

Virtual Rehabilitation and its Impact on Drug-Addicted Patients

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Abstract

Introduction: As a substitute for conventional treatment, virtual rehabilitation offers improved electronic rehabilitation techniques, maximising the impact of therapeutic interventions. The examination of compulsive mechanisms using VR settings remains in the early stages, notwithstanding the widespread usage of virtual reality models for studies on mental disorders.

Aim: The main aim of this research is to evaluate the value of virtual rehabilitation and how it affects patients who are drug addicts.

Materials and Methods: Numerous research techniques used in the study are being explored throughout the study's subject. The **positivism philosophy** was employed by the scholar. Moreover, the scholar has followed the **deductive approach, descriptive design** and thematic analysis has done. Additionally, the scholar has employed primary quantitative data-gathering techniques that aid in gathering reliable and real data. 5 patients of shree mookambika institute of medical sciences, kuleshekhrum, who are impacted by drug addiction have been engaged in the survey process.

Findings and discussions: The research shows that virtual reality settings constitute a dependable tool to elicit physiological responses, mental situations, and brainwaves. The outcomes ultimately hinge on social parameters, the features of the research groups, and how social behaviour is included within the VR scenario.

Conclusion: The rapid expansion of VR innovation has significant ramifications for the advancement of addictive treatment. Upcoming VR research will considerably aid in the creation of fresh therapeutic techniques.

Keywords – Virtual Rehabilitation, Innovation, Technology, Drug addiction, Patients' mental condition, social contexts.

1. Introduction

Millions of individuals nowadays struggle with the misuse of drugs alongside dependence on both legal as well as illegal substances. Such challenges call for a range of solutions because of their distinct complexity. Whenever understanding the term "rehabilitation", one needs to take into account the measures necessary to assist somebody

in overcoming drug abuse [26]. The terminology of rehabilitation including tips for choosing the best rehabilitation facility for an individual's requirements is covered in the material that accompanies it. Rehabilitation has become the procedure of using several therapy procedures to successfully cure someone who depends on a certain hazardous drug [4]. As a result, the concept of rehabilitation may vary depending on who is impacted by such intricate problems. In any event, the goal of rehabilitation is to assist the patient in quitting consuming the substance that is addictive while also assisting in finding alternative methods to maintain sobriety.

An extended, comprehensive procedure, rehabilitation can range from acute or ambulatory treatment through post-rehabilitation treatments [19]. As a result, the conservative approach to management involves a wide range of therapies, including rehabilitation, psychological counselling, along with physical exercises like meditation and diving. A continuing implementation of learned modifications including a sustained dedication to providing follow-up rehabilitation treatments is necessary to preserve the effectiveness of rehabilitation. Following the spread of technical advancements, novel chances to rethink the rehabilitation process open up. VR represents one technological advancement that is very important for rehabilitation. Virtual reality (VR) describes an instantaneously, computer-animated recreation of an imaginary and 3D world [2]. Via the application of digital, yet, dynamic surroundings, rehabilitation using VR constitutes an auxiliary medical device that serves to regain cognitive or sensory abilities that have been compromised as a result of an unfortunate event or sickness. VR gets a group of innovations that may be deployed to create sensory input that takes the shape of a dynamic, simulated setting that is regarded as being comparable to reality. Additionally, audiovisual reinforcement features might enhance patient adherence and the efficacy of therapies for the treatment of drug-dependent patients [7].

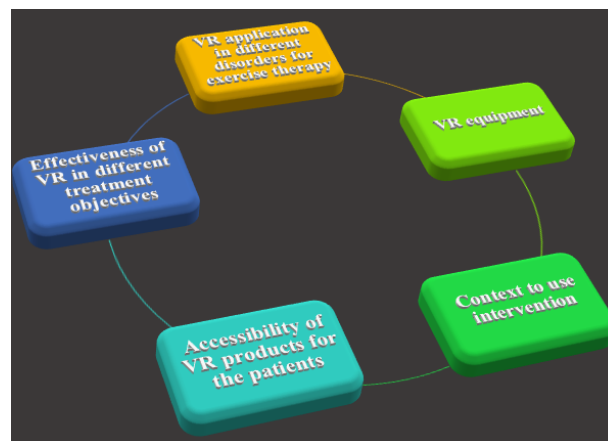


Figure 1: VR for treatment

(Source: Self-made)

