

After the first study, we consider it pertinent to investigate whether access to the video e-library as add-on to standard psychiatric rotation is causal in enhancing clerkship students' MSE skills; i.e. eliminating possible confounders like the different quality of teaching at the hospitals affiliated with University of Copenhagen (UCPH). Hence, we wish to carry out a randomized controlled trial, also controlling the students' use of the video e-library more rigorously than previously.

The Corona-restrictions, Spring 2020, had a major impact on university teaching, affecting lectures as well as clinical tutorials. This meant that all teaching in April and May was made into webinars on Microsoft Teams. Due to the emergency of the situation, not knowing the time-frame of the restrictions and how it would affect the oral examinations, there was a great demand for videos for teaching. While it hitherto had been unsolved how the video-library could be distributed to students in the Capital Region, it was now made possible by data management agreements between the UCPH and Kaltura©, the media platform operating within Absalon©, UCPH, teaching course platform.

Hence, we successfully launched an emergency, secure, self-learning course based on a number of the authentic patient videos from the video-e-library. It was also secured, that authentic patient video could be streamed in webinars based on Microsoft Teams © (and later Zoom©).

This autumn only lectures have been converted to digital teaching, and the psychiatric rotation is habitual. But the possibilities presented by the digital revolution of UCPH have made it possible to re-

design the present project (previously applied for in autumn 2019) to a fully digital randomized controlled trial.

Hypotheses

- That the medical students who have the e-video library and the e-course on mental status exam available (the V team) score more correctly in testing mental status exam compared to those who only have the e-course on mental status exam available.
- That the medical students' mental status exam test-scores correlate with their number of video vignettes viewed and self-reported time spent on the video site.

State-of-the-art

Previous studies within psychiatry [1, 13] and generally within medical education, have reported that videos of real or simulated patients, by their rich holistic image of the case, increase engagement and recall, presumably facilitating the transfer to clinical practice [20, 21]. A number of efficacy studies of videos used in psychiatric teaching has been reported: Self-directed, problem based multimedia teaching package incl. video yielded a better test score compared with a standard lecture incl. a video with detailed history and MSE [22]. Comparing three methods of teaching MSE, lecture, authentic videos and simulated patient videos, it was demonstrated, that students in the authentic video group performed better at a multiple choice test, than their counterparts in the lecture group [23]. Furthermore, video assisted teaching of MSE enhances the students' clinical ability of accurate observations significantly, when assessing a live interview [24]. This is important, testifying to the training impact of authentic videos, as it indicates that the benefit of video interviews on observational skills, including MSE, is transferable to "real life situations" i.e. live interviews/clinical encounters. Video material has previously accompanied a Swedish text books in psychiatry [25] and recently Munksgaard (a Danish publisher) has published a series of videos for training the MSE based on simulated patients (actors), which increase students' perceived patient-centeredness [26, 27]. However, the impact of this material on MSE skills has not been ascertained.

Theoretical considerations

The task of carrying out a psychiatric interview and writing a MSE, is a process of clinical reasoning, that is quite complicated. As outlined by Durning et al. [28], the process involve three factors: physician/student, patient and practice/context. Using videos of recorded interviews, the task is simplified; the reasoning about the observations are isolated from communication with the patient and from the context of treatment planning and other practicalities. Like simulation, the isolated MSE video task, distant from the real patient, offer a safe learning environment and promote collaboration due to equality of experiences, hence opening up for reflection [1]. At the same time the MSE task is engaging due to the real-world authenticity of the video and the disciplinary authenticity of the task [20, 29], which is precisely aligned with the students' clinical tasks and their summative assessment, which is a traditional "long case". From an information processing perspective, the isolation of the

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MSE task should decrease cognitive load [28, 30], which in the real clinical encounter is high for the novice in psychiatry. From the same perspective, it is relevant to consider the type of processing carried out for the MSE. Based on the features of the video, as well as the real life encounter, the perceptual nature of a large number of cues, and the simultaneousness, redundancy and equalities of cues would evoke an intuitive, pattern recognition process and less of an analytic deductive process [30]. In an early think-aloud study, it was shown that psychiatrists use more hypothetic-deductive reasoning than students do in a diagnostic analysis of a paper case [31]. Custers [30] recommend for pattern recognition learning, that students are exposed to a large number of patients with different features in a short time span. The video e-library would make this possible.

