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Psychomotor Therapy Using the Body Schema for the Intellectually Disabled at the A.D.A.R-Tubahoze Centre

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ABSTRACT: This study is the preliminary research focused on psychomotor therapy and body schemas for the intellectually disabled, hence the motor dimension with a test of balance, coordination and jumping in the pre-test and post-test of a BPM measurement at 60, 90 and 120 (BPM) with the YO and YC. The cognitive dimension with, for example, the Berces and Lezine test of body control and latero-spatial organization, the Piaget and Head tests of gesture imitation and latero-spatial organization. The affective dimension revolving around self-esteem was measured with the self-perception profile for adults with intellectual disabilities (SPPD) on physical appearance, athletic competence and psychomotor competence. At the end of the verification of research question and using methodological approach adopted on the present study on the motor dimension, the cognitive dimension and the affective dimension; it was found that with the motor dimension on the balance test, a trend on the performance of our intellectually disabled patients from A.D.A.R-Tubahoze centre during the psychomotor therapy sessions was tested positive in the post-test compared to the pre-test (BYO and BYC).With regard to the coordination test (CYO and CYC) at post-test and pre-test, the statistical frequencies with overall averages show that our intellectually impaired patients tended to obtain better results at post-test than at pre-test; this shows a success in the applicability of motor therapy to coordination disorder in intellectually impaired patients. Similarly, a positive performance trend was shown in the results of the jumping test at post-test than at pre-test. The trend in the results of the jump test (JYO and JYC) in the post-test than in the pre-test would have shown a positive result after our therapeutic-motor sessions with the IDs of the A.D.A.R. centre. From the cognitive dimension, using the test of imitation of gestures and lateral-spatial on different movements, has a score of 10 points in the test of imitation of simple gestures of hand movements, it would have been observed in MID patients that the test proved positive; with the Piaget's Head test of latero-spatial organization administered to MID which was evaluated at a score of 40 points, had as a positive performance to all patients who took this test. The results of our work on the affective dimension of the dominant modality "Rather true", was observed on items 12, 16, 20 and 24 of self-esteem, with physical appearance vis-à-vis items (5,10,18 and 22) and items 5 and 9 and then items 17, 13 and 1 of athletic competence; from items with a "Rather positive" modality with items 11, 3 and 2 3, 7, 15 and 19 of our MID patients that a positive trend on positive appreciation was satisfactorily observable.

KEY WORDS: Body schema, Intellectual disability, Psychomotor therapy.

1. INTRODUCTION

The problems of intellectual disability are having a major impact on the new generations currently being born in Rwanda. This can be seen on children and adults whose parents and relatives were victims of physical and verbal violence as a result of the murders of family members accompanied by machete wounds and repeated sexual violence during the Tutsi genocide of 1994. Most of these victims began using drugs and have the behaviours that can have multiple consequences such as intellectual disability and other physical disabilyties on newborns and young people (Rieder and Elbert, 2013; Hoppen and Morina, 2019).

Intellectual disability (ID), formerly known as *"mental retardation"*, is a condition characterised by significantly below-average intellectual functioning and impaired adaptive behaviours, manifesting before the age of 18. Degrees of intellectual disability include mild, moderate, severe and profound intellectual disability (APA, 2013:1-2; Nemerimana. M. et *al.,* 2018: 4-9). Similarly, children and adults with intellectual disabilities have varying degrees of neurodevelopmental impairments, including mobility and posture, communication and language, coordination and sociability. As a result, they may develop co-morbidities and associated impairments that differ greatly from one patient to another and increase with age (Rousseau et *al.,* 2021:15-20).

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According to recent studies and meta-analyses, around 1% of the general population is affected by intellectual disability, with a higher prevalence in children and adolescents (18.30/1000) than in adults (4.94/1000) (Maulik, et *al.,* 2011:2-4). In addition, it is estimated that around 1% of children aged between 3 and 10 worldwide have an intellectual disability (Greydanus, et *al.,* 2007). The Multiple Indicator Cluster Surveys (MICS) use a tool consisting of 10 questions to screen for the risk of various types of disability in children aged 2 to 9, and have shown that the risk of disability ranges from 3% (in Uzbekistan) to 49% (in the Central African Republic), a situation requiring everyone's intervention (Graham, 2014).

As a result, in Rwanda, the traumatic after-effects of the multiple crimes in Tutsi genocide 1994 continue to be observed in the new generations. Historically shown, the districts of Huye and Nyanza are among the main strongholds known as former palaces of the Rwandan monarchy (Mugabe, 2009: 2-8). Before 1994, the two districts were inhabited by more than 70% of the population of Tutsi origin, 99% of whom were exterminated by the extremists. More than 80% of the Rwandan population was affected by these criminal acts in 1994 (Nsanzuwera, 2018:3-10).