VR is an innovative as well as trustworthy technique for mobility and function-related rehabilitation [9]. This offers a less expensive option that allows therapeutic customised services, patient motivation, increased regulation, and improved functioning. VR may be utilised for at-home therapy and frequently becomes readily accessible [8]. Experts might have fewer jobs to do since they need little monitoring. With the incorporation of diverse aspects, interactions, and structure, entertaining themes are being added to a growing variety of virtual reality (VR) applications. Numerous studies have been conducted on patients with drug addiction and those with neurological disorders to determine the efficacy of VR across neurorehabilitation. Despite the potential benefits of virtual reality for treatment, it has yet to be implemented on a regular basis. Additionally, its efficacy for treatment for those with upper reaches outside neurological diseases is not properly investigated. Upper extremities impairment may occur among individuals with neurological conditions and drug addicts, however, there may be distinctions in therapy objectives that must be taken into account. Technologies like virtual reality have an opportunity to be beneficial instruments for neurotrauma recovery [1].

Virtual rehabilitation has become a key part of treatment these days since it has many positive impacts and any patient can get the best result [10]. Moreover, drug-addicted patients are more vulnerable to any kind of negative

impacts and it reflects that the technological intervention can deliberately make sure that it only gnats the positive outcomes. However, it is also a matter of conflict since it is a new technology and provides tough competition to the conventional system. The technology needs to be updated frequently in order to ensure a successful output.

2. Literary works in this field

By summarising the latest studies on the evaluation and treatment of motor deficiencies utilising virtual rehabilitation innovation, the article “**Virtual Rehabilitation**” discusses the condition of the practice of VR today. Additionally, the technological and therapeutic consequences of the VR strategy, as well as its advantages and disadvantages, will be covered. This review represents an expansion as well as modification of a prior section on VR with a related focus. Although VR hardware has advanced significantly over the last time, there remains a dearth of clinical studies supporting the effectiveness of virtual therapeutic techniques [5]. The efficacy of VR platforms for motor therapy in communities with stroke alongside traumatic brain damage is undeniable, according to several fresh comparisons, however, larger research investigations are required to examine the impact of particular VR mechanism components on various patient communities in various instances of neurorehabilitation.

The article “**Exploring the Opportunities and Challenges of Enabling Clinical-friendly Drug Psychotherapy with Virtual Reality and Biofeedback Technologies**” claims that drug dependency remains a long-term condition linked to numerous sentimental or mental health problems seen in addicts. Patients with drug addiction frequently exhibit deficiencies in their mental and physical connection as a consequence of which they are unable to recognise or readily dismiss behavioural or physical signals [14]. The findings highlight existing challenges in enhancing mind-body integration as well as determining the proper accusations of hunger triggers. In order to enable counsellors to collaboratively assess the generated desired situations utilising the gathered data, this study offered an initial plan of technological alternatives that include clinically suitable VR-based hunger triggering as well as immediate monitoring.

According to this study, “**CravingProbe: A System Combining Virtual Reality and Biofeedback Technologies to Support Drug Psychotherapy**”, VR has already shown promise in this field. The conceptual domain of VR experiences linked with monitoring in rehabilitation centres for substance use disorders, yet, has received very limited study which seems in line with therapeutic objectives. This project developed the CravingProbe experimental framework, which combines VR and biofeedback technology to support drug treatment [13]. Several psychotherapists were enlisted for an initial individual test to provide input from a medical standpoint. Outcomes demonstrate that those surveyed generally felt that the method is helpful for addressing prospective patient desires since it depicts the majority of normal real-life yearning events. Participants also acknowledged a desire to use this approach throughout drug treatments alongside a sense of capability in doing so.

An article titled “**Oral Manifestations of illicit drug use**” focuses on drug addiction. Accelerated caries, periodontal inflammation, inadequate oral cleanliness, and generalised carelessness are all well-known oral consequences of illegal substance abuse. The worse oral condition experienced by fenders is exacerbated by additional variables including high-cariogenic eating and living habits, as well as interpersonal and psychological concerns. According to published research, shooting drug addicts' dental medical condition of existence is worse than that reflected in the broader Australian individuals, while caries prevalence is correlated with superiors' standard of existence among addicts [23]. In order to assist physicians in providing care to patients, this paper will cover the commonality and method of operation of frequently encountered illegal substances in Australia, such as marijuana, and cocaine along with narcotics as well as the prevalent orofacial manifestations of their negative consequences.