Perspectives

The future use of the video e-library is intended to be a self-regulated e-learning platform, in the manner it already has been implemented in Spring 2020, see appendix 2 for the students evaluation of the video e-library Spring 2020. It is possible to be used at the students discretion during the rotation, as it applied in our initial studies [14, 17], or prior to the rotation as preparation for the clinical encounters, as suggested by other studies [26, 27]. In future implementation, the video e-library will be accessible from a highly secured intranet platform (Kaltura©) at UCPH. Every year approximately 460 medical students graduate from UCP and of these more than 50% will never have any more experience with psychiatry, than they received in their 5th year clinical course in clinical psychiatry. Improving the MSE skills of these doctors, working in a range of hospital specialties, could improve our overall treatment and care for our psychiatric patients, which in high numbers have serious medical conditions. Additionally, a more modern and deliberate training of psychiatric skills ultimately might improve students' and doctors' view of psychiatry, which is low (our unpublished data: Among 165 5th year medical students, only 7,6 % regarded the psychiatric specialty in high or moderate high standing). Eventually, perhaps, we could succeed in stopping the vicious circle of low standing and low recruitment [32]. The further growths of the emerging Danish medical education research group in psychiatry could become essential in this process.

Lastly, should corona restrictions again limit the clinical training options for the students, we will know if it possible to support their MSE skills development, and can expand the secure course.

Relation to Trygfondens Research Strategy

Central to the project is the efficacy trial, which is the second stage in a research series towards a better education of doctors in psychiatry. The RCT follows an initial quantitative pilot study that had promising results and a qualitative study of the use of the video library during the clinic stay. As such, the project follows the Tryg Foundation's research strategy towards implementing new procedures. In terms of subject matter, the project involves two categories: Within "Mental Health", it is especially in the project's focus on improving measurements among front staff, ie doctors. Within the "Patient First", it is especially within the effective training of practitioners. At the same time, the project has initiated the use of authentic patients in learning videos, within one of the most stigmatized medical

disciplines. The patients support it and want to contribute. It can therefore serve as a paradigmatic example of training front staff with this kind of patient involvement.

Project Aims

- To examine the effect of having an e-course on mental status exam including a video library consisting of authentic patient videos available during the ordinary teaching course, on the competencies within the description of mental status exam compared to simply having an e-course on mental status exam available during clinical psychiatry in 10th semeste

Project Content and Activities

- To improve the potential of the video e-library as self-study learning material through 1) extension with audio recordings of the clinical reasoning behind the MSE upshots; 2) additional video recordings; 3) self-study tasks; 5) a compendium of MSE phenomena to apply when solving the tasks.
- To investigate the level of MSE skills among trainee doctors and specialists, and explore what are the most difficult dimensions of the MSE.
- To carry out the RCT across three terms, testing all students at end of their rotation with the MSE skills test, and collecting pre and post survey data.
- Analyzing data and writing up at least three international peer-reviewed papers.
- Oral dissemination of project results at national and international meetings and conferences.
- Presenting the project at our research webpage in Danish and English

Succes criteria and milestones

| <i>Goals</i> | <i>Success Criteria</i> | <i>Data & Documentation</i> | <i>Prerequisites</i> |
|---|--|---|---|
| A comprehensive video e-library for MSE skills training that improves the students' MSE performance | The video e-library is accessible for UCPH students Data has been collected from 460 students | Students' and doctors' MSE skills scores Student survey data Oral presentations Web presentation Peer reviewed papers | Support from the a)Regional Mental Health Services, b) Department of Clinical Medicine c) Study Board, UCPH, and d) Psychiatric Faculty (all achieved) Willing patient video participants (previously acquired without problems) Funding |

Methods

Ethics and Data Security

The study complies with the Declaration of Helsinki and has been approved under a) UCPH, Ethics Committee for Health and Science, Journal number: 504-0010/17-5000; b) UCPH Faculty of Health and Medical Sciences umbrella permission in the Danish Data Security Agency SUND 2017-37; and c) Region Zealand umbrella permission in the Danish Data Security Agency REG-96-2015. Region Zealand Ethics Committee considered the study exempt from approval, but the UCPH Ethics Committee explicitly considered the participation of patients in their approval. Considering the interviewed patients, videos are handled according to GDPR legislation and they are stored on a secure educational platform Kaltura©, see appendix 3, guidelines for the handling of sensitive data in teaching. The patients have given/will be asked to give informed written consent to the participation in educational videos [14]. The enrolled students sign a study consent form and their data are also kept on a secure server. Student access to the video e-library is given after formal, signed, acknowledgement of detailed rules of confidentiality including prohibition of download, screen shot or photo or shared viewing with anybody, who do not have own access. This is presented at the entry point of the video-library course. The video-library administrator manually give each student access as well as close access after the clinical attachment. Agreement on data transfer from Region Zealand to UCPH has been signed for the video-library to be moved to and accessed on a UCPH server.