Over the past three decades, Huye district has had 30,159 people with disabilities, or around 12.2% of the district's population. By gender, the disabled population is around 11.5% among men and 12.9% among women (M'kumbuzi et *al.,* 2014:5 and NIRS, 2020:10-25). The sectors of Kinazi (18.0%), Rusatira (17.8%) and Rwaniro (15.1%) have higher proportions of people with disabilities. In these sectors, the proportion of women is slightly higher than that of men. We also note that around 17.4% of the disabled population in Huye district suffers from a mental disability. There is no significant difference between men and women with mental disabilities; 17.6% for men and 17.2% for women (Kabakambira et al., 2018:4-11; Kabanda et al., 2012:3-7 and NIRS, 2020:10-23). In Rwanda, people with intellectual disabilities continue to have problems with basic mental and physical care, but their numbers are increasing all the time. Intellectual disables are cared by health centres, hospitals or charities centres, or by private individuals; but in their interventions or therapies, there is no psychomotor therapy or psychomotor intervention that can contribute to sustainable mental and physical health care in Rwanda.

Due to the problems of acquisition and lack of psychometrician therapists and the absence of psychomotor therapy, our research focused on the contribution of psychomotor therapy using body schema among intellectually disabled people within the A.D.A.R-Tubahoze centre. The results of the research will enable the modelling of psychomotor therapy as a sustainable contribution to the mental and physical healthcare system in Rwanda. The general aim of our study is to carry out research into psychomotor therapy using body schema on the cognitive level and spatial, motor, affective and self-perception organisation in people with intellectual disabilities at the A.D.A. centre. R-Tubahoze centre, with the following specific objectives: to observe, quantify and evaluate the motor dimension and motor skills, the cognitive dimension and spatial organisation, the affective dimension and self-perception on intellectual disabilities at A.D.A.R-Tubahoze centre; to assess the need to continue psychomotor therapy for people with intellectual disabilities at A.D.A.R. centre and in other centres in Rwanda. This leads to the research question: Does psychomotor therapy using body schema have an impact on the self-perception of ID in terms of cognitive, spatial, motor and affective organisation?

2. THEORETICAL FRAMEWORK

2.1. Concept, aetiologies and risk factors of intellectual disability

In Rwanda, people with intellectual disabilities are considered to be "*Ibimara, Intagira Ubwenge or Ikigoryi*", which means that they are "*Without values, imbeciles or morons*", according to the WHO, which we support. Intellectual disability, or mental retardation, is defined as arrested or incomplete mental development, characterised mainly by deficits in the faculties that determine overall intelligence, for example: cognitive function, language, motor skills and social performance (WHO, 1992:705-714). Millions of people worldwide suffer from intellectual disability and the prevalence is estimated at 1-3% in developed countries (Ke et *al.,* 2017:5-19). Intellectual disability, or mental retardation, is defined as arrested or incomplete mental development, characterised mainly by deficits in the faculties that determine overall intelligence, for example: cognitive function, language, motor skills and social performance (WHO, 1992:705-714). Millions of people worldwide suffer from intellectual disability and the prevalence is estimated at 1-3% in developed countries (Ke et *al.,* 2017:5-19). Worldwide, the etiology of ID is heterogeneous, including traumatic factors, infections and toxicity, while genetic factors have become predominant. No specific aetiology is found in 40% of cases, particularly in cases of mild ID. In this case, in Rwanda in terms of etiology, the problem of intellectual disability affects 1.76% of men and 2.70% of women among adults, as indicated by the NISR (2005:14). This situation is influenced by environmental factors (*including malnutrition, social and emotional deficiencies experienced, for example, in poorly managed orphanages*) and genetic

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factors, reflected in diseases such as trisomy 21 and X, which are most often considered to be the genetic factors behind Intellectual Disability.

2.2. Behavioural and motor challenges on people with intellectual disabilities

It has been observed that intellectually disabled peoples at the A.D.A.R-Tubahoze centre in Rwanda live with a motor impairment that limits their ability to engage in physical, sporting, psychological, cognitive and social activities; some mentally disabled people behave in destructive, aggressive or violent ways towards others. This is in agreement with Ekins, Oesburg and their colleagues presenting that self-injurious behaviours (*such as self-inflicted hitting or biting*) can be observed in patients with moderate to severe ID (Ekins et *al.,* 2019:25; Oesburg et *al.,* 2011:1).

2.3. Psychomotor disorders

Psychomotor disorders are neurodevelopmental disorders that affect the subject's perceptual-motor adaptation. Their aetiology is multifactorial and transactional, combining genetic, neurobiological, psychological and/or psychosocial factors which act at different levels of complementarity and expression. Their clinical analysis is based on in-depth referential knowledge of normal development through specific investigation, including psychomotor examination, to apprehend the qualitative and quantitative aspects of perceptions of psychomotor disorders *"attention deficit/hyperactivity; coordination acquisition disorder* "*developmental dyspraxias"; developmental dysgraphia; non-verbal learning disorders; spatial disorders; abnormal movements; lateral dominance disorders; lateral dominance disorders; and muscle tone disorders*" (Albaret, 2012:408).