Drug dependency is a significant issue on a global scale, as this essay on “**The Impact of Reality Therapy on Metacognition, Stress, and Hope in Addicts**” demonstrates. The internal regulating mechanism known as reality counselling discusses the reasons it is necessary to make the choices that have been predetermined for humanity. The present research looked at how real-life therapy affected drug users' consciousness, anxiety, and loss of optimism. This research is a hybrid investigation. In Jahrom in 2012, specimens obtained were conveniently selected from around sixty drug users. The participants got randomly split into 2 groups - an intervention team along with a control group - each with 30 members [15]. The experimental team underwent reality therapy while

the control sample underwent standard treatment. The focus of reality counselling revolves around a person's present actions and sense of responsibility. Such therapy helps people manage their adverse feelings, encourages cognitive function, as well as increases optimism by making people more responsible for their actions.

The major topic of the study titled “**A Systematic Review of Machine Learning in Substance Addiction**” concerns the use of virtual rehabilitation for managing drug-dependent individuals. There exists no treatment for a dependency, which impacts multitudes of individuals globally. ML's advent has made it possible for medical organisations to use innovation to aid physicians in addressing individuals more effectively [28]. It is possible to decide on a course of therapy for people with drug dependence by using artificial intelligence and machine learning to comprehend them. By utilising the PRISMA approach to discover sources, this investigation seeks to summarise how well AI and ML approach is utilised in drug investigations, which comprise eleven research projects in total.

3. Materials and Methods

There are mainly four types of research philosophy such as positivism, interpretivism, pragmatism and realism and each one has its own significance.

Table 1: Types of research philosophies

POSITIVISM: It asserts that there is a neutral method to comprehend the social environment.	INTERPRETIVISM: It illustrates how social environments might be viewed subjectively [11].	PRAGMATISM: It asserts that the study's challenge largely influences the selection regarding study ideology.	REALISM: It is founded on presumptions that are essential for understanding the arbitrary basis of human experience.
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(Source: Self-made)

Among these philosophies, the scholar has followed the positivism philosophy since it has helped the scholar to gather real-life data on the present study topic.

It is witnessed that there are mainly two types of research approaches such as inductive and deductive and according to the requirements, scholars across the globe use any one of them. Since this study mainly dealt with the quantitative data collection process, the scholar has decided to follow the deductive method and eliminated the inductive method.

Table 2: Types of research approaches

INDUCTIVE: In order to identify trends and commonalities in the information, the inductive method employ higher qualitative analytical techniques, such as literary or graphical assessment.	DEDUCTIVE: Deductive investigation tests as well as validate the concept or idea using additional quantitative techniques, such as statistical computation [20].
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(Source: Self-made)

Table 3: Types of research designs

The goal of descriptive design is to clarify the present circumstance of a chosen element [25].	Employing empirical information, the correlational design aims to quantify the strength of a link across multiple aspects.	The goal of the causal- comparative or quasi-experimental design represents to determine the causes and effects of the factors.	The scientific approach applies in experimental designs to determine the cause-and-effect association between collections of study-related factors.
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(Source: Self-made)

Among the several research design, the scholar decided to follow the descriptive one since it has helped the scholar to descriptive the various variables of the study topic such as virtual rehab and the technology associated with it.

The examination of the information and the development of conclusions are governed by how properly the materials were collected [18]. Likert scales were used in the development of the survey questions. “Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree” are among the opinions that are rated on the rating system. In order to generalise the information and analyse particular replies, the answers of the 5 patients of shree mookambika institute of medical sciences, kuleshekham, were gathered using a closed-ended questionnaire. The questionnaires must be generated and adjusted while conducting a study [22]. The scholar managed to extrapolate and draw inferences from the comments of the participants displayed in a table format. Five patients who are drug addicts were chosen using a non-probability sampling approach.

During a study project, the “Data Protection Act of 1998's” legislative instructions must be implemented [21]. The scholar did that part quite nicely. The guidelines along with moral requirements were safeguarded in addition to being followed. The survey demographic was handled delicately by the scholar, who maintained their feelings. For the goal of conducting a literary study including gathering data, legitimate references were used. With the aim of maintaining the integrity of the current study, coercive or illicit strategies were discouraged.