Design

The main study is a two-armed, pragmatic cluster-randomised, superiority, partial-blinded, randomized controlled trial where the experimental intervention is in addition to the clinic stay, one group get access to the videotape and e-course on mental status exam (V), are compared with students in another group who only get the e-course on mental status exam (N-V). Primary outcome is score on the MSE skills test, after the clinical rotation. See figure 1 of the clinical course in psychiatry, illustrating the difference between conditions. Data management and randomization is computerized, the only stratification is by location (hospital). Allocation into two equal size arms, will

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be in variable blocks of 4, 6, and 8. See figure 2, for draft CONSORT diagram. A preparatory phase before onset of the RCT includes improvements in the content of the video e-library, see timeline in figure 3. Sub-study 1 is a cross-sectional investigation, entailing the collection of MSE skills scores and survey data among attendees at the annual meeting of the Danish Psychiatric Society (DPS). Trial protocol and Statistical Analysis Plan will be published at ClinicalTrials.gov.

RCT Feasibility

The faculty office allocates the 5th year (4th term master) students, in three shifts per term, to 12 different locations (different departments or different locations within departments i.e. Mental Health Centre Copenhagen has students placed at Rigshospitalet, Gentofte, Bispebjerg and Frederiksberg). Group size at each location/shift varies between 2-14 (fewer in peripheral locations). Each term approximately 240 5th year students are allocated to the clinical course in psychiatry, which is mandatory. Our preliminary study had nearly 100 % recruitment success, but it was not a RCT. At the MSE skills test, we had drop-out ranging from 20-26%, with the largest drop-out when the skills test were conducted at Panum, in opposition to testing at the local hospital. However, now the MSE skills test will be carried out as a Zoom© webinar with adjoining questionnaire in SurveyXact, and scheduled in the late afternoon, probably lowering the drop-out rate. Sample size calculation based on our preliminary study, setting a meaningful difference to 1.25 point on the MSE skills test, yields a group size of 88, i.e. a total of 176 students. Given some expected drop-out, we will recruit at least 220 students, and the study will need to be carried out at least across three terms. Incitement for full participation is the possibility of access to the video library for all participating students the week before the exam in clinical psychiatry.

Participants

Maximum 500 5th year medical student at the University of Copenhagen in 2022

Inclusion criterion: Consent

Exclusion criterion: Previous participation in teams with videotek access.

Substudy 1: Approximately 100 doctors attending DPS annual meeting March 2021. Previously tested doctors (2017) will be excluded. Alternatively, this could also be conducted as a webinar based test.

Procedures

Information about the study will be given in emails send at term start to all 4th term students (i.e. in August and January) in Absalon (UCPH student/teacher communication portal). The week prior to the course in psychiatry, the shift (Hold) of students, i.e. 60-70 students, will receive another information email, and they will be asked for consent by email, particularly for those not planning to attend the lectures in the first week. Oral information about the study will be given after lectures Monday and Tuesday in the lecture week, and electronic signed consent on paper will be gathered by SurveyXact. Consenting students will be entered in the data management system, and randomized by the end of the lecture week. The first day of the clinical rotation participating students will be informed of their allocation, whether they have access to the video e-library or not. All participating students will be

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tested with the MSE skills test in webinars either Mondays, Tuesdays or Wednesdays after the clinical rotation. Questionnaires will be sent by Survey Exact at start and end of the clinical rotation. All students participating in the MSE skills test will be given access to the video e-library the week before the oral exam in clinical psychiatry.

Partial blinding

As mentioned, it will not be possible to blind students or local lecturers to allocation group. An unblinded secretary draws the allocation list, sends emails informing the students of allocation, and gives them access to the video e-library on Absalon. The blinded research assistant will carry out the MSE skills testing, they and the assisting statistician will be blinded to student allocation until a conclusion is drawn based on concealed group allocation.

Experimental Add-on Intervention – Video-based self-regulated training

The intervention consists of access to the video e-library on Absalon. Consenting to participate the students also consent to see at least 12 videos, in pre-arranged order. At the end of the clinical attachment they will fill out a survey asking for the time spent at each task/video, and for their evaluation of the e-library. But data on the use of the video-library will also be extracted from Absalon data reports.