2.3.1. Tonus and posture

Our patients suffering from intellectual disabilities hosted at A.D.A.R-Tubahoze centre in Rwanda have dyspraxia, also known as developmental dyspraxia (DD), a chronic neurological disorder that has affected them since childhood. Scialom talk on tonus disorder understood as *"a state of active, permanent and involuntary tension whose intensity varies according to the different synkinetic or reflex actions that increase or inhibit it"* (Scialom et *al.,* 2011:145-177). Pireyre explains that all muscles are involved in tone. However, the extensor muscle, which is responsible for the anti-gravity system and therefore for posture, is the muscle most involved. Tonus is controlled by the central nervous system through the myotatic reflex loop. Action tone is voluntary, under motor control. Postural tone, on the other hand, is involuntary, like a reflex reaction. In parallel with the action of the central nervous system, the elasticity of muscle tissue allows contraction; the term tonus describes aspects of a different nature, sometimes dealing with the tonic distribution at rest (*passive tonus*), sometimes with the regulatory mechanisms involved in movement (*active tonus*) (Saccomanno et *al.,* 2021:186-191 and Lømo et *al.,* 2020:1-26).

2.3.2. Tonic regulation

Tonic-emotional disorders, such as tics, stammering, emotional outbursts and reactions corresponding to postural and mimic expression, are tonically regulated in our patients at A.D.A.R-Tubahoze centre. This fits in with the primary mode of regulation *"associates the tonic state with a control of sensory-motor and cognitive exchanges with the environment*"; the second mechanism of regulation concerns the control of sensory flows which lists the different sensory flows: gravitational, tactile, visual, auditory and olfactory. The third type of tonic regulation comes into play according to Bullinger: it involves interactions with the human environment. "*The sensory-motor dialogue with the wearer allows the accumulated tension to be metabolised and tonic states to be given meaning*" (Bullinger, 2019: 27-35).

2.3.3. Tonic-postural maturation: acquisition of the body axis

From birth, the individual is neurologically immature. It has been observed that some intellectually disabled children at Tubahoze centre in Rwanda are still neurologically immature, which poses problems in terms of the neuromuscular tone that prepares the body to perform certain gestures. Here the individual maintains stations, postures and attitudes. It is the basis of motor and postural activities, and tonus is therefore a basis for carrying out the motor project, registering a bodily attitude on individual (Jover, 2000:1-26). The researcher Potel mentioned two laws underpinning tonic development. Firstly, the cephalo-caudal law (*increase in tone from top to bottom*) enables the tonic development of the body axis. At the same time, the child's tone is subject to a second law called the proximo-dis law (Potel, 2019:5-10).

2.3.4. Tonic disorders

People living with ID at A.D.A.R-Tubahoze centre in Rwanda presented different forms of tonus and their vicissitudes, in particular: *Hypertonia, Hypotonia, Paratonia and Synkinesia* linked to emotions and psychomotor development. This is consistent with the

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findings of eminent researchers in psychomotor pathology presented below. For these authors, tonic states become pathological when they persist over time, hindering the subject's psychomotor abilities. Hypotonia is the cause of a decrease in muscle tone (Robert-Ouvray, 2010:85) and paratonia is an anomaly of muscle contraction: the muscle contracts instead of relaxing despite the subject's voluntary command and is in a state of permanent contraction inducing a catatonic attitude (Pireyre, 2015:168-181). Then there are synkinesias, which reveal action tone (Scialom, 2022:165-203 and Pireyre, 2015:168-181) and according to Pireyre (2015:168-181), these are involuntary movements or tonic increases that occur during the conscious execution of a gesture.

2.3.5. Fine and occulo-manual coordination

It has also been observed that some intellectually disabled people at the A.D.A.R-Tubahoze centre have problems with general dynamic coordination, i.e. coordination involving the whole body in action; bimanual coordination, which involves coordination between the two hands; oculomotor coordination: *"They involve the ability to coordinate visual information and motor action. They include oculomotor coordination (between the eye and the hand) and oculopodal coordination (between the eye and the foot)"* (Dominique, 2018:10-15).