4. Findings

Question 1

Table 1: Survey Response to Question 1

OPTIONS	RESPONSE	TOTAL PARTICIPANTS
21-25	1	5
26-30	0	5
31-35	3	5
36-40	1	5
41 and above	0	5

Source: Self-developed

In terms of age in the first question, the respondents remarked that a total of three participants ranged from 31–35 and the percentage is 60, whereas one participant stays under the range between 21–25 and here the percentage is 20. Moreover, it is also noticeable that the remaining participant's age remains between age 36–40 which is accounted for another 20 percent. The responses of all the participants have been crucial here since they are the patients also and their responses are more realistic [refer to appendix 1].

Question 2

Table 2: Survey Response to Question 2

OPTIONS	RESPONSE	TOTAL PARTICIPANTS
Highly agree	2	5
Agree	1	5
Neutral	0	5
Disagree	1	5
Highly disagree	1	5

Source: Self-developed

In this second question, the participants has been asked to mark their remarks on the impact or usefulness of virtual rehabilitation which is whether helped them overcome the drug addiction during the treatment stage. In this aspect, 40% of the respondents have nodded that it is true since they have highly agreed on this by saying that VR has helped them to overcome the phase of drug addiction. 20% of those surveyed agreed with this statement as well.

It is still a contentious issue, though, since another 20% of those surveyed disagree with this and an additional 20% of respondents highly disagree with this [refer to appendix 2].

Question 3

Table 3: Survey Response to Question 3

OPTIONS	RESPONSE	TOTAL PARTICIPANTS
Highly agree	1	5
Agree	1	5
Neutral	1	5
Disagree	1	5
Highly disagree	1	5

Source: Self-developed

The survey process went on since the respondents were asked to respond whether the VR process is able to provide all the mental and physical fundamentals which are present in the conventional rehab process. This question got a mixed response since 20% of the respondents highly agreed, and 20% of the respondents agreed. Moreover, another 20% of the respondents remained neutral since they did not have a fair concept of this matter. 20% of the respondents also disagreed with this and the remaining 20% of the respondents highly disagreed on this matter by mentioning that the conventional rehabilitation approach uses a variety of mental and physical principles that virtual reality cannot give [refer to appendix 3].

Question 4

Table 4: Survey Response to Question 4

OPTIONS	RESPONSE	TOTAL PARTICIPANTS
Highly agree	1	5
Agree	1	5
Neutral	2	5
Disagree	1	5
Highly disagree	0	5

Source: Self-developed

This question mainly dealt with the application of AI instead of human beings in terms of getting treatment under the banner of virtual rehabilitation. It is evident that 20% of respondents highly agreed with the statement, while another 20% agreed. This question continued to be contentious since 40% of the respondents stayed neutral because they had nothing to say about it. However, it is also noticeable that 20% of the respondents disagreed with this by saying that VR must not be done by AI [refer to appendix 4].

5. Discussions

Virtual rehabilitation has become a key area of the treatment of various areas in human life and presently, it is widely used for the treatment of overcoming drug addiction [24]. A therapy patient's treatment may be wholly centred on VR scenarios or may be supplemented by them. This is known as virtual rehabilitation in psychological research. The rehabilitation can be referred to by the term “virtual reality-based” when no traditional care is offered and the participants have acknowledged this while the literature review segment has also covered this part. Moreover, this is further reckoned by the participants as they have delivered their thoughts on this matter of whether VR is highly applicable at the present time to overcome drug addiction or not. Moreover, the respondents have also mentioned that AI has the potential to be used as a new way of dealing with VR instead of human interventions. In this aspect, it must be added that whenever virtual counselling is used in place of more traditional treatment, the approach is called “virtual reality-augmented” [17].