The video e-library is described in [14, 17]; briefly, it consists of 23 videos of brief patient interviews, mostly with inpatients, with adjoining MSE written by three faculty psychiatrists. Diagnoses are not mentioned, to ensure focus on the descriptive task. In accordance with the recommendations for instructional design in video teaching [13, 20, 33], we include written instructions for the training, requesting students to read the short note about the patient, to watch the video, to write up the MSE, and to compare their version with the MSE upshot. The strengths of the use of video cases include the repeatability and comparability of clinical experience [21, 34, 35]. The possibility of repetition and scrolling is highlighted in the introduction.

In preparation for the trial, the didactic features of the e-library will be improved, featuring a “start package” where x New videos will also be added. As well as the authentic patient videos on the e-library there are some pages with written theoretical instructions on the MSE, a brief animated movie and some simulated videos by an actor all regarding the MSE.

A booklet about the MSE will be handed out, to be used while MSE training. The MSE domains, in the upshot and the empty template, will be re-arranged slightly to align with the UCPH textbook in psychiatry.

Non-video group.

See also figure 1. In each shift, after the lecture week, the students have three weeks at designated hospitals/units in psychiatry. They are mostly allocated to the wards, where they will follow the doctors around, receive bedside teaching, and perhaps accomplish small round tasks themselves. During the three weeks, that are mandatory, they have to write up several full medical records, and present it for a faculty teacher; they also have to follow the doctor on call on a day and a night shift.

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Every afternoon, they have small group classes, where one student read a medical record aloud, and the patient participate, as an introduction to the afternoon teaching covering a diagnostic category. Near the end of the three weeks, the students are given a brief test exam, questioning them about a medical record, but without attending patients. Two weeks before exam, 12 session grand lectures in psychiatry, for all the students of that term, are given as preparation for the exam.

For the present trial, also the NV students will receive the same non-authentic patient material I.E written theoretical instructions on the MSE, a brief animated movie and some simulated videos by an actor all regarding the MSE. Ensuring it is the authentic patient video e-library and not the theoretical information responsible for the expected difference in scores.

Measures

Baseline measures

The baseline questionnaire, distributed digitally, will entail: Age and gender, unit of clinical rotation, and validated questionnaires on self-regulated learning [36], learning style [37] and on attitude towards psychiatry [38].

Primary outcome – MSE skills test

The test is described in [17]. The test consists of three subtests each consisting of a video vignette, not accessible in the library (i.e. none of the students had seen it previously) with a forced choice test (FCT). After each video, students have five minutes to fill out the MSE template. Each FCT consisted of 20 descriptive one-sentence statements that could be used as part of MSE; the instructions are to mark five, and only five, statements judged to be the most precise description of the case at hand. In each FCT, five statements could correctly be applied to the patient at hand, while five statements are detrimentally wrong. Ten statements are not to the point. We apply a purpose-made scoring algorithm on each FCT: Detrimental false -3 points, not to the point 0 points and correct +3 points. This results in a scoring range of -15 to + 15 points per FCT. The MSE-skills test score consists of the student's average score of the three FCTs. The MSE test will be scheduled at least thrice for each shift, to accommodate for students, who are not able to participate on a particular week-day.

Secondary outcomes

General evaluation of the clinical rotation is carried out by a validated questionnaire of 10 items, to be answered on a 5-point Likert scale [39]. Purpose-made supplementary questions concerning the student's number of patient encounters alone and with a doctor/staff and area of interest in psychiatry is shown in appendix 4. These questions are distributed digitally.

Questions concerning use of the video e-library (time spend on each task/video ; evaluation of/satisfaction with the different element of the e-library will be an intrinsic part of the e-learning program. Time spend and number of visits to the different pages in Absalon will be extracted.

Statistical Analyses

Will be described in the Statistical Analysis Plan (SAP)

Collaborators

Centre for Online and Blended Learning, Faculty of Health and Medical Sciences, UCPH

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For the present project Region Zealand Research Foundation donated, in 2018 367.000DKK, and part of 2017 funding of UCPH Faculty of Health and Medical Sciences Educational Development Foundation was for the RCT (200.000 DKK). The full budget is 2.113.440 DKK. Presently, we apply for 1.550.440 DKK. for salary for VIP researcher, student assistant, statistician, language editing, open access and video editing in COBL.

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