2.3.6. Spatial-temporal structuring

Space is above all a psychic and bodily integration of limits and finitude. Whether in the psyche of a child or that of an adult with mental retardation, internal and external spaces are initially confused, as are internal and external excitations, in an indistinguishability between inside and outside: this is why it is important to offer the child a space that provides positive opportunities where the child can take root in the framework of spatial-temporal structuring. It is in the tonic-emotional relationship with the mother that the child builds up his or her bodily envelope and psychic apparatus. The basic narcissistic security that gives the feeling of existing is based on the acquisition of the functions of maintenance and containment, identified in the characteristics of the ego-skin (Anzieu & Ferrer, 1995: 125-129). Based on the ideals of Anzieu and Ferrer and our own observations, we have become convinced that some of our intellectually disabled clients at A.D.A.R-Tubahoze centre have difficulty organising and structuring the time and space around them, and therefore developing their body schema, organising work, order and mental or intellectual representations.

2.4. Temporality in psychomotricity

Temporality in psychomotor therapy is the use of different activities of daily life, or of an experimental nature, in order to evaluate temporal processing capacities. Six types of temporal tasks are studied by Toplak et *al* in hyperactive patients. These are duration discrimination, temporal order judgement, production and reproduction of duration, verbal estimation of duration, sensorimotor synchronisation and anticipation abilities *"Perception of a sequence of stimuli and prediction of the next stimulus"* (Toplak et *al.,* 2003:1-10). In this context, one of the patients at A.D.A.R-Tubahoze Centre living with ID displays symptoms of temporal or cardinal dysfunction, such as the ability to perceive and use temporal information such as single durations or rhythms.

2.5. Body representations with the body schema

A schema is a multitude of expressions dedicated to mental representations of the abundant body, in proportion to the variety of bodily functions: sensory integration, motor behaviour, semantic understanding, emotional experience, etc. (De Vignemont, 2010:26-27). However, some people with intellectual disabilities at A.D.A-R-Tubahoze-Rwanda centre have been found to suffer from a body schema disorder, i.e. poor laterality, difficulties in situating themselves in space and presenting their bodies; they suffer from Body Dysmorphia Disorder (BDD) or dysmorphophobia (fear of something wrong with their body). Some are obsessed by the defects they perceive in their appearance.

2.5.1. Classification of body representations

From this perspective, two concepts regularly appear: one dyadic with body schema and body image, the other triadic with body schema, body image and body semantics (Schwoebel and Coslett, 2005: 543-553; Gallagher, 2005: 294). According to Gallagher, body schema is distinguished from body image as a *"system of sensorimotor capacities that function without consciousness or the need for perceptual control",* whereas body image is a "system of perceptions, attitudes, and beliefs about one's own body" (Gallagher, 2005: 543-553).

2.5.2. Psychomotor perspective of the body schema

On the one hand, the neurological data presented *"Bilateral somatosensory primary cortex and right supramarginal gyrus"* question the multiple use of the term *"Body Image"* in the dyadic taxonomy for different representations, which could lead to

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misunderstandings (e.g. visual and somatosensory perception, or cognition, or body-related affects). On the other hand, the exclusion of feelings and behaviours, such as disgust with a body part or health behaviour, in a model of body representations in turn raises the question of *"Triadic taxonomy"*. The best-known body schema pathology is phantom limb pain. Apraxia, hemi neglect and autopoagnosia are also frequently cited in the neurological literature.

Apraxia involves a sensorimotor and conceptual deficit. Hemineglect concerns both the structural representation of the body and its sensorimotor representations. Finally, disorders of the visuo-spatial map and semantics of the body are associated with autopoagnosia (De Vignemont, 2010: 26-27). From a psychomotor perspective, a combination of dyadic and triadic models in which body representations are divided into two categories. A category linked to bodily investment and socio-affective behaviour of the body image, *"bodily affect"*, and a category linked to knowledge, awareness and control of the body schema. The latter would be subdivided into three aspects: a semantic aspect for its knowledge *"The concept and semantics of the body"*, a figurative aspect for its awareness *"The perception and structuring of the body"* and finally an operative aspect for its control *"The sensorimotor representations of the body linked to action"*. Thus, the body schema is to action what the body image is to self-presentation (Albaret, in Scialom et *al.,* 2013:14-16).

3. METHODOLOGICAL FRAMEWORK

3.1. Areas of study

The district of Huye is bordered to the north by the district of Nyanza, to the East and South by the district of Gisagara, to the South-West by the district of Nyaruguru and to the North-West by the district of Nyamagabe. The hilly landscape extends to the East and West, but turns into an area of steep hills and mountains as you head west and North-West. The western part of the district features high, undulating mountains, including the famous Mount Huye. The district has a rainfall of 1,200 mm and an average climate of 19°C. The A.D.A.R-Tubahoze centre is based in the district of Huye, Seteur (Umurenge) of Tumba, Cellule (Akagari) of Rango; it is a home for those who are psychologically unfit. It takes in children and adults with epilepsy, Down's syndrome and other mental illnesses who have no family to care for them (NISR,2015: 19-22).