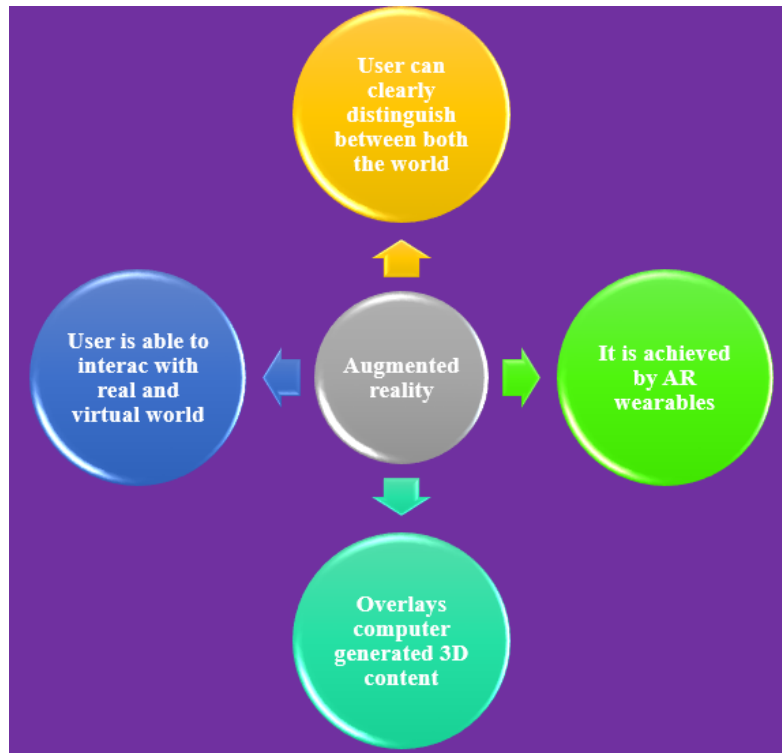


Figure 2: Augmented reality

(Source: Self-made)

Currently, over one-fourth of all people utilise online resources, while an overwhelming number of people employ the virtual realm to get around in everyday activities. Consequently, virtual rehabilitation has become extremely popular among users [6]. Actually, virtual rehab may have been employed in treating several kinds of problems instead of conventional treatment techniques. Practical convenience, along with the capacity to pay for the virtual treatment are a few things to take into account while using virtual rehabilitation [27]. The respondents have mentioned that this technology is highly reliable since they have acknowledged that this technique can improve the health condition of people who have been subjected to drug addiction. Moreover, it can be mentioned that there are many benefits of this technology since the older method is no more highly acceptable to many people. The survey process has gathered information from the 5 participants which reflects that this new technology is a matter of conflict over the use of conventional techniques.

Table 4: Advantages and disadvantages of VR

Advantages	Disadvantages
It can motivate patients.	Cost-effectiveness
Better realistic treatment.	VR sickness
Better management with effective impact.	Considering both moral and legal issues
Can be done virtually.	Efficacy of the therapy

(Source: Self-made)

In this aspect, it can be claimed that the programme is interesting, encourages patients to participate and has the ability to incorporate patients' sensory experiences for greater genuine therapeutic settings. VR may be used at the individual's house while being observed from another location (developing into telerehabilitation) [16] since such information is explicitly kept by the machine conducting the experiment. They can also become rendered accessible through the online presence. Participants have noted that the person receiving therapy appears greater involvement in the desensitisation process and added that patients might disregard they receive therapy or are

being observed, leading to additional genuine sentiments. It is accurate since VR helps organisations cut expenses while the monetary value of medicines and supplies has decreased [3].

The participants have mentioned that as VR remains a comparatively recent innovation, its moral consequences do not seem as extensive as those of different kinds of medication, therefore, there remains some controversy around the topic. In order to expand the scope of the influence of VR treatment, particularly in topics pertaining to legal investigations, it makes sense to formalise the restrictions, adverse reactions, warranties, and rules regarding privacy. Additionally, it should be noted that rolling around in an online setting is reported to impair vision. Long-term VR immersion can trigger uncomfortable adverse reactions including nausea, vomiting, headaches, and perspiration, which are sensations akin to movement syndrome [12]. Furthermore, this can trigger other health problems while trying to minimise the addiction to drugs.

6. Conclusion

This study has effectively covered the use of VR and its effects on patients who are drug addicts. The fundamental quantitative data collecting procedure and collections of the pertinent information on this subject have been discussed, which has assisted the scholar in gaining a full understanding of the subject. This study comes to the conclusion that following completing programmes, those who have been addicted to any substance would encounter constraints and incentives to return. The chemicals will still be present regardless of whether individuals participate in intensive residential programmes or as a component of a programme for adolescents. Establishing trust as well as strengthening one's capacity to fight dependency are two benefits of using VR for drug therapy. They may develop the expertise necessary to successfully handle these events at another point in their lifespans while avoiding relapsing into a pattern of addiction through going through such circumstances as well as worries in a secure setting. VR is an innovative technology and it is highly impactful for overcoming addiction to drugs it is completely acknowledged by many participants of shree mookambika institute of medical sciences, kuleshekham, however, it is still a matter of fact that many participants have raised concerns about this technology since it has not become widely recognised and providing significant rivalry to the traditional process.