3.2. Materials and methods

3.2.1. Materials

We have used the questionnaires and semi-structured interviews, the Canon camera to take images and videos, Excel 2013 software for data encoding, SPSS 208.0 software for data analysis and the Apple iPhone 7 plus, which enabled us to time the (*Beats Per Minutes*) BPMs of 60, 90 and 120.

3.2.2. Method

In the methodological framework, we propose to use the description of psychomotor exercises, the psychomotor intervention centred on the body schema based on the three (Dimension) Motor dimensions *"to evaluate psychomotor experience*"; the Cognitive dimension "*the test of mastery of one's own body and latero-spatial organisation (Berces and Lezine: Test d'imitation de gestes et Tests de Piaget et de Head),* the Spatial structuring test (*Rey's complex figure test*)" and finally the Affective dimension with questions on "*self-esteem* (SPPID:Self-Perception Profile for Intellectual Disabilities), *physical appearance* (SPPID), *athletic competence* (SPPID), and *psychomotor competence* (SPPID)" with people suffering from intellectual disabilities based at A. D.A.R-Tubahoze (Rwanda).

3.3. The analytical method

Our work at the A.D.A.R-Tubahoze centre involved 60 people of varying ages, from 11 to 37, some with multiple disabilities and others with intellectual disabilities. Recruitment was based on the distribution of a population aged between 23 and 37 with a mild intellectual disability within A.D.A.R. Tubahoze-Rwanda. The age of the participants (average =11 years; min. = 23 years; max. = 37 years) was taken into account in order to match the age of the participants as closely as possible to the body stage represented and the mature phase of the body schema. Consequently, 6 people (10%) from our population with mild intellectual disability expressed an interest in participating and were recruited to follow the whole intervention. In the analysis framework, the Wilcoxon rank order test was used to analyse our three Dimensions (Motor dimension, Cognitive Dimension and Affective dimension) and the Spearman correlation test to check whether there was a dependency between the evolution score (post-test scores minus pre-test

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scores) and the initial score (pre-test scores) in order to see whether each of the tests had changed significantly. To do this, a non-parametric Charles Spearman correlation test was used using SPSS 28.0.

4. RESULTS

At the end of the verification of the hypotheses by the methodological approach adopted in the present study on the Motor dimension, the Cognitive dimension and the Affective dimension.

4.1. Dimension

4.1.1. Motor dimension with the balance test

It was found that with the Motor dimension in the balance test, a trend in the performance of our intellectually disabled patients at A.D.A.R.Tubahoze centre during the Psychomotor therapy sessions tested positive in the post-test compared to the pre-test (BYO and BYC) with statistical frequencies for the overall means of 96.5 out of 120 BPM (post-test-BYO) and 64.5 out of 120 BPM (pre-test-BYO) ; 66 out of 90 BPM (post-test-BYO) and 43 out of 90 BPM (pre-test-BYO); 42.17 out of 60 BPM (post-test-BYO) and 28.83 out of 60 BPM (pre-test-BYO). The same results were observed in the BYC test, with statistical frequencies for the overall averages of 95 out of 120 BPM (post-test) and 75.67 out of 120 BPM (pre-test); 60.33 out of 90 BPM (post-test-BYC) and 42.5 out of 90 BPM (pre-test-BYC); 42.17 out of 60 BPM (post-test-BYC) and 31.33 out of 60 BPM (pre-test-BYC).

4.1.2. Motor dimension with the coordination test

With regard to the coordination test (CYO and CYC) at post-test and pre-test, the statistical frequencies with overall averages show that our intellectually impaired patients tend to obtain better results at post-test than at pre-test: 89.17 out of 120 BPM (post-test-CYO) and 79 out of 120 BPM (pre-test-CYO); 75.17 on 90 BPM (post-test-SYO) and 52.67 on 90 BPM (pre-test-SYO); 50.67 on 60 BPM (post-test-CYO) and 36 on 60 BPM (pre-test-CYO). The same results were observed with statistical frequencies of 89.17 out of 120 BPM (post-test-CYC) and 73.17 out of 120 BPM (pre-test-CYC); 64.5 out of 90 BPM (post-test-CYF) and 56.17 out of 90 BPM (pre-test-CYC); 41.67 out of 60 BPM (post-test-CYC) and 40.17 out of 60 BPM (pre-test-CYC).

4.1.3. Motor dimension with the jump test

The trend in the results of the jump test at post-test and pre-test would have shown a statistical performance of 98.33 out of 120 BPM (post-test-JYO) and 77.67 out of 120 BPM (pre-test-JYO); 74.5 out of 90 BPM (post-test-JYO) and 61. 5 out of 90 BPM (pre-test-JYO); 51.5 out of 60 BPM (post-test-JYO) and 41.67 out of 60 BPM(pre-test-JYO) and the same statistical trend was observed at an average of 95.5 out of 120 BPM (post-test-JYF) and 77.33 out of 120 (pre-test-SYF); 62.83 out of 90 BPM (post-test-JYC) and 49.67 out of 90 BPM (pre-test-JYC); 41.33 out of 60 BPM (post-test-JYC) and 35.17 out of 60 BPM (pre-test-JYC).

4.2. Cognitive dimension

On the basis of the cognitive dimension with intellectually disabled people at A.D.A.R-Tubahoze centre, in the test of imitation of gestures and lateral-spatial on different movements, a score of 10 points in the test of imitation of simple hand movements, it would have been observed in the MID patients tested a statistical trend of an average of 8.80 points with a standard deviation of 0.49, the minimum of 7.5 points and the maximum of 9 for this test. At the same 10-point score, for arm movements an average of 7.08 points with a standard deviation of 1.74 was recorded for this test, but we see patient NO with more points than the others on this arm movement score, i.e. 8.5 out of 10 points, and ML and UJ coming last with 5 points each. The Piaget's Head test of latero-spatial organisation was evaluated at a score of 40 points, all the patients in this test scored 31.5 points with a standard deviation of 5.29 points, from this test NO and UD each scored 35 points as the highest scores in this test and ML came last with 21 points out of a score of 40 points. With regard to the spatial structuring test with a score of 72 points, the average of 43.33 points was obtained with a standard deviation of 8.58. In this test, the UD patient came top with 54 points out of 72, and ML and NO with a minimum of 35 points each.

4.3. Affective dimension

The results of our work on the affective dimension of the dominant modality *"Rather true",* was observed in items 12, 16, 20 and 24 of self-esteem, with *physical appearance in relation* to items (5,10,18 and 22) and items 5 and 9 and then items 17, 13 and 1 of *athletic competence* ; from items of modality *"Rather positive"* with like items 11, 3 and 23, 7, 15 and 19 of our patients MID (Mild Intellectual Disability) that a positive tendency on the positive appreciation was observable for certain patients and that a negative tendency was also noticed for certain patients after the sessions of psychomotor therapy within the centre A. D.A.R-Tubahoze. The

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survey of our MID (Mild Intellectual Disability) patients' appreciation of the affective dimension of psychomotor therapy, at the beginning of the psychomotor therapy sessions, some patients showed a reluctance to enjoy or have fun doing psychomotor exercises, since 4 out of 6 patients said NO, whereas when we continued the sessions, 4 out of 6 patients answered YES that they had positively improved their motor skills thanks to the psychomotor therapy exercises. As for the supervisors' appreciation, 6 out of 6 clearly answered with YES that they appreciated the psychomotor therapy and that they would recommend the same practice to other people, shelters for the disabled and to Rwandans population in general.

5. DISCUSSION OF RESULTS

This part of discussion container Motor dimension and motor skills of people with intellectual disabilities, Cognitive dimension and spatial organisation of people with intellectual disabilities, Affective dimension and self-perception of people with intellectual disabilities and Strengths and limitations of the study of psychomotor therapy for people with intellectual disabilities.

5.1. Motor dimension and motor skills of people with intellectual disabilities

On the basis of the results of the pre-test of the unity of the variables measuring the motor skills of intellectually disabled people who have benefited from the psychomotor therapy intervention, with significantly different correlation thresholds. It was observed that a trend in the performance of our intellectually impaired patients at the A.D.A.R-Tubahoze centre during the psychomotor therapy sessions was positive in the post-test balance tests than in the pre-test (BYO and BYC). The results on the motor balance tests on the MID (Mild Intellectual Disability) at A.D.A.R centre would have a trend close to the results of Solis et *al,* (2023: 649-660) and Maulet et *al,* (2023: 57-58) who presented that 88% of patients with motor balance disorders have specific muscle weakness mainly affecting the hip adductors, extensors and abductors from which they explore locomotion. As a result, 83% of these patients show neuromuscular performance in relation to disorders that impair locomotor skills, reducing gait perimeter and speed, altering spatial-temporal parameters and increasing contralateral falling with an anterior pelvic tilt, and 3% are capable of postural control in relation to balance disorders.