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APPENDICES

Appendix 1

Question 1

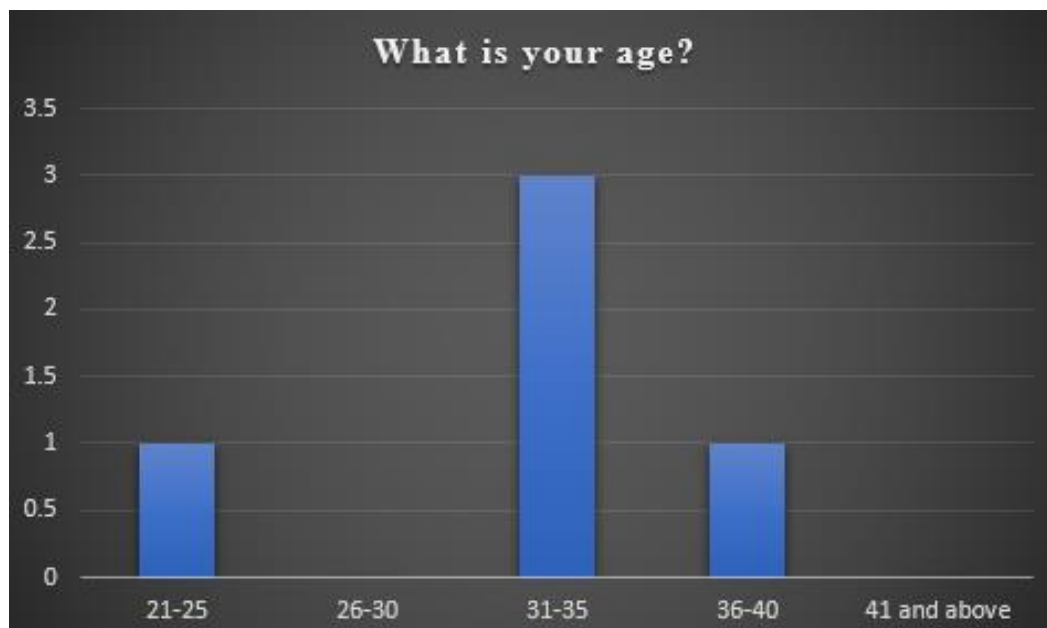


Figure 1: Survey response to Question 1

(Source: Self-developed)

Appendix 2

Question 2

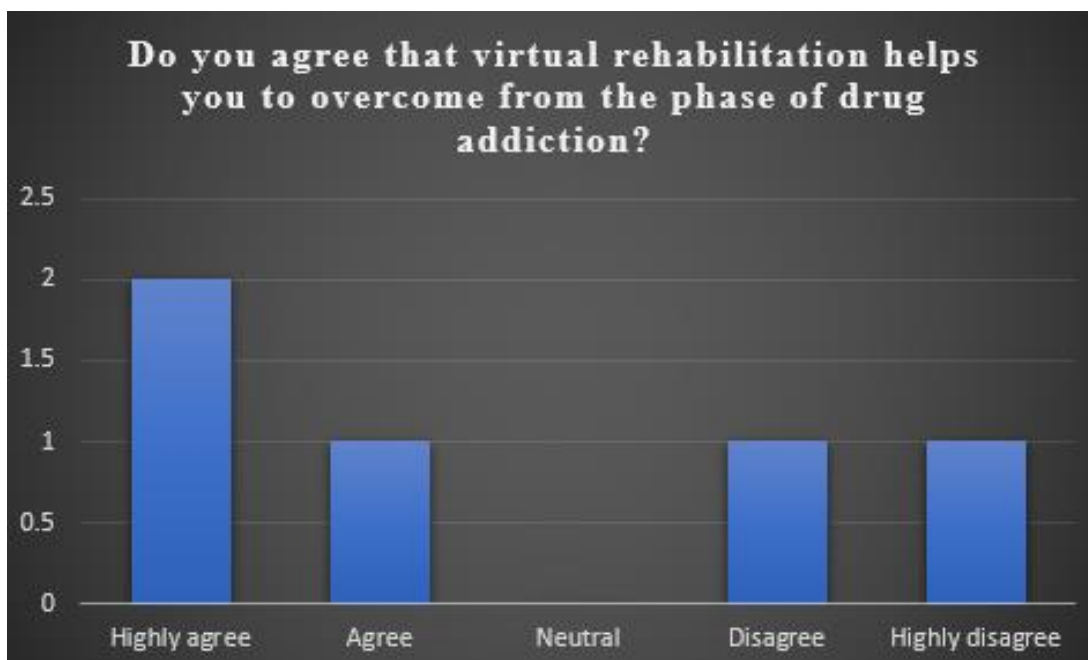


Figure 2: Survey response to Question 2

(Source: Self-developed)