With regard to the CYO and CYC coordination test, both pre-test and post-test, the statistical frequencies with overall averages show that our intellectually disabled patients performed better post-test than pre-test. In the same way, the results of the present work concerning the coordination test would have a similar tendency to the results of research carried out on adults by the author Journet, (2023:44-53) affirming that psychomotricity added to the orthosis has an impact on several daily activities helping patients suffering from coordination disorders including: walking or refining manual coordination. Vaivre-Douret et *al,* (2023:311-330) add that coordination disorders originate in childhood and should therefore be diagnosed from childhood to adulthood, as they have adverse effects on individuals in terms of their motor activities, their participation and their quality of life in society. The results of the pre-test and post-test jump test on intellectually disabled patients were positive during psychomotor therapy sessions, with an increase on frequency of (post-test-JYO-JYC) and (pre-test-JYO-JYC), our results on the jump test on intellectually disabled patients tend to lean towards the findings of Arramon et *al,* (2023: 2-8), where they claim that the jump test has an influence on patients' spatial function and physical appearance. Our results, based on correlation analysis of the balance, coordination and jumping tests on motor dimension of our intellectually disabled patients, showed positive aspirations for beats per minute (BPM) of 60, 90 and 120 (Eyes Open) which are observed to be significantly correlated with each other, whereby the BYO of 60 BPM correlates positively with BYO 90 (r=0.965), BYO 120 (r=0.849), also with BYC (eyes closed) of 60 (r=0.850), and CYO 60 (r=0.941). Similarly, BYO 90 correlates positively and significantly with BYO 120 (r=0.919) and CYO 60 (r=0.957), and BYO 120 correlates positively with CYO 60 (r=0.868). BYC 90 correlates positively and significantly with BYC 120 (r=0.853). CYO 60 correlates positively with CYO 90 (r=0.885) and (r=0.838). The correlation shows the level of relationship between two variables, as demonstrated in the results of the post-test analysis of the 60, 90 and 120 beat-per-minute balance, coordination and jump test that some of the parameters studied have a significant and positive effect on the others, which is to say that each time the level of beat-per-minute frequency increases this implies an increase on others positively, in particular BYO 60 which correlates significantly with BYC60 (r=0.857), and BYC120 (r=0.947). BYO 90 is significantly correlated with CYO 60 (r=0.889), CYO90 (r=0.979), CYC90 (r=0.821), JYO 60 (r=0.967), JYO 90 (r=0.967) and JYO120 (r=0.935). Similarly, BY0120 correlates with BYC 60 (r=0.839) and CYO 60 (r=0.834). BYC 90 correlates positively and significantly with BYC 120 (r=0.904). BYC 120 with JYC 120 (r=0.887). CYO60 correlated significantly with CYO90 (r=0.942), and JYO120 (r=0.910). CYO 90 also correlated significantly with JYC 120 (r=0.883). And CYO120 correlates significantly with CYC 120 (r=0.887), CYC 90 (r=0.942). CYC 90 has a

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significant association with CYC 90 (r=0.883). These correlation results for our Mild Intellectual Disability (MID) patients at the Centre A.D.A. R-Tubahoze were close to the results of Arramon et *al,* (2023:2-8) in their research on the practice of motor dissociations exercises, which had enabled them to significantly improve their motor skills (balance, jumping, coordination, manual speed and precision) and their spatial functions (mental rotation and visuo-constructive praxis), as well as their self-perception (perceived body appearance), leading to moderate sizes with min. d = 0.549 and p = 0.048; max. d = 0.883 and p = 0.001.

5.2. Cognitive dimension and spatial organisation of people with intellectual disabilities

With regard to the results of the cognitive dimension, on a score of 10 points for the test of imitation of simple gestures of hand movements, in patients tested at the ADAR centre the following statistics were observed: an average of 8.80 points with a standard deviation of 0.49, a minimum of 7.5 points and a maximum of 9 for this test. At the same score of 10 points, for arm movements an average of 7.08 points with a standard deviation of 1.74 was recorded for this test, but we see the NO patient with more points than the others on this arm movement score, i.e. 8.5 out of 10 points, and ML and UJ who come last with 5 points each. The Piaget's Head test of latero-spatial organisation was evaluated at a score of 40 points, all the patients in this test scored 31.5 points with a standard deviation of 5.29 points, from this test *NO* and *UD* each scored 35 points as the highest scores in this test and *ML* came last with 21 points out of a score of 40 points. Speaking of the spatial structuring test on the score of 72 points, the average of 43.33 points was obtained with a standard deviation of 8.58. In this test, the *UD* patient came top with 54 points out of 72 and *ML* and the *NO* patient with a minimum of 35 points. These results are probably close to those of Dirani (2005:2) who used the Battery for the Evaluation of Cognitive and Social Development (BECS) in the field of cognitive development to adjust patients with psychomotor and psychic disorders who scored 71.42% positive. Similarly, Maass et *al*, (2014:3-8) and Feuillerat, (2006:48-56) found that 81% to 100% of patients with visuo-spatial dyslexia due to an oculomotor defect affecting prehension, exploration and visual strategies were positively positioned for left-to-right recognition on their self after psychomotor therapy sessions.