Appendix 3

Question 3

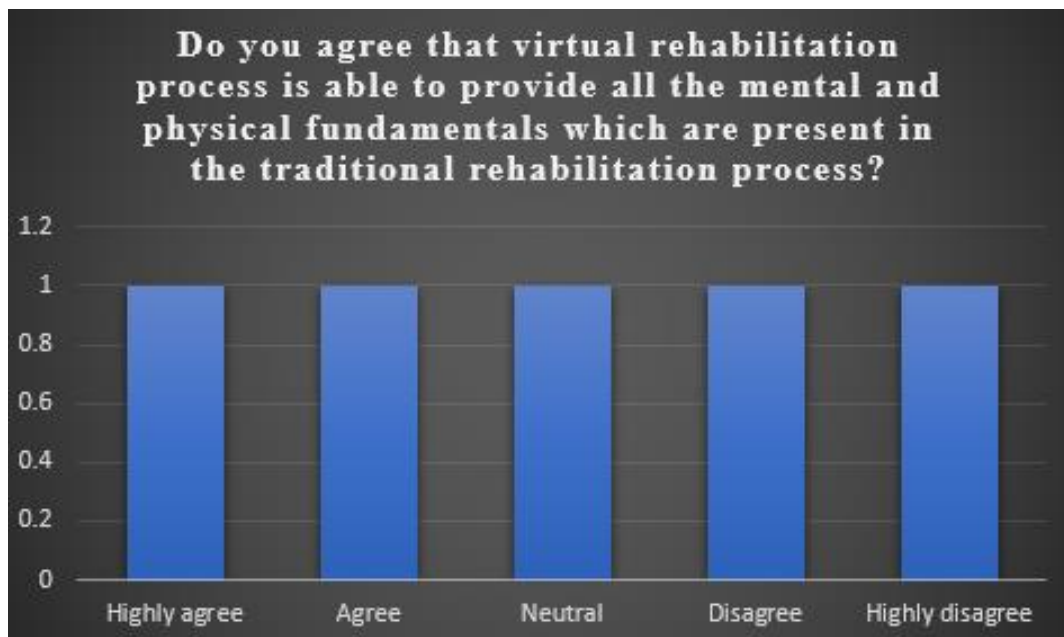


Figure 3: Survey response to question 3

(Source: Self-developed)

Appendix 4

Question 4

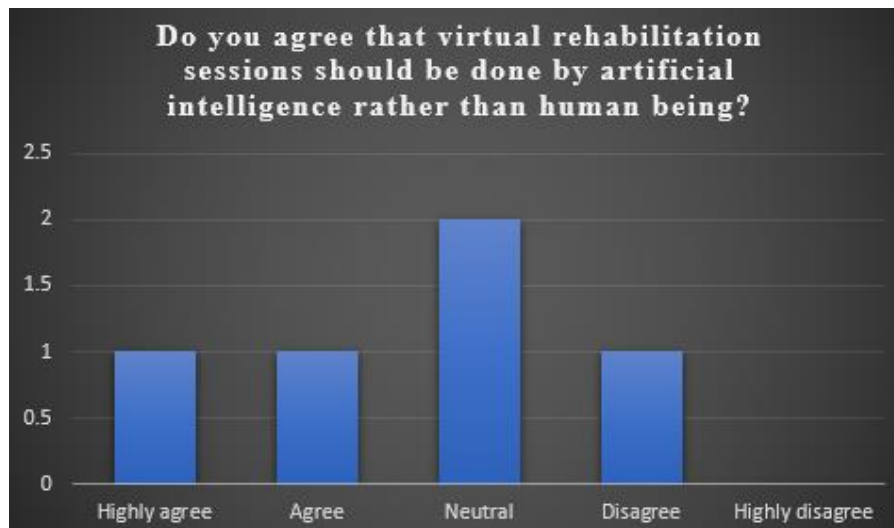


Figure 4: Survey response to question 4

(Source: Self-developed)