5.3. Affective dimension and self-perception of people with intellectual disabilities

The results of our work on the affective dimension of the dominant modality "*Rather true",* was observed that with items 12, 16, 20 and 24 of self-esteem, with physical appearance with respect to items (5,10,18 and 22) and items 5 and 9 and then items 17, 13 and 1 of athletic competence ; items with a *"Rather positive"* modality including items 11, 3 and 23, 7, 15 and 19 of our MID patients that a positive trend on the appreciation was observable for some patients and that a negative trend was also noted for some patients after the psychomotor therapy sessions at the A. D.A.R-Tubahoze centre. Our research results come close to those of Granjon, (1951) cited by Maass et *al*, (2014:3-8) in the context of psychomotor sessions with spatial organisation with dyslexic patients which concluded with a positive achievement followed by the results of the researcher Anna et *al,* (2016: 1365) on perception of physical appearance, motor competence and athletic competence confirmed that the implementation of psychomotor therapy sessions is necessary, as it created the conditions necessary for the development of patients, both in the motor and socio-affective domains. However, significant changes can only occur when the intervention lasts longer than two months, so that there is sufficient time for all the necessary psychomotor changes to take place. So that all the necessary psychomotor adjustments can take place smoothly and effortlessly.

5.4. Strengths and limitations of the study of psychomotor therapy for people with intellectual disabilities

From the survey on the appreciation of our MID (Mild Intellectual Disability) patients and those of their supervisors in the context of the affective dimension of psychomotor therapy, at the beginning of the therapy sessions ; some patients showed a reluctance to feel pleasure or have fun doing psychomotor exercises since 4 out of 6 patients said NO, whereas when we continued the sessions, 4 out of 6 patients answered YES that they had positively improved their motor skills thanks to the psychomotor therapy exercises and wished they could have continued with the psychomotor therapy exercise sessions in their residential centre. As regards the supervisors' appreciation, 6 out of 6 clearly answered with YES that they would have appreciated psychomotor therapy and that they would recommend the same practice to other people, shelters for the disabled and to the Rwandan population in their life systems in general. This information provided by the present work in terms of the strength of psychomotor therapy with people with intellectual disabilities does not depart from the idea of Simons, (2014: 8-10) informing that psychomotor therapy has the strength of stimulating and integrating motor, cognitive and affective skills as inherent aspects of human behaviour, thus enabling the disabled to react autonomously in their own psychosocial context and he had added that psychomotor therapy focuses on the somatic effects of physical activity (at the morphological, muscular, cardiorespiratory, metabolic and motor levels) and on the physio-psychological

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effects as a central element of the treatment. Based on the wish and observation of our MID (Mild Intellectual Disability) patients and even their supervisors on the continuity of psychomotor therapy in Rwanda, as much as they wish it; Santos, (2017: 22-37) adds that psychomotor therapy has strengths; but also limitations and weaknesses that require valid psychomotor screening and assessment instruments; to collect information that will guide the psychomotor therapist in his intervention with precision in order to identify the targets of the intervention, to allow the communication of the results and the development of an appropriate psychomotor intervention adapted to the patients.

6. CONCLUSION

Our research was carried out among intellectually disabled patients at A.D.A.R-Tubahoze centre in southern province of Rwanda, is a preliminary study on the applicability of psychomotor therapy using body schema, with a view to integrating this therapeutic approach into health and education policy in Rwanda. Our study focused on the central theme of "*Psychomotor therapy using body schema for the intellectually disabled at the A.D.A.R-Tubahoze centre*". At the end of the verification of the hypotheses by the methodological approach adopted on the present study on the motor dimension, the cognitive dimension and the affective dimension; it was found that with the motor dimension on the balance test, a trend on the performance of our intellectually disabled patients from A.D.A.R-Tubahoze centre during the psychomotor therapy sessions was tested positive in the post-test compared to the pre-test (BYO and BYC).With regard to the coordination test (CYO and CYC) at post-test and pre-test, the statistical frequencies with overall averages show that our intellectually impaired patients tended to obtain better results at post-test than at pre-test; this shows a success in the applicability of motor therapy to coordination disorder in intellectually impaired patients. Similarly, a positive performance trend was shown in the results of the jumping test at post-test than at pre-test. The trend in the results of the jump test (JYO and JYC) in the post-test than in the pre-test would have shown a positive result after our therapeutic-motor sessions with the IDs of the A.D.A.R. centre. From the cognitive dimension, using the test of imitation of gestures and lateral-spatial on different movements, has a score of 10 points in the test of imitation of simple gestures of hand movements, it would have been observed in MID patients that the test proved positive; with the Piaget's Head test of latero-spatial organization administered to MID which was evaluated at a score of 40 points, had as a positive performance to all patients who took this test. The results of our work on the affective dimension of the dominant modality "Rather true", was observed on items 12, 16, 20 and 24 of self-esteem, with physical appearance vis-à-vis items (5,10,18 and 22) and items 5 and 9 and then items 17, 13 and 1 of athletic competence; from items with a "Rather positive" modality with items 11, 3 and 2 3, 7, 15 and 19 of our MID patients that a positive trend on positive appreciation was satisfactorily observable.

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